

**THE STAKEHOLDERS' RELATIONSHIPS AND THE  
FORMATION OF ENVIRONMENTAL INEQUALITIES IN THE  
VALDIVIA PLANT, LOS RIOS REGION, CHILE: A CASE  
STUDY OF ENVIRONMENTAL INEQUALITY**

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## **ABSTRACT OF THE THESIS**

The stakeholders' relationships and the formation of environmental inequalities in the  
Valdivia plant, Los Rios region, Chile: a case study of environmental inequality

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Much of the literature on Environmental Justice documents if a community suffering from an environmental hazard is non-white or low-income, ignoring the community's context and relationships between them. These relationships reflect the formation of environmental inequality as the continuous shaping and shifting alliances between multiple stakeholders. By following Pellow's model of Environmental Inequality Formation (2000), this thesis investigates the role that different stakeholders play in the formation of Environmental Inequalities by looking at the events that conforms the Valdivia Plant's Cruces River pollution, in the Valdivia province, Los Rios region, southern Chile. This thesis was conducted using a qualitative method and case study approach to review the case literature and to gather, code, and interpret secondary sources of information, including archival records and historical documents in the written form of news and texts. The information about the Valdivia plant case was gathered between

1994 and 2007. The results from this thesis show that the stakeholders involved in the case study participated actively and influenced the formation and avoidance of Environmental Inequality, stepping away from traditional assumptions of a “perpetrator-victim” scenario where vulnerable communities are passively bearing the pollution. Accordingly, this thesis also examines the different outcomes that stakeholders can achieve, by comparing the Maiquillahue Bay and the Cruces River stories of success and failure regarding the pollution and environmental inequality coming from the Valdivia Cellulose Plant. Moreover, the purpose of this thesis is to identify the broader causes of Environmental Inequality, moving beyond the common race/class explanations, and looking for structural and local forces that may explain the Environmental Inequality phenomenon. Future research directions in EJ studies should aim to incorporate the multistakeholder perspective when looking for the causes of environmental inequality, and to further research locals’ active resistance to environmentally unequal situations.

**Keywords:** Environmental Inequality, Stakeholders’ relationships, Environmental Justice.

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## CHAPTER 1. INTRODUCTION

The Environmental Justice social movement and body of literature (EJ) studies, fights, and documents the excessive ecological hazard exposure that vulnerable communities face near their neighborhoods, schools, and workplace (Bullard, 1996). According to Mossa and Ramia (2014), the EJ term may mean one of two things:

1) a movement that focuses on the fair distribution of benefits and burdens. 2) an interdisciplinary body of social science literature that includes theories of the environment, theories of justice, environmental law and governance, environmental policy and planning, development, sustainability, and political ecology (Moosa & Ramia, 2014:62).

Both terms became relevant in the 1980s. The Environmental Justice social movement started in 1982 when civil rights activists gathered to stop the dumping of more than 120 million pounds of contaminated PCBs in Warren, North Carolina, a county inhabited by a large African American population (Newton, 1996). Soon after, EJ studies emerged as an interdisciplinary endeavor in which scholars, activists, and scientists documented the uneven impacts of pollution on society. These studies concluded that people's race and socioeconomic position play a fundamental role when looking at how exposed they are to higher loads of environmental hazards that come from air, water, and soil pollution, as an outcome of industrialization and consumer practices (Pellow et al., 2001). The phenomenon became well-known as *environmental racism*, *environmental inequality*, or *environmental justice*; all concepts that have informed environmental politics, public policy, and social theory (Pellow, 2000). Scholars looking at Environmental Inequality document spaces of discrimination, where inequities are not random events, but instead,

they are the "consequence of official public and corporate policies that could either be conscious and deliberative or unconscious and responsive to other dynamics" (Been, 1993; Kaswan, 1997).

While there is a correlation between race and class with the unequal exposure to environmental hazards, some EJ scholars discuss that the appearance of Environmental Inequalities is not merely understood as an imposition that comes from a privileged class/race of people over another; instead, its appearance is constituted through a process of continuous change, actions, and resistances that shape and reorganize social and environmental disparities along the way (Pellow, 2000; Mohai et al., 2009). This paradigm is highly relevant considering that much of the Environmental Justice research only documents if the community suffering from an environmental hazard is less powerful, non-white or low-income, ignoring the community's context, dynamic, inputs, relationships, and outcomes with other actors involved (Pellow, 2001).

Moreover, EJ researchers analyze case studies and historical patterns to provide a more contextual understanding about why Environmental Inequalities arise in the first place, while also examining the incipient organizations that might challenge this phenomenon (Mohai et al., 2009). These considerations are intended to reveal the driving forces that work against the cause of Environmental Justice, including not only economic factors or discriminations towards vulnerable communities, but also local interests, alliances, and divisions between various stakeholders that negotiate throughout the process of formation of environmental disparities (Pellow, 2000).



According to Pellow et al. (2001), the importance of looking at the context of Environmental Inequality Formation is based on the fact that unjust outcomes are more than the presence or absence of hazards in the territory. These outcomes occur when:

Different stakeholders struggle for access to valuable resources within a political economy in which the benefits and costs of those resources, such as clean air and working environments, power, wealth, and status, become unevenly distributed. [This is revealed] when stakeholders who are unable to mobilize resources are more likely to suffer from environmental hazards, and the stakeholders with more access to resources can divest other stakeholders from the same access (Pellow et al., 2001:428).

This thesis examines the importance of these relationships by looking at the role that different stakeholders play in the formation of Environmental Inequalities in the context of the siting of the Valdivia cellulose plant or “Valdivia Plant” in the Valdivia province in Los Rios region, southern Chile. More particularly, this thesis studies the different events, within the same case study, that illustrate the different environmental outcomes that arise when different interests and relationships between stakeholders reveal result in unevenly distributed resources.

The review of events starts in 1995 when the cellulose plant investment project was submitted to the environmental authorities by the CELCO - Arauco company S.A. (CELCO), a multinational forestry company located in Chile and other countries of South America.

Multiple stakeholders intervened to modify the location of the plant's effluents because of the proximity of the plant to a protected Nature Sanctuary and wetland located 32 km downstream of the effluents' stationary point. The location of these toxins started a conflict between the communities, the state and the company between 1995 and 1999.

The environmental authorities asked CELCO to move them to the sea and into the Maiquillahue Bay, a fishing cove that resisted and successfully avoided the siting of a proposed pipeline that would travel all the way from the Valdivia plant, located in Mariquina to the Bay's territory, 50 km to the shore. The company and the state, both short on alternatives, settled to dump the effluents into the Cruces River, despite the alarm concerning the proximity to a protected Sanctuary and wetland.

Following events, including the actual siting of the Valdivia plant in Mariquina and the contamination of the Cruces river, were reviewed between the years 2004 and 2007 to pay attention to the process of formation of Environmental Inequality. During these years, and as a result of the contamination of the Cruces River, a citizens' movement was formed to claim justice in the name of the environment and the people from the Cruces River basin. Moreover, this movement, called "Acción Por Los Cisnes" (AXC), was named after the black-necked swan, an emblematic bird species that disappeared from the Nature Sanctuary and wetland located in the river only four months after the plant started its operations. During these years there is an avid conflict surrounding the responsibility of CELCO and the Valdivia Plant for the death and migration of these birds from the basin.

The case study is approached adopting the Environmental Inequality framework postulated by Pellow (2000), in which he examines the stakeholders' relationships and their active participation in the avoidance or production of environmental inequalities. This framework also includes a "multistakeholder perspective" (Pellow, 2000), which notes that:

Environmental inequalities are not always imposed unilaterally by one stakeholder on another, but rather, like all forms of inequality, [they] emerge through a process of ongoing change that involves negotiation and conflict among many stakeholders (Pellow, 2000:592).

This perspective also pays attention to the position of each of these stakeholders and their levels of influence and power dynamics in the case study. This thesis goal is to critically examine the role of the involved stakeholders departing from conventional accounts of Environmental Inequality where particular social groups are disproportionately burdened by environmental hazards (Bullard, 1996).

In this context, class and political clout are important because they often place specific people in a position of power over others to benefit from the production of environmental inequality (Newton, 1996). The tensions generated by their different background and interests are significant because the relationships between stakeholders and their resistance practices can produce or avoid pollution and the siting of hazardous facilities across different geographical spaces when shifting these power and political dynamics (Skewes & Guerra, 2004; Hurley, 1995; Walsh et al., 1997). Moreover, under Pellow's framework (2000), social inequalities go further than class or race and considers other explanations about the causes of environmental inequality, such as the unequal access that certain vulnerable groups may have to political decision-making processes in environmental policy (Camacho, 1998), or the uneven access that they may have to scientific knowledge (Agyeman, 2005; Walker, 2010). This is the case of most of Latin America's EJ struggles, where trade policies and the opening to market economies affect the environmental arena and reveals who benefits and who absorbs the costs (in the form

of pollution) of economic expansion, which relates to notions of EJ struggles but that also Political Ecology (Newell, Contesting trade politics in the Americas: The politics of Environmental Justice, 2008), a theoretical approach that studies how political economy impacts local environments (Bryant R. , Political Ecology: A critical Agenda for Change?, 2001). More particularly, “these studies are sensitive to the interplay of diverse socio-political forces and their relationship to environmental change,” (Bryant, 1992:14) which also related to the outcomes that result from the stakeholders’ characterization and relationships. In this thesis, these relationships are important because they can inform about the different outcomes and resistance practices that appear when looking at the events that happened in the Maiquillahue Bay and Cruces River basin.

The understanding of environmental inequality as a process allows the involvement of these negotiations, conflicts, and resistance among multiple stakeholders as fundamental in the creation of winners and losers in the conflict (Pellow, 2000). Here, the narrative of environmental justice overlaps with the one of Political Ecology, noting that "Political Ecology focuses on stories of justice and injustice" (Robbins, 2004:87). Both narratives consider the uneven consequence that disempowered communities bear in comparison to others, keeping in mind this as a continuous, shifting, or repetitive process. Nonetheless:

While Political Ecology extends the notion of justice and injustice to the environment itself, the environmental justice framework attends specifically the dynamics regarding the location of environmental hazards, and the tendency of minority communities to expose to toxic dumping (Robbins, 2012:87).

In his multiple stakeholders' perspective, Pellow (2000) explains that Environmental Inequalities not only occur as a result of poor people or people of color being dumped on

or exposed to hazards because they do not have power in comparison to a company or the state (Pellow, 2000:587). The race/class reasoning may be usually correct, but overly simplistic of important details such as the role that the stakeholders' interests play in producing environmental inequality or the significant variabilities that these inequalities may represent across different places, as “*no two environmental justice struggles are the same*” (Pellow, 2000). At the same time, power dynamics and difference across these geographical spaces can reveal structural or local forces that help to produce Environmental Inequality.

### **Research question and hypothesis**

Following the previously noted research problematic, the primary research question of this thesis will aim to answer the following question: "How did the stakeholders' relationships produced Environmental Inequalities in the Valdivia plant case study"?

This question is answered by addressing the following sub-questions:

- Who are these stakeholders and what do they want?
- How do these stakeholders negotiate different environmental outcomes in the case study?
- How do environmental inequalities unfold as an outcome of these stakeholders' relationships?

### **Objectives and hypotheses (H)**

The first sub-question allows us to unpack the motivations and behaviors of the stakeholders involved in the environmental conflict. This question aims to realistically

characterize the identified stakeholders without reducing them to "poor rural communities against multibillionaire international corporation," recognizing the shifting power dynamics that these may present in the case study.

H1: The stakeholders in the conflict are not involved in a simple “perpetrator-victim scenario”. Instead, they have power and participate actively in the events portrayed in the case study.

The second sub-question focuses on the different social and geographical composition between the citizens’ movements from the Maiquillahue bay and the Mariquina/Valdivia city. This question addresses the factors that influenced the avoidance and production of environmental inequality in the Valdivia plant case study.

H2: The avoidance and production of Environmental Inequalities are the result of negotiations and conflicts between the stakeholders involved in the case study.

The third sub-question considers Pellow's understanding of Environmental Inequality, which is produced when “different stakeholders struggle for access to valuable resources within a political economy in which the benefits and burdens of those resources become unevenly distributed,” and identifies these unevenly distributed resources to understand the structural and local forces that contribute to the formation of Environmental Inequality (Pellow et al., 2001:428).

H3: The outcomes that result from the stakeholders' relationships and their struggles over resources in the Valdivia plant case study reveal the structural and local forces that produce environmental inequality.

The inclusion of these three sub-questions contributes to the understanding of the causes that produced Environmental Inequality.

### **Outline**

The outline of this thesis follows Chapter Two, which provides the theoretical and conceptual framework used in this thesis, incorporating EJ definitions and theories to discuss the production of environmental inequality in the "Valdivia plant" case study. This chapter further presents the approach that is used in the analytical section of this thesis. Chapter Three presents the study area, and the background of the events that conforms the Valdivia plant case study. Chapter Four discusses the methodology and research design. Chapter five presents the results of this thesis. Chapter six contains the discussion and analysis of the findings regarding the theory presented in chapter two. Also, in this chapter, the research questions and hypothesis presented in chapter one is answered. Chapter Seven contains the conclusion and recommendations of this thesis.

## **CHAPTER 2. LITERATURE REVIEW: ENVIRONMENTAL JUSTICE THEORETICAL FRAMEWORK**

This chapter serves to explore the Environmental Justice theoretical framework that was used to understand the role of the stakeholders' relationships in the production of environmental inequalities in the Valdivia plant siting case study. This framework also includes a brief review of EJ studies in Chile, which includes an examination of Chile's marked history of neoliberal policies and environmental conflicts. The chapter begins with a critical examination of core EJ concepts, including definitions, theories, and justice claims, accompanied by an extensive review of the literature, which focuses in the causes and process of production of environmental inequality. Additionally, this literature review includes previous findings and methods to approach the problematic and the identification of knowledge gaps in Environmental Justice studies.

### **EJ definitions**

There are many terms used in EJ to describe occurrences like the one happening in the Valdivia plant siting. In the case study, it is possible to see a link between the geographical location of the plant/toxic waste disposal system with the social composition of the nearby communities, which are mostly constituted by indigenous communities and poor people, making of it a case of interest to EJ studies.

However, is this case related to environmental racism, environmental inequality or environmental justice? Considering how unclear these concepts can be, the first task of



this literature review is to define these terms to have a shared understanding of the ideas that are sometimes used so casually in Environmental Justice studies.

The definitions of Environmental Racism, Environmental Inequality (or Equity) and Environmental Justice are provided by Bunyan Bryant (1995), who defined environmental racism as the deliberative targeting of communities, such as black or ethnic communities, for least desirable land uses, resulting in segregated exposures to environmental hazards (Bryant, 1995).

Moreover, the term "Environmental Justice" was defined by Robert Bullard, as a principle to be followed, noting that "all people are entitled to equal protection of environmental and public health laws and regulations" (Bullard, 1996). Environmental Justice, as a principle, focuses on research programs that attempt to detect the existence of environmental racism or environmental discrimination, to uncover the reasons that explain these practices and promote the enforcement of existing or new laws that are needed to eliminate overall discrimination (Newton, 1996:5). Communities in which Environmental Justice prevails are "culturally and biologically respected, supported by safe jobs, health care, and democratic decision-making processes" (Bryant, 1995:6). However, the EJ body of literature mainly reveals unjust situations where "people of color and low-income persons carry out greater environmental and health risks in comparison to society at large in their neighborhoods, workplaces, and playgrounds" (Bullard & Johnson, 2000:558).

Moreover, Environmental Inequality studies the unequal protection of environmental laws and expands on how rules "should be enforced equally to ensure the proper siting, clean-up of hazardous waste, and the effective regulation of industrial pollution, regardless of the racial and economic composition of the community" (Bryant, 1995:6).

This thesis frames the Valdivia plant case study within the "Environmental Inequality" definition, because the case considers issues of unequal access to decision-making processes and environmental protection, in which discriminating actions are not particularly evaluated.

According to David Pellow, Environmental Inequality phenomenon is a process (Pellow, 2000). This term is further explained in his work on "Environmental Inequality Formation" or EIF model, where he mentions that "Environmental inequality focuses on broader dimensions of the intersection between environmental quality and social hierarchies. It addresses structural questions that focus on social inequality and environmental burdens." (Pellow, 2000:582). Considering this definition, the author emphasizes that, unlike environmental racism, environmental inequalities include any type of hazard that impacts any particular social group (Pellow, 2000).

Consequently, Environmental Justice's various definitions acknowledge that "the cost of pollution and environmental protection is unevenly distributed in our society" (Edwards, 1995:36). EJ studies not only consider the disproportionate siting of hazardous waste sites, incinerators, landfills, polluting industries, and facilities (Bryant, 1995; Bullard R. D., 1990; Bullard R. D., 1996; Bullard & Johnson, 2000; Mohai & Saha, 2007); but also

look at inequality in the application of environmental laws and standards in vulnerable communities, including studies that document the lack of environmental enforcement in vulnerable groups of people (Pellow et al., 2001). These studies also acknowledge the need to achieve more recognition, participation, capabilities, and overall justice for people. These terms are addressed in the next section of this chapter.

Among the many definitions that EJ may present, David Schlosberg mentions that there are knowledge gaps when studying the connection between Environmental Justice theory with the environment itself (Schlosberg, 2013). In "*Sustainable communities and the challenge of Environmental Justice*," Agyeman argues that Environmental Justice should go beyond socio-cultural impacts alone to incorporate the interactions that exist between social and environmental communities. This, in the case study context, would have been a good starting point to connect the citizens' movements' formation with the death of the black-necked swans in the Valdivia plant case study.

Moreover, Agyeman argues that the ecological damage done to ecosystems can lead to greater vulnerabilities to human and non-human communities (Agyeman, 2005), so further EJ studies should include these linkages in the study of environmental inequalities. In an interview with Laura Pulido, David Pellow also recognized the struggle between the notions of Environmental Justice and "*ecological justice*." Pellow mentioned that while the former is more human-centered, the latter opens up ways of thinking about the world as "*multispecies societies, communities, and politics*" (Pulido, 2017:46).

Ecological justice, as discussed by Pellow, should be fully included in the definition of Environmental Justice because it incorporates a respectful engagement to think and achieve justice for multiple species, through more democratic practices (Pulido, 2017).

### **Theories of justice in Environmental Justice**

One of the objectives of this thesis is to understand the different environmental outcomes presented in the Valdivia case study. To move on this direction, it is important to review the different justice claims that resistance groups exercise when perceiving injustice in their environments.

Most claims developed in Environmental Justice cases are rooted in the expectation of distributive justice (Bryner, 2002). While this understanding is pertinent in Environmental Justice studies, they focus on a conception of justice that is defined only as "the distribution of goods in a society, and the best principles by which to distribute those goods" (Schlosberg, 2007:3). The second form of justice, known as procedural justice, pays attention to the political process and the fairness in the decision-making process (Kaswan, 1997).

Environmental justice scholarship mostly deals with claims about distribution (Schlosberg, 2007), but there are further ways of understanding the processes of justice and injustice. These processes incorporate notions about the development of maldistribution, and highlight the need to achieve social recognition of various cultures and races, as a pivotal element to reach a just outcome (Fraser, 1996). Additionally, some theories point that justice looks for a real inclusion and political participation from

various people, with a broad array of interests (Hunold & Young, 1998). Other authors argue that justice is achieved once these communities are empowered and have the capacities that are necessary for them to reach their full potential in life (Nussbaum, 2011).

Moreover, Young and Hunold illustrate the importance of distributive and procedural justice in an analysis of case studies of polluting waste sites in the US (Hunold & Young, 1998). In their work, the notions about distributive equity are central. These authors argue about who has the right to make a decision and by "*what procedures?*" criticizing that many times distribution and equity assume just institutions, which, as we see in the Valdivia plant case study, is not always the case.

Moreover, Hampton (1999) discusses the necessity of the stakeholders' involvement in the decision-making process to achieve equity. He also argues that "the promotion of environmental equity requires the provision of conditions and resources that can enable communities to freely express their opinions" (Hampton, 1999:165). Hampton goes further and mentions that people should count with the procedural opportunity to make their values explicit, participate, and have an impact in policy to encourage a sense of justice in the community (Hampton, 1999). Other authors, such as Cable, Mix, and Hastings, look at EJ as the study of excessive hazard exposure, according to class and race, and state that "the goal of the Environmental Justice is equitable distribution." Nonetheless, they highlight the importance of respect, recognition of local expertise, and participation (Cable, Mix, & Hastings, 2005). These claims are common when

communities react and contest an already sited polluting facility (Capek, 1993), which is the case of the Valdivia and Mariquina communities.

However, and as this thesis argues, justice claims are not always founded on participation claims. Peña argues that Environmental Justice is about autonomy above all else (Peña, 2005). Autonomy, according to the author, is the essence of Environmental Justice studies because it allows communities and local cultures to claim control over their territory by "exercising freedoms to organize their production and consumption in sustainable and equitable patterns that derive from self-generated ecologically and culturally appropriate norms" (Peña, 2005:144). These claims were a particularity of the "Sea defense committee" in the Maiquillahue Bay.

### **Multistakeholder perspective in the production of environmental inequalities**

EJ studies that examine environmental inequalities focus on "the broader dimensions of the intersection between environmental quality and social hierarchies" (Pellow, 2000:582). However, as Szasz and Meuser (1997) indicate, most of the literature surrounding Environmental Justice focuses on the unequal outcomes in space, without examining the mechanisms behind them, such as social hierarchies (Szasz & Meuser, 1997). To cover this ground, David Pellow examines the processes and mechanisms behind environmental inequality by analyzing sociohistorical occurrences, multiple stakeholders' relationships, social stratification, like class and race, and resistance practices against toxins and other environmental hazards (Pellow et al. 2001). This framework was created to uncover the underlying assumptions that contribute to the production of differential exposures to environmental hazards. In this offered scenario

and extended Environmental Justice framework, alleged victims shift into active agents in the practices that shape the process of environmental inequalities before, during, and after they emerge, providing new understandings about the production of environmental disparities as a continuous and changing process (Pellow, 2000). To work within this EJ framework, Pellow introduced the "Environmental Inequality Formation" model (EIF) to see how these social relations and patterns influence the production of environmental inequalities (Pellow, 2000).

Pellow considers the involvement of multiple stakeholders in the spatial decision-making process and shaping of environmental inequality as one of three ways to study Environmental Justice as an ongoing process that emerges from different contexts, stories, and scales (Pellow, 2000). In the present thesis this framework is adopted to analyze the actions and outcomes of the stakeholders' relationships and environmental influence in the Valdivia plant case study.

Pellow argues that traditional assumptions about corporations polluting neighborhoods that lack the power to challenge the injustice are not completely accurate. He notes that even if the industry or the government are guilty of committing unjust actions, community leaders, neighbors, and environmentalists are also implicated in the production of Environmental Inequalities (Pellow, 1999; 2000; Pellow et al., 2001).

Studies of EJ issues, such as the ones written by Hurley (1995) and Walsh et al. (1997) prove this by showing how stakeholders can actively negotiate their quality living and environmental conditions. The author developed a theoretical perspective that argues that "when one studies environmental inequality from a multistakeholder perspective, it

becomes clear that environmental inequalities are not always simply imposed unilaterally by one stakeholder on another” (Pellow, 2000:592). Moreover, the author notes that environmental inequality is an ongoing process that involves the complex interests, conflicts, relationships, and negotiations among various stakeholders (Pellow, 2000; 2001; 2017; Pellow et al., 2001).

Who are these stakeholders and what do they want? Pellow is asking the EJ body of literature to expand on the active role that various groups of people play in the formation of Environmental Inequality. This thesis argues that the inequality component moves away from the class and race analysis and examines the broader explanations that influenced the development of environmental inequality in the Valdivia plant case study. Following Pellow’s theoretical perspective about the role of these stakeholders as “active participants,” the role of citizen’s movements will be explored in the Valdivia plant case study, paying attention to the modes of resistance that provided power to the wrongly categorized “weak” population from the Valdivia province. These resistances are very important because they show the different activities that citizens’ movements can do to avoid siting attempts<sup>1</sup> and explore the broader questionings about EJ studies a movements’ efficacy and capacity to achieve Environmental Justice. Moreover, these struggles not only reveal the active role that communities have in Environmental Inequality case studies, but they also uncover the underlying causes that cause inequalities to manifest in the first place.

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<sup>1</sup> To read more on the avoidance of siting attempts see Walsh et al., 1997



### **What are the causes of Environmental Inequality?**

Environmental Justice critiques "mainstream" environmentalists' movements because they leave out social justice components from their environmental protection claims (Sandler & Pezzullo, 2007), and policymakers because they do not consider EJ principles when proposing solutions to environmental problems (Faber, 2007). Conversely, the EJ body of literature and movement is also criticized for not having clarity on what to do after documenting an environmentally unjust situation (Mohai et al., 2009). Despite the clear definition of Environmental Justice issues, there are disagreements regarding their underlying causes and possible solutions. Moreover, there is a lack of studies that look at other dynamics besides race and class (Pellow, 2000).

Stephen Sandweiss (1998) mentions that disagreements like these "seriously threatens the ability of Environmental Justice to achieve the substantive policy changes it is demanding" (Sandweiss, 1998). However, notwithstanding the current difficulties in determining the specific cause of present-day Environmental Inequalities, numerous arguments explain the disparate impacts on why such inequality exists so broadly (Mohai et al., 2009). These alternative explanations to the same unequal outcome help to think about what policies could be useful to improve or end environmental inequality.

Following the same principle, these alternative explanations may also help movements' strategies when considering their claims or demands.

The historical patterns of social inequality and ethnic discrimination in EJ studies are broadly understood to "have a relationship with the conditions produced by the region's insertion into the international economy" (Borg Rasmussen & Pinho, 2016:8). This,

which appears to be too broad, is further elaborated to include that environmental injustice arises from political, economic, and social conditions that impact the poorest and most discriminated and marginalized population (Mohai et al., 2009). These social dynamics in EJ studies are further categorized in economic, sociopolitical, and racial discrimination (Mohai et al., 2009).

The economy's main argument is that the industry is not looking to discriminate racial, ethnic, or poor communities, but instead, is trying to maximize profits and reduce the cost of doing business (Been, 1993). The latter occurs when the industry sits near its raw materials or when it seeks to locate near cheap land, labor, and other resources (Hurley, 2005); all of which could be coincidental to where poor people live (Mohai & Saha, 2007). This scenario can also change after the siting of the facility because the plant could impact residents that may have the financial means to move out, leaving the more impoverished residents behind. Vicki Been discusses that in these cases the socioeconomic status of the neighborhood would decrease, aggravating racial or socioeconomic disparities in the already polluted environment (Been, 1993). Moreover, the emigration of high rent population from these settings can also lower property values, attracting more poor people to move in, further increasing their concentration around contaminated areas (Mohai et al., 2009).

The sociopolitical explanations in EJ studies indicate that the industry and the government seek the path of least resistance when siting new polluting industrial facilities or when dumping hazardous waste disposal (Mohai et al., 2009). Thus, while the industry is aware that many communities could oppose the construction of a polluting industrial

plant, they seek to avoid the ones that are most capable of forming an active opposition by locating near the ones that don't. The lack of resistance usually comes from communities with fewer resources and little representation in the decision-making process, which is primarily guided by the industry or the government (Mohai & Saha, 2007; Mohai et al., 2009).

Questions about power and politics arise in Environmental Justice disputes when communities feel that they are being selected for undesirable territorial uses because of the decision makers' failure to treat that community with the same respect as others (Kaswan, 1997). In the siting of polluting industries context, the politics of Environmental Justice is well studied when looking at the example of the Cerrell's associates report (Been, 1993; Kaswan, 1997). This report was written in the name of the California Waste Management Board (CWMB), and it was called "Political difficulties facing waste-to-energy conversion plant siting" (Cerrell Associates, 1984). In the report, the authors determined that:

All socioeconomic groupings tend to resent the nearby siting of major facilities, but middle and upper socioeconomic strata possess better resources to effectuate their opposition. Middle and higher socioeconomic strata neighborhoods should not fall within the one-mile and five-mile radius of the proposed site (Cerrell Associates, 1984:25-26).

These types of reports show the rationale used to avoid political repercussions from a hazardous siting. This responds not only to class differences but to the political process in which some communities are considered as recipients of hazardous facilities while others are not. Camacho (1998) argues that the power dynamics, in the context of unjust

decision-making' processes, exclude those communities who are weak in comparison to those who are stronger. However, the affected communities are not passive or quiet when confronted with this reality. According to Camacho, impoverished communities can develop "*insurgencias*" when the restructurings of existing power relations happen (Camacho, 1998:19). The instability that occurs when there are shifts in the political and economic landscape disrupts the status quo and encourages collective action by organized groups that feel prepared to contest the new political order (Camacho, 1998). This can work to increase the political leverage of vulnerable communities, thus changing the power relations that they have with more powerful groups surrounding the conflict (Camacho, 1998). In the Valdivia plant case, Sepulveda and Villarroel argued that the accumulation of environmental disputes, which started with the first EIA studies submitted by the company, provoked an institutional breakdown by the end of 2004, which allowed the coordination of social responses in the community of Valdivia to arise (Sepúlveda & Villarroel, 2012). And, even when these insurgencies did not shut-down the cellulose plant, they made visible the structural crisis of legitimacy in the environmental laws and EIA regulation system (Sepulveda & Villarroel, 2012).

Furthermore, while the exposure to pollution and hazardous facilities may not be sufficient to generate the reversal of a siting decision, it can increase the accountability of decision-makers to groups that might have been ignored in the past (Walsh et al., 1997).

EJ scholars have identified patterns to characterize the grassroots movements that have been able to stop the siting of polluting facilities in comparative case studies in the US (Bullard, 1996; Walsh et al., 1997). These studies discovered that the best predictor of

success in stopping polluting facilities included having people with pre-existing social capital, such as education and high-income (Walsh et al., 1997), and communities with elevated levels of organization, despite of their income or levels of education (Mohai & Saha, 2007; Mohai et al., 2009; Skewes & Guerra, 2004).

The racial discrimination explanations expand the previous arguments and include the ethnic pattern in siting decisions (Bullard, 1996). As Mohai and others have mentioned:

Even though overtly racist attitudes and actions may be a thing of the past in public policy circles, current decisions that may seem racially neutral in their face, may nevertheless have discriminatory outcomes because of past discriminatory actions (Mohai et al., 2009:415).

Sociohistorical work has been done to cover these racial discrimination explanations (Pulido, 1996a; Pulido, 1996b), but in general, discriminating acts can be very difficult to prove, especially in legal instances (Been, 1993; Kaswan, 1997; Kaswan, 1997).

These three categories of explanation are not mutually exclusive or comfortable to unravel. For instance, if people of color/ethnic communities are targeted for the siting of a new locally unwanted land use because they are less likely to mount useful oppositions, this does not mean that the industry motives are not also based on racial discrimination (Mohai et al., 2009:415). According to the theories posed by these authors,

Environmental Inequalities emerge as a product of market dynamics, sociopolitics, and racial discrimination, which affects the most marginalized population. These social dynamics generate inequalities that are visible not only because of the existence of hazards and pollution, but because of the unequal access to procedural/political justice,

recognition, participation, and capabilities (Fraser, 1996; Hunold & Young, 1998; Nussbaum, 2011).

Among other explanations concerning the causes of Environmental Inequalities, Pellow noted that environmental Justice activists use a "political-economic frame" to assign blame and look for the causes of their environmental problems in a study about consensus-based decision-making (CBDM) (Pellow, 1999). The frame consisted of claiming that the state and the industry colluded to produce the increasing ecological and economic injustices against vulnerable communities, while these same fragile communities were allowed little or no participation in the decision-making process that produced the ecological or economic degradation in the first place. The framework was also criticized for considering the health of the economy and the stability of the environment as the same thing (Pellow, 1999).

Even when considering this frame to explain the existence and understandings of environmental inequalities, EJ studies show that the causes of inequality can be more textured and complex, especially bearing in mind the role that environmental institutions play in the production of ecological inequalities. Considering the events surrounding the Valdivia plant case study, this thesis argues that the resources that are being fought over includes the access to democratic decision-making in environmental policy, laws and regulation, and the access to scientific knowledge production in environmental impact assessment studies. This responds to studies done in EJ, such as the work of Bullard and Johnson (2000), which shows that environmental protection and regulation apparatuses can sometimes reinforce and create inequality in the environment (Bullard, 1996). These

authors' dominant paradigm notes that the current environmental protection policies, far from protecting people, exist to manage and regulate the distribution of risks, resulting many times in the following:

Institutionalized unequal enforcement; trade of human health for profit; burden of proof on the "victims" and not on the polluting industry; legitimacy of human exposure to harmful chemicals, pesticides, and hazardous substances; promotion of "risky" technologies; exploitation of economically and politically disenfranchised and vulnerable communities; incentives to ecological destruction; creation of an industry around risk assessment and risk management; delay in cleanup actions; and failure to develop pollution prevention as the overarching and culminant strategy. (Bullard & Johnson, 2000:558).

This situation is also stated by Kaswan, who mentions that environmental and land use laws provide fewer ecological benefits and worsen the ecological conditions of vulnerable communities (Kaswan, 1997). The author comments that this may happen because environmental regulations fail to consider the distributional consequences and effects on the population, serving to the wealthy better than they serve the poor (Kaswan, 1997). This last point is taken by Lazarus (1994), who discusses the ways in which environmental strategies assist, or harm, communities in different ways. He firstly claims that national environmental laws, which pursue the reduction of ambient levels of pollution, fail to address the concentrations of pollution to which vulnerable groups are exposed. An example is waste disposal, since this is moved and concentrated in few places, such as landfills, impacting some communities in disproportionate ways. The second point argues that well-off communities have more means to access environmental laws and goods, exacerbating the different ecological conditions (Bullard & Johnson, 2000). This point, well discussed by Kaswan (1997) talks about how affluent

communities have the resources to participate in environmental proceedings, such as the hiring of experts to analyze documents, participate in public hearings, or suing decision-makers more easily in comparison to vulnerable communities (Kaswan, 1997).

Other aspects regarding environmental laws and regulation in EJ studies are discussed by Bryant (1995). In his book "*Environmental Justice*," the author argues that "because of immediate demands for certainty and solution embodied in issue-oriented research, scientists often find themselves in a position of not knowing more than those affected" (Bryant, 1995:15). In this context, the scientists that produce the EIA risk assessment studies are not 100% sure about the risks and usually venture into uncertain decision-making. Meanwhile, the community affected by uncertainty is rarely a part of that decision-making process (Bryant, 1995). In EJ studies, the scientists that produce knowledge about environmental risks are well-examined (Corburn, 2002). According to Bryant (1995), knowledge production is treated as a commodity, which can be purchased in the market by the highest bidder (Bryant, 1995). He argues that while science tries to be neutral, it falls, under the social control of powerful forces, to use science under certain narratives that are more beneficial for some interest groups, in detriment of others. This point is also shared by Bailey et al. (1995) who argues that environmental authorities and industrial interests:

Usually attempt to protect themselves by founding their decision on objective criteria and the rational logic of risk assessment studies. However, scientific criteria and logic often ignore the disproportionate burden of environmental and human health risks imposed on minority communities (Bailey et al., 1995:38).



Moreover, a critique coming from EJ studies points to the fact that grassroots organizations rarely have equal access or influence to publish their local knowledge, having to educate the public in the streets, or accessing other non-academic platforms to socialize their knowledge (Skewes, 2004). Some of these critique extends to universities, which could promote and encourage faculty members to involve in local communities' EJ problematics (Bailey et al., 1995).

The Valdivia cellulose plant may present other explanations to the production of Environmental Inequality, including the procedural uncertainty in the EIA system, which is also criticized by the EJ literature. As Bryant (1995) and Bailey et al (1995) mention, EIA studies and environmental regulations leaves the general public out of the most important stages of the decision-making process, which usually include the negotiated risks, the location of the hazardous facility, and other technical aspects. At the same time, even when the community participates in the EIA process, this participation only happens after the project is already outlined, and its claims have to be based on scientific and non-sentimental arguments (Garcia et al., 2006).

### **Looking at Political Ecology for an explanation**

While taking the task of critically studying human-environment relations, the Political Ecology field of study has reached a respectable position in geographical scholarship ever since Eric Wolf (1972) first coined the term. Since its beginning, Political Ecology studies have analytically assessed how the least powerful groups in society inhabits the most hazardous environments (O'Keefe et al., 1976); and how this relates to the insertion to the global economy and capitalist dynamics (Watts, 2000).

In the global context of neoliberal capitalism, the causes of Environmental Inequality can be concealed behind social relations, capitalism, and the social construction of what constitute “the environment” (Bryant R. , 1998). The Political Ecology approach can uncover these inequalities by studying political economy, marginalization, social constructionism, and social relations, all of which are relevant as underlying causes of environmental injustice (Bryant & Bailey, 1997). The approach also provides a larger social and political economic framework to the situations occurring in the study area, including the role of neoliberalism in the marginalization of rural or indigenous communities, and their exposure to hazardous facilities (Sundberg, 2008). As Budds comments, “the emphasis [of Political Ecology] has been placed on both plurality of explanation rather than cause and effect, and in the shift from a positivist to an interactionist approach” (Budds, 2004).

Moreover, as the extended Environmental Justice framework has evolved to consider broader explanations to inequality in the environment, it has also informed Political Ecology studies (Swyngedouw & Heynen, 2004). According to these authors, even though Environmental Justice lacks a strong theoretical framework, Political Ecology often fails to be applied in real social and environmental problems, so they complement each other because the practical characteristic of EJ studies are able to enrich the Political Ecology field beyond practicality (Swyngedouw & Heynen, 2004).

More particularly for ‘third world countries,’ justice issues are commonly linked to class inequalities, human rights, property rights, local or indigenous knowledge, and so on (Blaikie, 1995; Bryant & Bailey, 1997).

Debates associated with inequality and justice are not new in the Political Ecology field, which studies marginalized people, the environment, and geography (Robbins, 2004; Schroeder, St. Martin, Wilson, & Sen, Third world environmental Justice, 2008).

Moreover, the theories that shape the field have social justice concerns at their forefront, especially in publications such as “Liberation Ecologies” (Peet & Watts, 1996) and “The Environmentalism of the Poor” (Martinez-Alier J. , 2002), where these authors argue, between many other points that “development can only occur when the people it affects participate in the design of the proposed policies, and the model which is implemented thereby corresponds to the local people’s aspirations” (Statement by the Coordinating Body for the Indigenous Organizations of the Amazon Basin, 1989, in Peet & Watts, 1996:29); and where the “environmentalism of the poor” struggles contest risk allocation and the unequal distribution of gains from resource exploitation (Martinez-Alier 2002).

Furthermore, studies coming from the Political Ecology field also look at the social construction of the environment itself, looking at it as more than just an objective entity, and as perceived differently across scales, geographies, time; and subsequently being constructed according to different positionalities, and mobilized through different voices and discourses (Blaikie, 1995). Either way, the Political Ecology field starts from the premise that these environment (and their different understandings and definitions) are conformed through a political process (Carvalho, 2007), and that “environmental issues are inherently politicized and cannot be understood in isolation from the political and economic contexts within which they are produced” (Budds, 2004).

As Budds explains, the political and economic context, in the form of social and political power structures, is reviewed as the underlying processes that explain myriad environmental implications, such as the allocation of natural resources, and the marginalization of 'weak' social actors (Budds, 2004), for which a Political Ecology approach to explain the underlying causes of Environmental Inequalities can be of use.

### **Environmental Inequalities in Latin America and Chile**

The narratives and stories about social justice and environmental well-being have come together in different settings (Carruthers, 2008). Environmental Justice has developed outside of the US, and all over the world, as an essential part of the "popular environmentalism" (Carruthers, 2008). However, its emergence and development are slightly different. For instance, there is a lack of studies documenting the disproportionate environmental burdens in poor, indigenous, urban, rural, and black communities in Latin America (Sundberg, 2008).

Moreover, regardless of the rapid growth of industrial production and associated hazards, there is limited access to data to test the relationships between ethnicity, class, and the exposure to the myriad environmental risks (Carruthers, 2008; Cifuentes & Frumkin, 2009). There is also limited funding for research and activism since community groups experience a severe lack of resources, which implicate that environmental groups are less able to advance their agenda, relying more on denunciation and defense (Kelly, 2002).

The EJ body of literature in Latin America has become a unifying banner of reflection and mobilization (Carruthers, 2008; Porto, 2012). The field has brought up to the fore stories and experiences of struggles that come from diverse individuals, communities,

and entities. These include grassroots movements, environmentalist, scientist, among others (Carruthers, 2008).

The historical patterns of social inequality and ethnic discrimination in the region are broadly understood to "have a relationship with the conditions produced by the region's insertion into the international economy" (Borg Rasmussen & Pinho, 2016:8). The latter means that the distribution of conflicts arises from political, economic, and social conditions that impact the poorest, most discriminated and marginalized population of the region (Newell, 2008). The latter is highly related to the extractive nature of the economy in third world countries, which has allowed the export of risks to nations that have weaker environmental regulations, affecting mainly indigenous people and low-income rural communities in Latin America (Szasz & Meuser, 1997).

In relation to the factors that produce Environmental inequalities, EJ issues in Chile are characteristic of third world countries' economies. The market economy has allowed the export of risks and hazards to nations with weaker environmental regulations (Camus & Hajek, 1998). This has affected, for instance, indigenous people and low-income rural communities all over Latin America (Carruthers & Rodriguez, 2009). In Chile and other countries of South America, these environmental conflicts are studied and known as "socioecological conflicts" (Folchi, 2001). These originate from an environmental harm, which involves two actors with contradicting interests. In the conflict, one of the actors is the one that produces the impact, i.e., a company, another one functions as mediator, i.e., the state, while the third one defends himself from the impact, i.e., a community (Folchi, 2001). According to San Martin (1997), the conflict does not originate when the impact is

done, but when is contested (San Martin, 1997:12). Moreover, these socioecological conflicts in Chile are responsive to broader sociohistorical explanations linked to the restructuration of neoliberalism that the country experienced in the late 70's with the help of Pinochet's dictatorial regime (Harvey, 2007). Sabatini (1997) argues that the economic system, combined with the processes of globalization and the economic opening, created a pressure that increased the rate of extraction of natural resources and industrial production (Sabatini, 1997). The negative externalities that came out of these practices headed towards the massive appearance of conflicts in the physical system allowing the appearance of Environment Justice as a response to the pollution coming from hazardous facilities (Sabatini, 1997; Sepúlveda & Villarroel, 2012; Skewes & Guerra, 2004).

As noted by Camus & Hajek (1998), Chile's democracy period, which started in 1990, opened the political realm to start making laws for the environment, but the impulse did not come from national authorities; it occurred in response to external environmental demands that required minimal environmental standards in their commercial treaties (Camus & Hajek, 1998). Thus, the new environmental regulations were conceived and design by economic elites who were committed to the neoliberal agenda of the country (Sepúlveda & Villarroel, 2012).

According to Silva, the new institutional design of the Chilean environmental Law N°19.300 enacted in 1994, was too limited to focus in the environmental decision-making process or citizens' participation, leaving these aspects of the regulation to be interpreted

and followed by EIA experts, politicians, and lobbyists (Silva, 1997).<sup>2</sup> In their “*History of environmental institutions*,” Camus & Hajek stated that because of the previously noted, since the 19.300 law passed, environmental conflict have multiplied alongside social unrest (Camus & Hajek, 1998).

In relation to the case study, during Pinochet's dictatorship, Chile faced an economic liberalization and large-scale timber plantation process that was controlled by private and multinational forestry companies that gained ownership to large extensions of land, previously owned by the state and rural communities (Camus & Hajek, 1998). The forestry sector, distinguished for carrying out an aggressive privatization of forested lands, benefited from the 701 Decree Law,<sup>3</sup> a highly controversial monetary incentive to plant exotic trees in degraded properties (Kay, 2002).

Rural areas were purchased almost entirely for forestry purposes to secure significant extensions of territory where the forestry industry could concentrate and control most phases of the commodity chain. The latter included the planting of tree monocultures, allocation of industrial plants, and the disposal of toxic waste in the same extensions of land (González-Hidalgo & Zografos, 2017). The capital accumulation that resulted from this activity was absorbed by the dominant economic groups and most powerful families of the country, while the associated cost and negative impacts were captured by defenseless sectors of society (Andersson et al., 2016). The most vulnerable population

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<sup>2</sup> Sepulveda & Villarroel (2012) argue that the most explicit exclusionary feature of the environmental law was the procedures for public involvement in the EIA process. According to the authors, participation opportunities for the community appear only “at the end of the pipe” when the decisions about the siting had been already made (Sepulveda & Villarroel, 2012:184).

<sup>3</sup> The Decree Law N°701, enacted in 1974 and known as the “Forestry Development Law” gave subsidies and tax incentives for planting forestry plantations (Navarro, 2014).

had to deal with bad smells, pesticides, water and air pollution, droughts, forest fires, among other hazards that emerged from these extractive and industrial activities, laying the groundwork for multiple conflicts with the community (Ubeda & Sarricolea, 2016).

According to the National Commission of Innovation and Development (CNID), the most common socioecological conflicts in Chile occurs in the energy (57%), mining (30,6%), forestry and farming sector (12,2%). Many scholars have examined these conflicts from an Environmental Justice perspective to document these issues (Gerber, 2011; Folchi, 2001; Bustos et al., 2017; Romero, 2009).

Environmental Justice's efforts to study the Chilean forestry industry and its waste sites focuses in the environmental impacts provoked by the industry and the communities' struggles to avoid the pollution in their environment (Carruthers, 2008; Carruthers & Rodríguez, 2009; González-Hidalgo & Zografos, 2017; Schlosberg & Carruthers, 2010; Torres-Salinas et al., 2016). These studies include some interesting work already done concerning the present Valdivia plant case study, in which the Maiquillahue Bay's community' struggles (Skewes & Guerra, 2004), and the "Acción Por Los Cisnes" movement against the Valdivia plant are revised (Sepulveda & Villarroel, 2012).

Furthermore, authors such as Romero and Romero et al. (2009; 2010) have discussed the need to look at the power relations hidden in socioecological conflicts to analyze social inequalities, politics, and institutions in the context of environmental hazards. According to Romero (2009):

It is essential and urgent to implement Environmental Justice in Chile, in addition to recovering and strengthening the social justice platform in territories and landscapes



that are currently being affected by complex processes of fragmentation, exclusion, and inequity (Romero, 2009:38).

These authors also agree that it is crucial to defend those who lack information, such as the poor and ethnic minorities, by providing them with knowledge and political action (Romero, 2009; Romero et al., 2010).

### **Methodological approaches to Environmental Inequality studies**

These studies mostly rely on case studies, which are approached from various qualitative methods, such as participant observation, interviews, or content analysis; or ethnographies, which assess the environmental inequality in a particular geographical place, while also looking at the historical processes behind the current problematic under study. As reviewed in this literature review, studies in environmental inequality explore real estate dynamics, land use laws, racial discrimination, sociopolitical or economic discriminations (Been, 1993; Hurley, 1995; Mohai et al., 2009; Pellow, 2000; Walsh, 1997). Laura Pulido mentions that to reveal the complex historical and geographical processes that generate these patterns of inequality in the environment, the methods should focus on qualitative approaches, because they offer better ways to approach these processes (Pulido, 1996a, 1996b). On the contrary, quantitative methods would pose an inconvenient when trying to research a historical process behind environmental inequalities (Holifield, 2001), unless they present a literature-based historical context, like the one presented in Szasz and Meuser's (1997) work.

## **CHAPTER 3. THE CASE STUDY OF THE VALDIVIA PLANT**

### **SITING IN THE VALDIVIA PROVINCE**

This chapter presents the study area and explores the background of the Valdivia plant siting conflict that occurred in Chile from 1995 till 2007.

#### **The study area**

The case study area was set in the physical and human environment of the Mariquina and Valdivia communes, in the Valdivia province, “Los Rios” region, in Chile. The geographical area under study was limited to the location of the Valdivia plant and its affected surroundings, in the Valdivia province.

Los Rios region (XIV)<sup>4</sup>, previously known as the “Los Lagos” Region (X), extends through an area of 18,429.5 km<sup>2</sup>, and represents 2.44% of the national surface. It stands between the 39° 16" and 40° 41" South, and 71° 35" West coordinates (INE, 2007). The region limits to the north with the Araucania Region, to the east with Argentina, to the south with “Los Lagos” region, and to the west with the Pacific Ocean. Los Rios has a population of 356,396 inhabitants, mostly located in the city of Valdivia (INE, 2002).

The population density of the region has 19.3 inhabitants per square kilometer, which is significantly higher than the national density level (7.5 hab./ km<sup>2</sup>). The political and administrative division separates the region in two provinces - Ranco and Valdivia. The Valdivia province includes the commune of Valdivia and Mariquina, both encompassed

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<sup>4</sup> Created under Law N°20.176 on March 2007, by the Ministry of the interior, Sub secretary of the interior.

in this research. The former constitutes the capital city of the region, while the latter allocates the Valdivia Cellulose plant.

The climate in the region is temperate-oceanic, or rainy with the absence of a dry period (Solari et al., 2011). From the hydrographic point of view, this area characterizes for the presence of many rivers, while its vegetation is distinctive of the rainforest “Valdivian forest” (PLADECO, 2009). The climatic characteristics in the region and the erosive action of its glaciers have a considerable influence on the hydrographic features of the Valdivia basin, making it one of the most beautiful regions of Chile (Solari et al., 2011).

The people that have lived in the area throughout history have witnessed extreme geological and climatic events, such as eruptions, earthquakes, tsunamis, floods, and droughts, all of which are highly related to the hydrological system in the region (Aceituno et al., 2009).

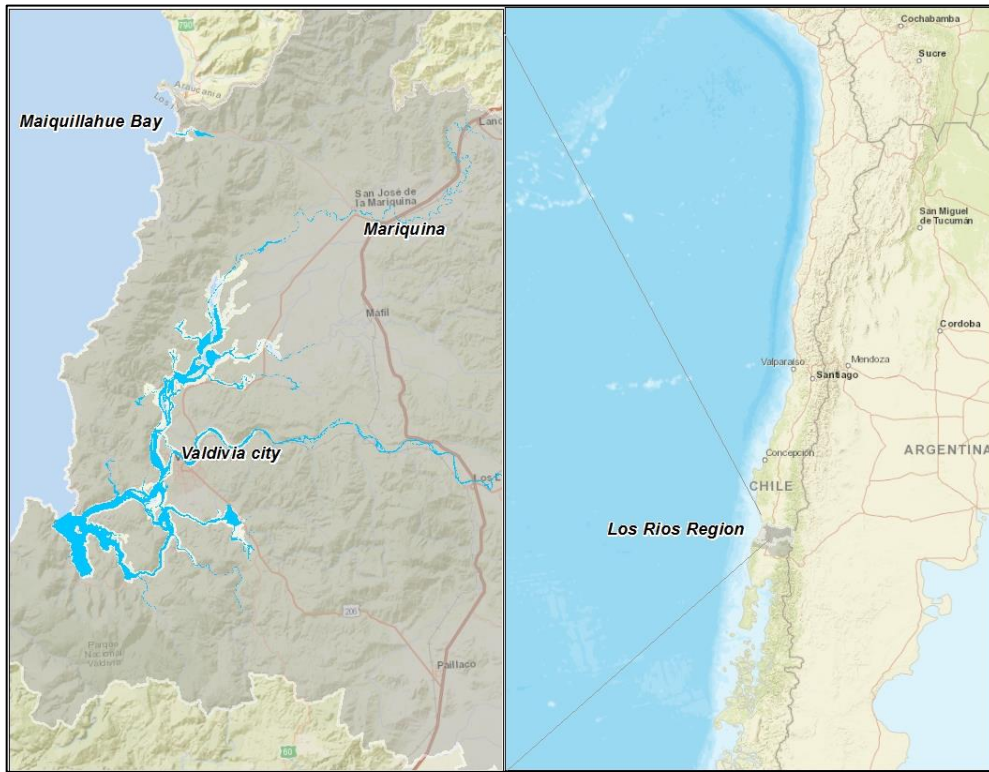


Figure 1. The Los Rios Region.  
Source: ArcMap 10.5. Basemap.

The most relevant hydrographic systems of this region are the "Valdivia," "Bueno," "San Pedro," and "Calle-Calle" rivers, which give the region its name. The Cruces River originates in the hills near the Villarica volcano and meets the Valdivia River in its coastal range (Solari et al., 2011). This river flows near the cities of Loncoche, Lanco, and Mariquina, while some of the swampy areas are inside the "Carlos Anwandter Nature Sanctuary," a protected area and wetland located in the Mariquina and Valdivia Commune, home to thousands of birds, including the black-necked swans (Galaz, 2006). The wetland was the result of the 1960s Valdivian' "great earthquake" which left sunken

areas of land near the Cruces River (CMN, 2018)<sup>5</sup>. This event, plus the presence of the black-necked swans, made of this wetland a profitable tourism activity for the region (PLADECO, 2009). The wetland of the Cruces River, inserted in the Carlos Anwandter Nature Sanctuary, locates between the cities of Valdivia, in the Valdivia commune, and the “San José” urbanization in the Mariquina commune. Considering the ecological properties and the importance of the landscape, the wetland was protected through the RAMSAR convention as the first “Neotropical Wetland of international importance” in 1981 (CMN, 2018).

This thesis focuses on the two communes that were impacted the most with the arrival of CELCO to the region. These include the Valdivia and Mariquina commune. The Mariquina Commune is located 40 km from Valdivia city, and is surrounded by the Cruces River at the south end of the communes’ capital, San Jose de la Mariquina. The Valdivia commune is located at the confluence of the Calle-Calle, Valdivia, and Cau-cau rivers. Since 2007, Valdivia has been the capital of the Los Rios region (INE, 2007). The main economic activity of both communes includes agriculture, cattle farming, tourism, cellulose manufacturing, forestry, and beer production (INE, 2002). The population that lives in these communes reaches 158.223 people, and the Mariquina commune has a 23% of indigenous communities in its territory (INE, 2002). Moreover, Valdivia and

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<sup>5</sup> The wetland was formed in May 1961, after a massive 9.5 earthquake hit the region. The earth movements provoked a tsunami of 10-15-meter waves that penetrated the estuarine areas around the region (Cisterna, et al., 2005). Moreover, an area of more than 4 thousand hectares sank under the ground, and former agricultural and forest lands were flooded, establishing the wetland ecosystem that the region has today (Galaz, 2006).

Mariquina have a 21.32% and 42.63% of people living in poverty, respectively (CASEN, 2011).<sup>6</sup>

Population and indigenous people in 2002	Population		Indigeneity	
	Nº	%	Nº	%
Valdivia	140.000	55	7.011	5
Mariquina	18.223	5,11	4.221	23,2
Rest of Valdivia province	101.020	28,4	27.211	10.5
Los Rios Region	356.396	100	40.615	11.4

Table 1. Population and level of indigeneity  
Source: INE, 2002.

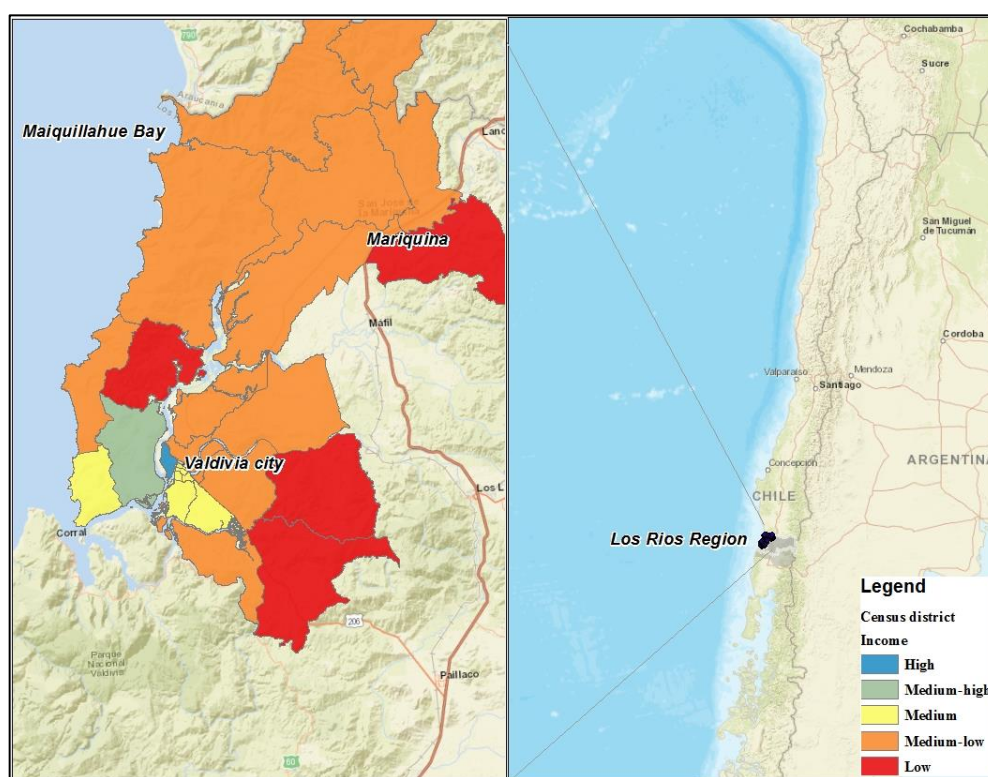


Figure 2. Map of social capital.<sup>7</sup> Source: (BCN, 2017).

<sup>6</sup> According to the same socioeconomic survey – CASEN, the level of poverty in the entire region reaches a 32%, while the country in general has a 22,2% of poverty (CASEN, 2011).

<sup>7</sup> The map represents the socioeconomic status and educational level per census districts of the study area. While the socioeconomic level is calculated through a division of average income (CASEN, 2011), the

There are four settlements of rural communities located in the immediate perimeter of the Valdivia cellulose plant, all of which have experienced the harmful contaminants that emanated from the plant. These four settlements include the urban area of San Jose de la Mariquina and the rural hamlets of Mariquina station, Rucaco, and Puile.

The first one is located four kilometers from the urban areas and is characterized by having a high amount of population dedicated to the transport of forestry products. The second one is located 200 meters from the plant, on the banks of the Cruces River, and its divided by route five. This settlement is distinguished from other places for being surrounded by forest plantations. The third settlement is located north of route five and northeast to the Valdivia plant.

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educational level considers the average years of attendance to school. While the red areas represent low levels of income and education, the blue areas represent high income and high educational levels.

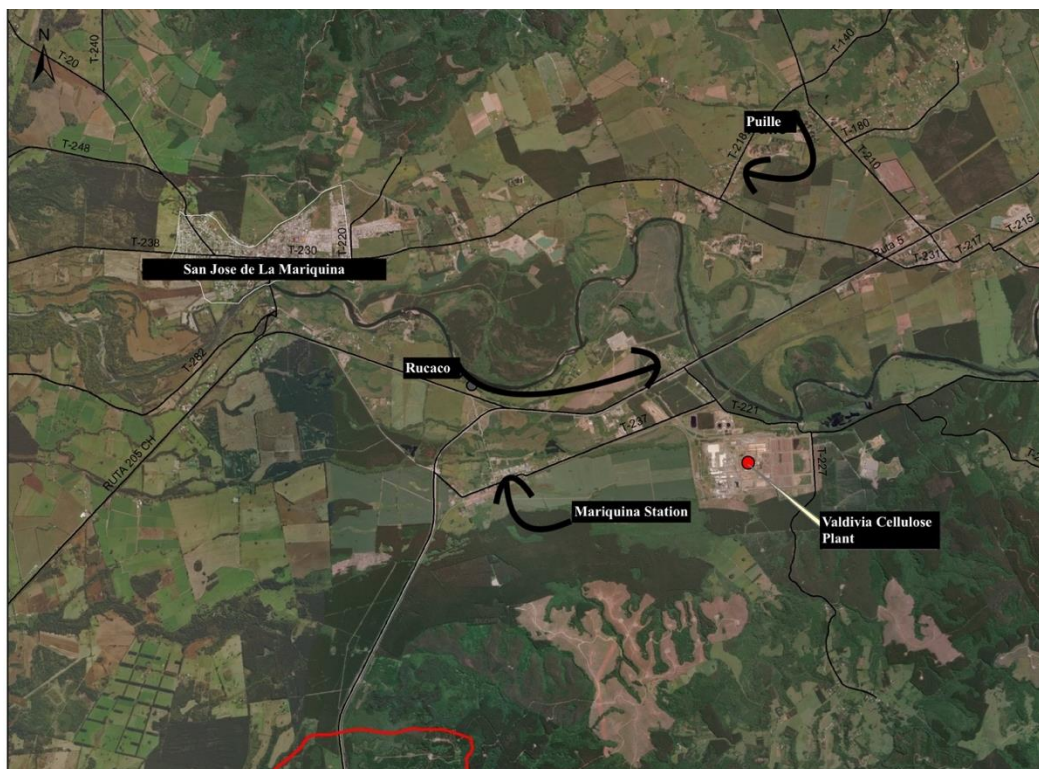


Figure 3. Settlements near the Valdivia cellulose plant  
Source: Google Earth

The influence of the conflict in the Maiquillahue Bay, located in the coastal area of the Mariquina commune, affected five settlements: Cheuque, Mehuín, Mississippi, Low and high Mehuín, and Maiquillahue.

The first settlement is located on the beach and its population dedicates to fishing activities and collection of marine resources. The second settlement corresponds to the second highest populated area in Mariquina. The third settlement is a fishing cove located south of the Lingue River and the fourth has a low population density and positions south to the Lingue river bank. This settlement has scattered houses on top of a hill. Lastly, the fifth settlement hosts a consolidated rural fishing cove.



There is a significant percentage of Mapuche population in the identified settlements. These indigenous communities answer to the names of "Huilliches" when located in the valley, and "Lafkenche" when located on the shore (Arcadis, 2009)<sup>8</sup>. The Mapuche community has increased in the area by a 30% in the previous decades, reaching a 23.5% of the Mariquina's total population (INE, 2002). This, after the enactment of the "Indigenous Law" in 1993 stimulated the relevance of ethnic conditions, and aimed to reduce the prejudices and discrimination of society towards these groups. This indigenous Law granted exclusive benefits to persons and communities belonging to an ethnic group (Arcadis, 2009).

Near the plant, these indigenous groups are mainly found in the Raluya sector in the Rucaco settlement, and represent the 21% of the population (Arcadis, 2009).

Sector	Mapuche	Total population	% of Mapuche people
Rucaco	26	126	20.6
Estacion Mariquina	89	555	16
Puile	27	163	16.6
Urban Mariquina	991	7,79	12.7
Mariquina commune	4,183	18,223	23

Table 2. Indigenous population in rural communities near the plant.  
Source: INE (2002)

<sup>8</sup> In Mapudungun "Che" means land, "Huilli" means "Valley", and "Lafken" means "sea" (Bengoa, 2000).

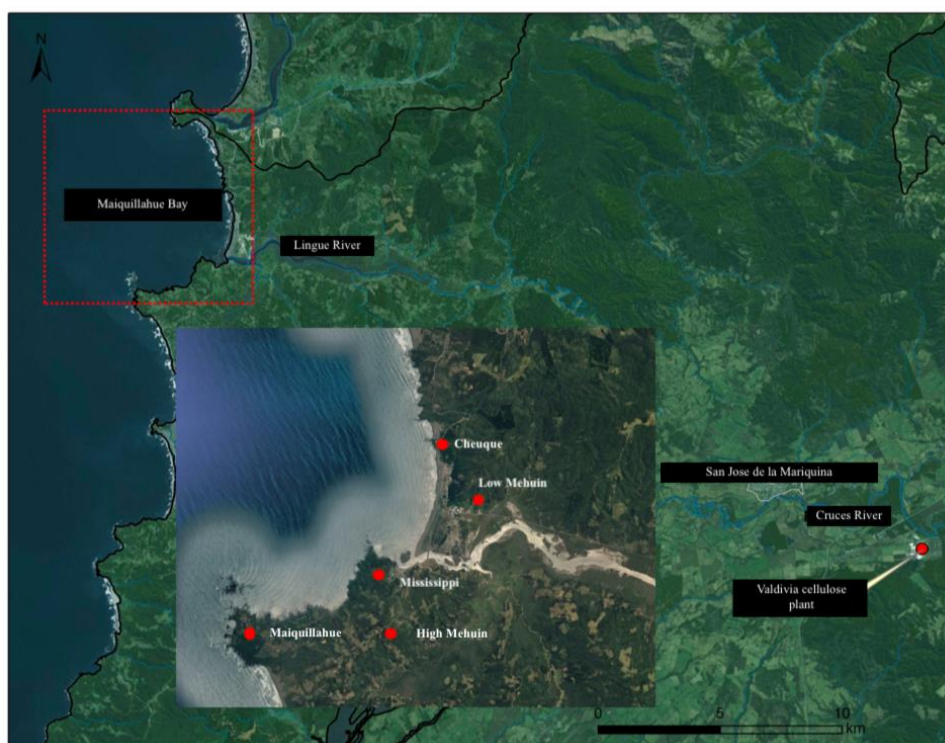


Figure 4. Settlements near the Maiquillahue Bay.

Source: Google Earth

In the Maiquillahue Bay these groups, concentrated in the Low and High Mehuín, Maiquillahue, and Cheuque sectors, represent the 87.6, 70.6, and 59.8% of the population, respectively (INE, 2002).

Sector	Mapuche	Total population	% of indigenous people
Cheuque	58	97	59.8
Mehuín (urban area)	225	1,135	19.8
Mississippi	145	349	41.5
Low and High Mehuín	155	177	87.6
Maiquillahue	101	143	70.6

Table 3. Indigenous people in rural communities near the Maiquillahue bay.

Source: INE (2002)

Altogether, the indigenous communities inhabiting the settlements near the plant and the indigenous communities located in the entire study area are distributed in the Maiquillahue Bay, Mariquina rural areas, and in Valdivia city (CONADI, 2017). The distribution of the indigenous communities in the study area is illustrated in a polygon map, which is divided by the census districts from Mariquina and Valdivia. The map is displayed next to the social capital map shown before to compare the distribution of these characteristics in the population. Altogether, the indigenous communities inhabiting the settlements near the plant and the indigenous communities located in the entire study area are distributed in the Maiquillahue Bay, Mariquina rural areas, and in Valdivia city (CONADI, 2017).

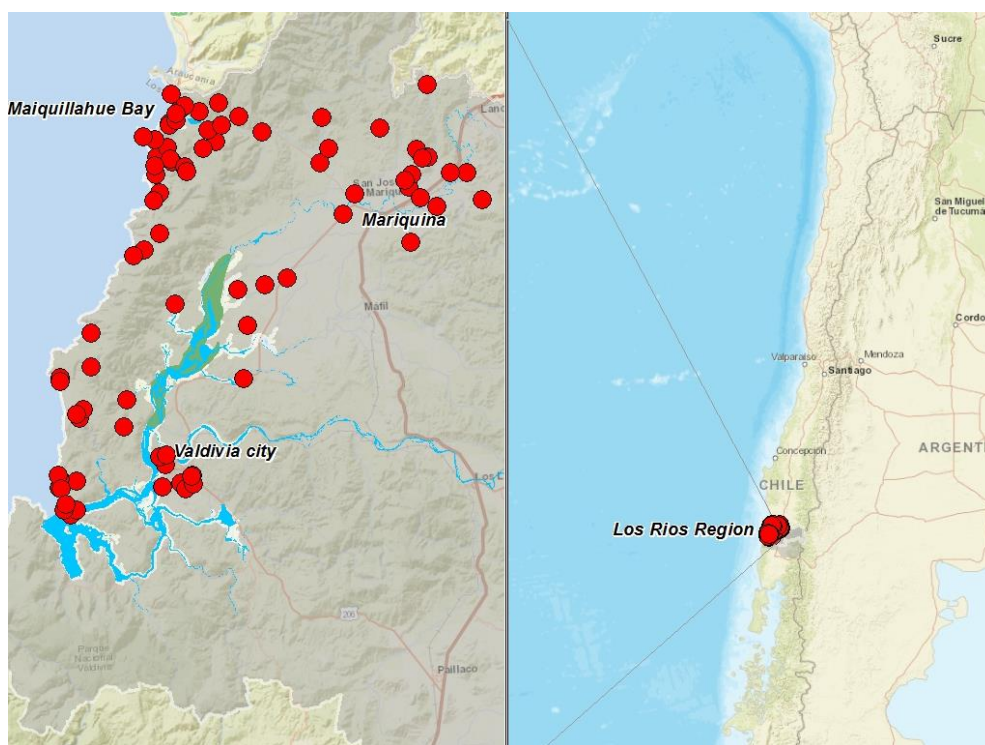


Figure 5. Indigenous communities in the study area.  
Source: CONADI, 2017

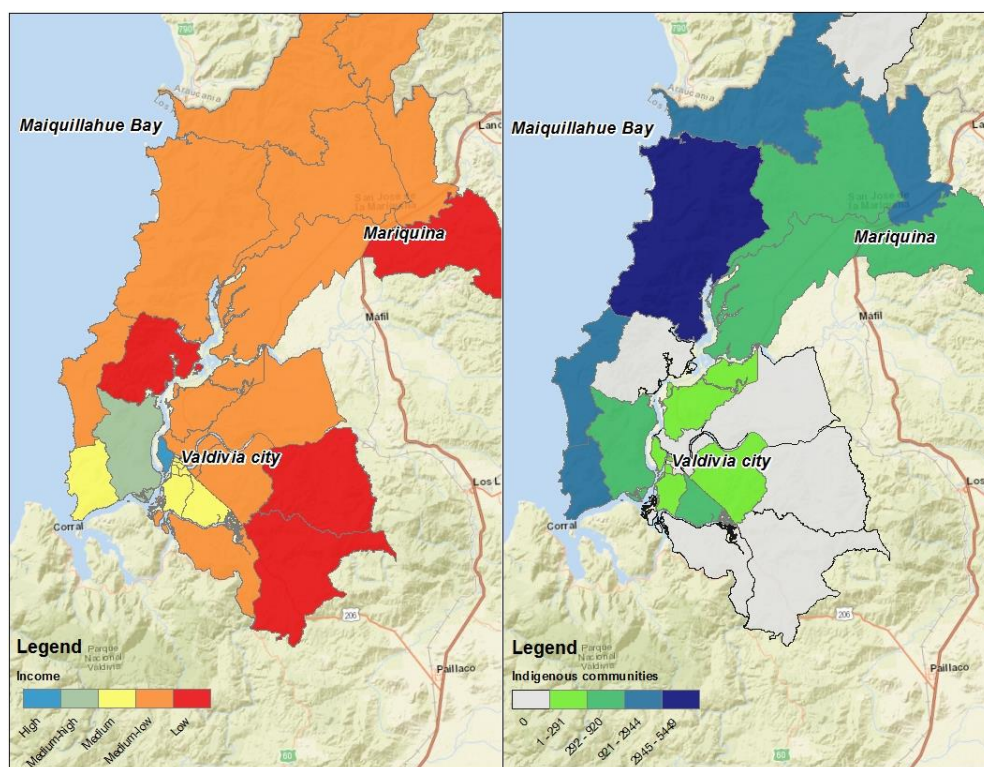


Figure 6. Social capital and indigenous communities in the study area.<sup>9</sup>  
Source: CONADI, 2017.

### The case study events

In 2004, the “Celulosa Arauco y Constitucion S.A”, also known as CELCO, a Chilean multinational forestry company, built the “Valdivia plant” in the “Los Rios” region, Chile. The plant’s investment project, which was estimated to cost over one billion dollars, expected to produce 550.000 tons of bleached Kraft cellulose per year,<sup>10</sup> and to

<sup>9</sup> The map shows the districts in which the indigenous communities live. The grey color indicates that no indigenous community inhabits that area, while the dark blue indicates a higher concentration of these ethnic groups. The blue and dark blue areas correspond to the shore and Maiquillahue bay area.

<sup>10</sup> The Kraft process is a process for conversion of wood into wood cellulose fibers. In some situations, the plants that count with this process can release odorous products and produce substantial liquid wastes (EPA, August 1993).

generate a chemical waste of 900 liters per second (or 77.760 m<sup>3</sup>/day) (Valdivia Project, 1995). The waste would be discharged at the Cruces River, which located 500 meters from the plant and nurtured the Carlos Anwandter Sanctuary, placed 32 km downstream from the project's location.

When the idea of the project was presented in 1995,<sup>11</sup> the plant in question was celebrated because it promised that the arrival of this company to the region would bring more than 5000 direct jobs for the people living in the area (Valdivia Project, 1995).

Nonetheless, when the company presented their first Environmental Impact Assessment study (EIA) in October 1995, there were disagreements concerning the plant's location.

The project's EIA study, submitted voluntarily to the environmental authorities, presented flaws in its elaboration, including a lack of studies about the water quality and sediment characterization in the watershed of the Cruces River during the summer months, when the stream was lower (Sepúlveda & Villarroel, 2012)<sup>12</sup>.

The project's EIA study was rejected by the newly formed environmental authorities, causing panic in the business sector and central government. The rejection also relieved environmentalist groups that were aware of the effects that the effluents would have had on the Cruces River (INDH, 2017). Soon after the initial rejection, a clash between those who supported the business, the environment, and those who looked for a balance between both, led multiple sectors to fight over their interests for over 20 years.

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<sup>11</sup> In July 4<sup>th</sup> of 1995 the project was presented to the community of San Jose de la Mariquina (approximately 200 people attended). The presentation was facilitated by the communes' mayor, Rolando Mitre, and the regions' governor, Jorge Vives (Valdivia Project, 1995).

<sup>12</sup> The EIA study was conducted only during Winter months, when the stream of the River is high

### **The Environmental Impact Assessment studies and resistance (1995-1999)**

The national environmental institution at the time, CONAMA, and its regional branch, the COREMA X<sup>13</sup>, resolved that the company had not elaborated a comprehensive impact assessment of the project, rejecting it in January, 1996 (COREMA X, 1996). This rejection received attention from multiple groups of people. The communities and environmentalists received it positively because they considered that the company's EIA study left out important information about the environmental impacts of the plant and explicit information about the “on point technologies” that they would be using to discharge their effluents (INDH, 2017). For the State, the rejection of the study by the COREMA X meant two contradicting things: Even though the COREMA X did an excellent job rejecting an incomplete EIA study of the project (especially considering that the environmental institutions in the country were created the year before)<sup>14</sup>, the rejection also meant risking a billion-dollar investment and the loss of more than 5000 jobs for the region. In addition, the country had recently regained trust from foreign investors after the dictatorship had ended in 1990, making of the situation a much more complex issue to grasp on (Carruthers, 2008; Camus & Hajek, 1998). For the company and its investors, the rejection of the study meant a tremendous failure for the forestry industry and set a before and after in the business, because now they needed to look over the environmental institutions and regulations more carefully (Sepúlveda & Villarroel, 2012).

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<sup>13</sup> Environmental National Commission, or “Comisión Regional del Medioambiente”. The “X” references the region: Each region in Chile has a roman number. Since Los Rios it's the tenth region going from North to South, its identifier it's the X.

<sup>14</sup> Law N°19.300 of the “General Bases of the Environment” was published in the official gazette (D.O.) on March 9<sup>th</sup>, 1994.

A few months after the resolution, the then-president of Chile, Eduardo Frei (1994-2000) travelled to Valdivia to “set the first stone”<sup>15</sup> to inaugurate the construction site for the Valdivia plant. Frei’s actions were clarified in a public statement where he noted that “no project will be stopped for environmental considerations.” He gave the green light to the project, ignoring the rejection already made by the environmental authorities (Rojas, Sabatini, & Sepulveda, 2003). Two months after the president’s visit to Valdivia, the COREMA X changed the resolution and approved the EIA study with two conditions: to incorporate a tertiary treatment of the plant’s effluents,<sup>16</sup> or to move them to the sea (Sepúlveda & Villarroel, 2012)<sup>17</sup>. The company went for the second option and decided to evaluate the environmental impacts that the discharge of the effluent would have in the Maiquillahue Bay, located 35 km from the plant.

The Mehuín fishers from the Maiquillahue bay were worried about the possibility of having chemicals being dumped into their sea and started a mobilization never seen before in the Maiquillahue bay (Skewes & Guerra, 2004). These fishers, mainly local Mapuche people called “Lafquenches” or “Persons from the sea,” were concerned about the environmental impacts, because they considered that the company influenced the government and the environmental institutions to get their EIA rejections changed. The fishers took action and denied the company access to their harbor, prohibiting them from evaluating the project's environmental impacts and viability studies (Skewes & Guerra,

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<sup>15</sup> The setting of the first stone is a traditional ceremony of various cultures in commemoration of the first day of construction of a building or other project (RAE: <http://dle.rae.es/?id=Sx1NDzh#KJGaKtS>).

<sup>16</sup> A tertiary treatment it’s the final cleaning process that improves the effluents quality before it is discharged to the environment. The tertiary process removes the remaining inorganic compounds and noxious substances (EPA, 1997).

<sup>17</sup> COREMA X Exc. Resolution 001/96



2004). They implemented a surveillance system, which involved a night watch formed by the fire department, school children, women, and fishers from the bay (TVN, 2011).

Without getting access to the sea, CELCO decided to assess the impacts of the effluent in the sea with models instead of fieldwork samples and submitted their second EIA study to the COREMA X, in August 1997. The study incorporated a 35-km pipeline that would go from the cellulose plant to the sea. This study was also rejected by the COREMA X because of insufficient sources and reliable methods for determining the impacts, and because the navy organization, “DIRECTEMAR,” denied the company access to the sea (INDH, 2017).<sup>18 19</sup> These actions ultimately forced the company to reconsider the inclusion of a tertiary treatment for their effluents to be discarded in the Cruces River, as the COREMA X also offered. The people in Maiquillahue celebrated this decision and claimed that their water and seafood’s were “free of contamination.”<sup>20</sup>

CELCO included the tertiary treatment of the effluents without incorporating the other components that were missing from the study, and without considering a more complete baseline regarding the possible damages to the Carlos Anwandter Nature Sanctuary. The COREMA X approved the repairs submitted by the company,<sup>21</sup> leaving the tertiary treatment of the effluents as the main preventive method to avoid environmental impacts

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<sup>18</sup> The DIRECTEMAR, or “General direction of the Maritime Territory and Merchant Marine of Chile” is an agency, branch of the Chilean army. The agency seeks to “comply with the laws and international agreements that are in relation with the Chilean maritime territory, to protect the human life at sea, the environment, natural resources, and regulate the activities that take place in the aquatic environment of its jurisdiction, with the purpose of contributing to the maritime development of Chile” (DIRECTEMAR, 2017).

<sup>19</sup> The project was rejected by Exc. Resolution N°01/96 May 20<sup>th</sup> of the COREMA X.

<sup>20</sup> Footage of the surveillance techniques of the community can be seen in the following video: <https://youtu.be/VJmm6CepfcQ?t=1785>

<sup>21</sup> October 30<sup>th</sup>, 1998. Approved RCA Exec. Resolution N°279/98 of the COREMA X.



in the sanctuary and adding a monitoring system of the biological communities that inhabited the River (Sepúlveda & Villarroel, 2012). The company later asked the CONAMA to leave the tracking of the *Egeria densa* and other biological communities out of the monitoring activities, which was approved by the environmental authorities of CONAMA.<sup>22</sup>

### **The Valdivia plant allocation and Cruces River contamination (2004-2007)**

The actual construction of the cellulose plant happened in January 2004. The odors and noise that came out of the plant's construction site affected the population living nearby,<sup>23</sup> who complained about headaches and asthma, among other symptoms (Pimentel & Moreira, 2004). Moreover, once the plant started its operations, it contaminated the Carlos Anwandter Nature Sanctuary and wetland, located 32 km downstream from the facility, causing a significant ecological disaster known in the region (El Diario Austral, 2004a). This disaster occurred a few months after the plant settled in the province, when the contamination of the Cruces River caused the disappearance of the black-necked swan, an iconic bird species that inhabited the Carlos Anwandter Sanctuary, from the region (Sepúlveda & Villarroel, 2012). This disaster generated an alarm in the Valdivia commune (60 km south), where a citizens' movement, the "Acción Por los Cisnes" (from now on "AXC") was created (in November 2, 2004) to push the authorities to investigate about the environmental disaster in the Sanctuary (Hunter, Open council for the swans, 2004).

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<sup>22</sup> February 4<sup>th</sup>, 1999. Exec. Resolution N°009 by the executive directive of CONAMA

<sup>23</sup> The population from Mariquina and Valdivia (over 50 km south the plant) complained about strong odors coming from the recently inaugurated plant. These complaints were register on February 26<sup>th</sup>, March 8<sup>th</sup>, and July 13<sup>th</sup> (Pimentel & Moreira, 2004).

The AXC collective was particularly worried about the death of the hundreds of black-necked swans and asked the government to suspend the plant's operation until they were sure about their impacts and risks (Austral Valdivia, 2004a). Both, the community and scientists, complained about the pollution, getting the CONAMA to conduct an audit to determine what was going on in the Sanctuary (CONAMA, 2004). In November 2004, the results, which were presented to the press and the public,<sup>24</sup> concluded that the company constructed a plant with the capacity for more than 685.000 tons of bleached Kraft cellulose per year, instead of the 550.000 declared in the EIA (AXC, 2005). It was also proved that the plant had a clandestine pipeline to discard undeclared contaminants into the Cruces River (CONAMA, 2004).

In December 2004, the Superintendence of Sanitary Services (SISS) started two sanction processes against the company because they were discharging manganese, arsenic, nickel and soluble irons into the River without a permit. In addition, the SISS, CONAMA, and representatives of the General Water Direction (DGA) also confirmed that the company was diluting its pollutants into 70 l/s of unauthorized freshwater wells to disguise the concentration of pollutants being dumped into the river.<sup>25</sup> After these events were uncovered, the AXC presented their first legal complaint against the CELCO company in the Valdivia court of law (Austral Valdivia, 2004b).

Following these events, in January 2005, the COREMA X decided to temporarily close the plant (Hunter, 2005), demanding CELCO to comply with the requirements of control

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<sup>24</sup> Ord. N°1536, November 2, 2004 CONAMA.

<sup>25</sup> Monitoring activities were conducted by the following organisms: Ord N°1880 December 23, 2004, by the CONAMA. Ord. N°770 December 29, 2004, Ord. N°190 January 13, 2005, Ord. N°080 January 17, 2005 by the DGA. Ord. N°014 January 18, 2005 by the SISS.

and monitoring conditions set in the EIA study resolution (CONAMA, January 8th 2005). The closure lasted for a month (COREMA X, February 11th 2005), with no preventive measures or changes implemented in the industrial process (Cooperativa, 2005; Austral Valdivia, 2005). Simultaneously, the Sanctuary was suffering from the worst ecological damage since its creation in 1981 (UACH, 2005a).

### **The scientific community and the disaster in the Sanctuary**

Four months after the Valdivia plant started its operations, the wetland showed remarkable changes: The population of black-necked swans decreased from 8000 individuals to fewer than 400 in May, 2004 (Galaz, 2006). Rangers working in the sanctuary warned the environmental authorities and claimed that the decline of the swans was related to the disappearance of the “luchecillo” (*Egeria densa*), the swans’ main food source (Galaz, 2006).

The contamination caused by the plant modified the water quality of the river, generating a significant increase in the levels of organic halogen compounds (OHC), sulfates, chlorides, manganese, resin acids and aluminum, among others<sup>26</sup>. The River and the sanctuary were connected to wells that supplied the population with drinking water, making the contamination of this resource a risk to human health (Moreira & Pimentel, 2004).

In November 2004, in response to the emerging citizen pressure from the AXC citizens movement, the CONAMA hired a commission of scientists and academics from the

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<sup>26</sup> Ord. N° 014 January 18, 2005 by the SISS.

“Austral University of Chile” (UACH) to determine the causes of the disaster.<sup>27</sup> In April 18, 2005, the UACH confirmed in a final report that the contaminants produced by the company were “sufficient to explain the disaster” (UACH, 2005a). The company denied any responsibility, but the SISS had already notified the environmental authorities about the sulfates found in the plant’s chemical waste. To respond to these allegations, the company hired a study from the “Advanced Study Center of Ecology and Biodiversity” (CASEB), and in April 25, 2005, the CASEB, member of the Pontifical Catholic University of Chile (PUC), released a study criticizing all the claims done by the UACH (CASEB, 2005). An ecology scholar from the University of Chile (UCH), Victor Marin, also presented an exculpatory study mentioning that the luchecillo died because of a mix of events that included a low in the Cruces River’s stream flows and temperature (Delgado & Marin, 2009).

The State Defense Council (CDE),<sup>28</sup> the collegiate body that represents public entities, filed a lawsuit against CELCO for polluting the River and causing the decline of the black-necked swans. The claim made by the CDE in court included a petition to close the plant until the wetland recovered (La Tercera, 2005).

After the lawsuit, CELCO mobilized and protested along their workers in the city of Valdivia (El Diario Austral, 2005).<sup>29</sup> In these demonstrations, the workers and leaders of CELCO claimed that “*Nature was supposed to be at the mercy of Man and not the other*

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<sup>27</sup> The study was done by a team of 20 scientists, 40 field site visits, and 15 hypothesis testing (UACH, 2005a).

<sup>28</sup> The State Defense Council, or “CDE” is the internal collegiate body that, in use of its legal powers, decides to take legal action or assume the defense of public entities, within the legal scope that belongs to the institution (CDE, 2017)

<sup>29</sup> Footage of the protest can be found in the next link: <https://youtu.be/zLCEL-ZtIT0?t=1507>

way around" (AXC, 2014). The main reason to conduct the protest was to exercise pressure to avoid the revocation of the plant's permit, which allowed workers to keep their jobs (AXC, 2014).

The supreme court ruled on June 3 in CELCO's favor accepting the company's study, "*Iron Balance in the Cruces River discharge sector*," which they claimed was elaborated by the EULA institute, Concepcion University. The study was fabricated, and the EULA institute denied participation in its confection a few days after (El Mercurio, 2005b). The institute, as they commented in their public statement, developed a sample of iron levels from the Cruces River in their labs, but CELCO made it appear as a full academic report on the low concentrations of iron in their effluents (Alonso & Narváez, 2005). The supreme court considered the report, even after CELCO had rectified that they "misquoted" the information and ruled that CELCO didn't contaminated the River with iron (Bellido, 2005). A number of academics from the UACH questioned this decision, particularly because in their report, iron was not the only pollutant, and the court completely dismissed the Aluminum and sulfates' content in the effluent (Meneses, 2005).

In June 2005, the environmental authorities of the COREMA X, with an administrative order coming from the president, authorized the company to unload daily loads of aluminum (60 kilos per day), sulfates (40 tons per day) and chlorides (24 tons per day)<sup>30</sup>. These were the same chemicals found and sanctioned by the SISS, and which were not

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<sup>30</sup> Exc. Resolution 377/05 COREMA X to modify exc. Resolution 279/1998 of the same organism, regulating the dumping of Aluminum, sulfates, and chlorides.

declared in the EIA study (El Mostrador, 2005). It is stated in the regulations and environmental law that if the company violates the executive resolution of approval (RCA) they have to stop their operations. But instead of moving to a closure of the plant, the COREMA X authorized these compounds, violating the same environmental law that allowed this institution to function (Sepúlveda & Villarroel, 2012). The authorization of these chemicals ignored the antecedents shown in the UACH study that the same environmental authority hired, and which showed that these compounds were the trigger of the wetland's disaster (UACH, April 18th 2005:204-295).

The company appealed to the decision of the COREMA X arguing that those levels were too demanding and that it was impossible for them to meet those standards. The company had to stop their operations,<sup>31</sup> which caused a political crisis within the company, and between CELCO and the government (Sepúlveda & Villarroel, 2012).

On July 22, 2005, the COREMA X issued a new resolution<sup>32</sup> in which they increased the maximum daily levels of pollutants that the company could discharge into the waters of the Cruces River. These levels went from 60 to 120 kilos of aluminum, from 40 to 60 tons of sulfates, and from 24 to 30 tons of chlorides. Along with this illegal permit to increase the discharge of undeclared pollutants, the COREMA X asked the company to submit an EIA with an alternative discharge to the Cruces River, in addition to reducing its production by a 20% until they managed to move their contaminant through a pipeline

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<sup>31</sup> The plant closed voluntarily on June 8th. In addition, the CEO of CELCO, Alejandro Perez" was asked to resign the company.

<sup>32</sup> Exc. Resolution 461/05 COREMA X.

out of the river.<sup>33</sup> In August 2005, the then Chilean president, Ricardo Lagos (2000-2006) pointed out that the alternative to the Cruces River disposal system "*could not be other than the Sea.*" Soon after, the company confirmed their plans to insist with the pipeline in the Maiquillahue Bay, reactivating the conflict with the fishers and the Maiquillahue community.

After many episodes of violence with the people from Maiquillahue, the company decided to compensate the fishermen that were willing to support the pipeline. The company paid 8500 US dollars to each person that signed their "reciprocal collaboration agreement" (TVN, 2011). In this agreement, people from the bay, mainly the fishers' cove, received the money with the obligation to follow two impositions set by the company: to facilitate the EIA study's measurements and to support the pipeline once this was built (TVN, 2011). The indigenous communities of the bay did not accept the compensation and continued their struggle against the company, invoking their rights as native peoples, through the "Lafquenchas Law," which protected their marine coastal space.<sup>34</sup>

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<sup>33</sup> The COREMA X demanded the company a time limit to present the new EIA with the alternative site for the effluents. This time limit was extended in multiple occasions, being settled in 2009, when CELCO submitted a third EIA study that contemplates a pipeline that would go all the way into the Maiquillahue Bay. This study got approved on February 24<sup>th</sup>, 2010, Exc. Resolution N°0027/10 of the COREMA XIV.

<sup>34</sup> LAW N° 20.249. Planning ministry. February 16<sup>th</sup>, 2008.

## **CHAPTER 4. RESEARCH DESIGN**

The present thesis attempts to qualitatively explore the role that the stakeholders' relationships had in the production of environmental inequality in the Valdivia plant case study.

This thesis was designed to look at the two specific timeline events concerning the conflict in the Valdivia province. The first event revisits the EIA studies, political decision-making process, and the resistance coming from the locals in the Maiquillahue bay, and the "sea defense committee" that were against the pipeline that would discharged pollutants into their sea. The second timeline of events focuses in the actual siting of the plant, which caused the contamination of the Cruces River and affected the human and natural environment of the Valdivia basin. Moreover, the pollution coming from the Valdivia plant, which caused the disappearance of the black-necked swans, prompted the emergence of the "Acción Por Los Cisnes" (AXC), also studied in this stage of the case study.

This case was selected because the community of the Valdivia province is considered one of the first to fight back against big companies, such as CELCO and the state, opening the ground for recognition to communities that actively participate in environmental issues by forcing actions in the environmental institutions (Sepúlveda & Villarroel, 2012).

Through the case study of the Valdivia plant in Chile, this research hopes to deepen the understanding of the social relations that influence the environment by looking at the stakeholders' relationships. To achieve this goal, this research was approached from a



case study methodology that seeks to describe certain phenomena to understand its complex units (Della Porta & Keating, 2008). The units are portrayed by the stakeholders' relationships in the previously discussed events and are useful for testing hypothesis and theoretical prepositions (George & Bennet, 2007), which in this research considered to connection between the stakeholders' relationships outcomes with the theories and prepositions coming from the EIF framework and broader understandings about the environmental inequality's causes and explanations (Pellow, 2000).

It is important to emphasize that this thesis is oriented towards the understanding of environmental inequality. This phenomenon occurs "*when a particular social group is burdened with environmental hazards*" (Pellow, 2000). Under this framework, environmental hazards are understood as pollution exposure, but they are also understood as environmental wrongs, i.e., the overlooking of human health in the decision-making process of a hazardous facility siting (Pellow, 2000).

The central analysis of the two stages of events focused on describing the multiple relationships of the stakeholders involved, which were predefined as: The central government, which is represented by the environmental authority; the local communities, scholars and scientific community; and the CELCO company, owner of the Valdivia cellulose plant.

## **Methodology**

This thesis adopted a case study methodology and approach, which conducts a detailed investigation about the occurrences surrounding the siting of the Valdivia plant, to

provide an analysis of the context and processes that illuminate the theoretical issue being studied (Hartley, 2004).

The qualitative work presented here serves to deeply analyze the context of the Environmental Inequality formation in the Valdivia Plant case study. To comply with this, the thesis adapts part of a Pellow's proposed methodology, used in his work on transnational waste trade systems in the US (Pellow, 2007). These methods included a literature review concerning the historical forces that shaped environmental inequality in the study area, plus a qualitative content analysis of government documents, NGO reports, and other relevant secondary sources of information. Furthermore, these methods are guided by the EIF theoretical framework as part of a larger effort to uncover the outcomes that have been shaping these territorial inequalities. Thus, both the methods and EIF approach speak to each other to examine the structural and local forces that may have resulted in environmental inequality in the present case study examination.

### **Data collection and analysis**

This research was conducted using a qualitative case study methodological approach that collected and analyzed secondary sources of information, including archival records and historical documents concerning the Valdivia Plant siting case study, from 1994 until 2007. This data was collected and analyzed together in an iterative process that is organized around certain topics, key themes and the central research question.

To cover that ground, the examination of websites managed by opponents and advocates of the cellulose plant, transcripts of city councils' meetings and public forums, official

reports from related ministries, business programs, EIA studies submitted by the plant's company, scientist reports concerning the pollution of the River, and public statements from multiple stakeholders were coded, and analyzed. All of these sources of information were interpreted to focus on the analytical disclosure of meaning-making practices of the studied events. The analysis was critical to understand the intentions and actions that influenced the environmental outcomes in the Valdivia plant case study, providing useful framings of environmental inequality from a multistakeholder perspective (Pellow, 2000).

The data collection involved the gathering of the literature reviewed and the organization of documents and other secondary sources that covered both stages of the case study. The gathered sources of information were also cross-checked between different sources (e.g. information from interview documents were cross checked with news articles and archival records that mentioned the same events) whenever possible to improve the information reliability.

The revision and analysis of previous literature that covered the historical facts about the case study included the following sources, which include books, articles, and NGOs reports<sup>35</sup>.

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<sup>35</sup> More details about these sources can be found at the bibliography section.

<b>Title</b>	<b>Authors</b>	<b>Year</b>
Environmental history of Chile.	Pablo Camus; Ernst R. Hajek	1998
OLCA. Mehuín, Sustainability and Resistance. Lessons from an Organized Community. Latin American Observatory of Environmental Conflicts.	OLCA	1999
The defense of the Maiquillahue Bay: Knowledge, faith, and identity in an Environmental conflict.	Juan Carlos Skewes	2004
The great deception: Impacts associated with the installation of the Arauco-Constitucion Cellulose Plant, San Jose de la Mariquina.	Juan Moreira; Juan Pimentel	2004
Archeology of a Conflict: Excavations in the visual memory of the Mehuin Defense.	Debbie Guerra; Juan Carlos Skewes; Vanesa Naranjo; Daniela Pino; Natalia Barria	2004
Chronological development of the environmental conflict in the Rio Cruces wetland, Chile's first Ramsar site.	Andres Muñoz Pedreros	2005
CELCO case: Jurisdiction of the higher courts of justice to decide, by virtue of an environmental protection remedy, on technical matters, which are the responsibility of the respective environmental institutions.	Carol Apablaza Cheuquepán; Carla Hormaechea Mena	2008
Social construction of the Environment: The citizen movement Action for the Swans CELCO case – Valdivia.	Bárbara Oñate Santibáñez	2009
Comfort, exclusion and lack of environmental justice.	Hugo Romero	2009

<b>Title</b>	<b>Authors</b>	<b>Year</b>
Environmental conflicts and environmental reform in Chile: An untapped opportunity for institutional learning about citizen participation.	Claudia Sepulveda; Alejandro Rojas	2010
Swans conflicts, and resonance.	Claudia Sepulveda; Pablo Villarroel	2012
The SEIA in Crisis? Environmental conflicts and citizenship	Ezio Costa	2012

Table 4. Literature review of the Valdivia plant case study

The first step to analyze the collected data involved coding the gathered information, which was firstly done by considering the stakeholders and their relationships with others in the Valdivia plant case study. The secondary sources were also divided according to the following (Table 2):

<b>Data Sources</b>	<b>Data sources</b>
Archival	Public participation, meeting notes, minutes, National CENSUS data, monitoring reports, sanctions and fines.
Official Documents	Stakeholders reports and documents, court agreements, EIA studies, Laws and regulations, Decree-Laws, environmental resolutions
Newspaper articles and letters to the editor	Letters to the editor and articles from the following official newspaper: “Austral Noticias” “El Diario Austral,” “El Mercurio,” “La Tercera,” “Valdivia Noticias,” “Cooperativa Online,” “Radio Biobio Online.”

Table 5. Data sources.

The information coming from all sources, including notes, key documents, and tabulated materials, were stored in a Computer-Aided Qualitative Data Analysis Software

(CAQDAS), Nvivo, which organized the information in bins divided by stakeholders, timeline, and sources of information (Table 3)<sup>36</sup>.

In addition to the creation of the bins, the CAQDAS program facilitated the recording of source details, time and date of the data collected. Moreover, the collected data were broken down into manageable pieces through coding techniques.

Stakeholders/ n ° sources	CELCO	Community and Environmental	Scientist and scholars	State authorities
Archival records	5	34		4
Documentary		2		
Documents	9	2	4	9
newspaper article	21	22	6	13
Total	35	61	10	28

Table 6. Sources of information and documentation per stakeholder.

The coding was done after reading and reviewing the relevant collected data. The summary of these readings was reorganized as preliminary memos that were later used to formulate the first categories, themes, and relationships between the identified stakeholders. The coding process incorporated three levels of abstraction, as described by Baškarada (2013). The first one contemplated a descriptive coding technique, which included the broad topics that were of interest in this thesis, such as the identification and description of the stakeholders' interests. The second one comprised a topic coding technique, which included the information that became apparent once the data collected was firstly analyzed in the previous stage. This topic coding method was important to

<sup>36</sup> Details of these sources can be found in Appendix A.

reorganize the situations and outcomes of the stakeholders' relationships. The third level of coding abstraction incorporated the analytical coding technique, which was used to include the coded data into a more abstract framework to relate the results with the EJ extended theoretical framework.

In addition, the framing of the stakeholders was done using Mitchell, Agle, and Wood's "model of stakeholders' identification and salience" (1997), to obtain the level of influence of each stakeholder in the case study events. In the model, the authors define stakeholders as "actors, internal and external, that affect or are affected, in different degrees, by the objectives or results of a given organization. This happens if they possess three basic attributes: power, legitimacy, and urgency" (Bernal et al., 2012:260). the attributes (power, legitimacy, urgency) are interpreted and assessed accordingly to the collected data about the stakeholders' interests, backgrounds and influence in the production of environmental inequality.

In the model, power is understood as the capacity or possibility that stakeholders have to gain resources, which could be coercive, i.e., arms, strength, technology, money, raw materials; or symbolic, i.e., prestige, esteem, or charisma (Mitchel, Agle, & Wood, 1997). In the model, the notion of "sensibility" also plays a role in the definition of power. When stakeholders lack one of the abovementioned resources, they develop a stronger sensibility towards the stakeholders that, on the contrary, have plenty of that same resource (Mitchel, Agle, & Wood, 1997).

The legitimacy attribute is contemplated as a perception about the actions of a social actor. These actions have to be appropriate within a certain system that shares the same

norms, values, beliefs, and definitions (Mitchel, Agle, & Wood, 1997). An example of the latter might be that, if a company pollutes the environment, those actions might not be desirable for other stakeholders, taking them legitimacy from the polluting act.

The urgency attribute reflects the immediate claim towards a situation. This urgency also represents a critique, which is equivalent to the importance of the claim considering the possibility of harm to the stakeholder's property, feelings, expectations or exposure (Mitchel, Agle, & Wood, 1997).

The levels of influence were determined according to the number of attributes the stakeholders possess in the conflict. In other words, if a stakeholder has power, legitimacy, and urgency, his influence will be permanent. On the contrary, if a stakeholder only has legitimacy, the level of influence will be low or latent (Mitchel, Agle, & Wood, 1997). If a stakeholder has two of the attributes, the influence level is "expectant," which means that these stakeholders are waiting to gain the third missing attribute to become powerful and influential.

Accordingly, the seven levels of influence include the following: Dormant (1), Demanding (2), Discretionary (3), Dangerous (4), Dominant (5), Dependent (6), and Definitive (7)



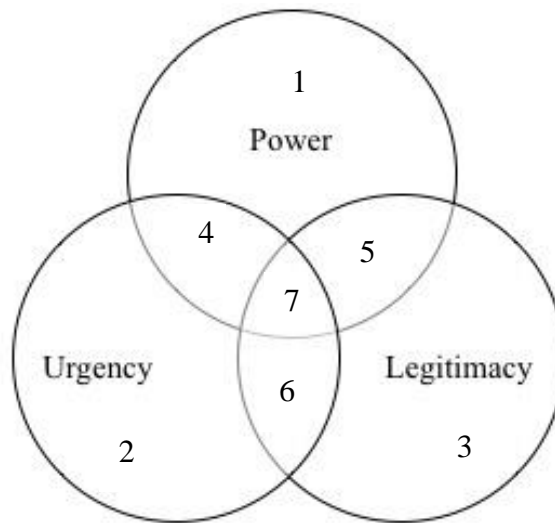


Figure 7. Level of interest per attribute  
Source: Mitchel, Agle & Wood (1997).

The dormant subcategory (1) references a stakeholder that has power, but no legitimacy or urgency. To provide an example, this type of stakeholder could include a company that has money, but it is not legitimized by other actors to gain influence, and does not possess urgency, in the sense that it is not attracting attention from other stakeholders. The demanding type (2) includes those stakeholders that possess the “urgency” attribute, but don’t have power and aren’t legitimized. The discrete stakeholders (3) are those that don’t have the power or the urgency but possess legitimacy. An example of these stakeholders could be an NGO or a charity. The dangerous stakeholders (4) are those that have power and urgency. While these have no legitimacy, they can use their claims and resources to act “dangerously.” In a few examples provided by Falcao and Fontes (1999), these stakeholders’ actions included strikes, sabotages, or even hostile takeovers (Falcao & Fontes, 1999).

The dominant stakeholder (5) possesses power and legitimacy, and no claim of urgency because this actor is usually the strongest. Meanwhile, dependent stakeholders (6) have urgency and legitimacy without power. These stakeholders depend on the power of others to ensure their interests are being addressed and not marginalized. An example of these type of stakeholders is a local community that could be having urgency claims towards a dominant stakeholder, while looking for support in a dormant government. Lastly, the definitive stakeholder (7) possesses the three attributes and is prioritized over any other actor or stakeholder involved in the conflict (Mitchel, Agle, & Wood, 1997).

These subcategories of stakeholders and level of influence they had in the Valdivia plant conflict were done considering their role in both examined timelines of events included in this research.

The qualitative findings of this thesis incorporated all of the sources to form a comprehensive story about the environmental inequalities and the local and structural forces behind them in the case study. Extensive explanations about these environmental inequalities are explored in the following results section.

## CHAPTER 5. RESULTS

The thesis main research problem and question asks: How do the stakeholders' relationships produce environmental inequalities in the Valdivia plant case study?

This question is answered in this chapter using Pellow's EIF model (2000), and is addressed by examining the following sub-questions: Who are these stakeholders and what do they want? How do these stakeholders negotiate different environmental outcomes in the case study? And lastly, how do Environmental Inequalities unfold as an outcome of these stakeholders' relationships?

This thesis results section presents how these struggles firstly revealed the active role and power that communities previously referred to as “victims” took in the Valdivia plant case study. Secondly, showed the different environmental outcomes that these struggles had in two geographical settings; and thirdly, uncovered the underlying causes of environmental inequality to explain how these unfolded in the Valdivia plant case study.

### **Who are the stakeholders and what do they want?**

This question was answered by firstly developing a timeline of the most relevant events from both stages of the case study (figure 8 and 10). The main stakeholders appeared from these events and were framed within broader categories, such as producers, the state, and the communities, but after the revision and interpretation of the secondary sources, these categories were modified to include citizens' movements instead of the entire community of the impacted region. The scientific and academic community was also incorporated as a stakeholder.

The main findings from this sub-question examines the stakeholders' interests and power dynamics to characterize them accordingly to their influence and active participation in the events that conform the Valdivia plant case study.

According to the first events that represent the case study, which occurred with the formulation of the first and second EIA study of the Valdivia plant, the main stakeholders were categorized as the company (CELCO), the state, and the “sea defense committee” formed in the Maiquillahue Bay. During the second period of events, and once CELCO had already built the plant with a tertiary treatment of the effluents in Mariquina, the relevant stakeholders were coded to include the company, the environmental institutions, the citizens' movement formed in the Valdivia commune (AXC), and the scientific and academic community.

The stakeholders' identification within the first level of coding abstraction, resulted in 4 major categories and characterizations according to their interests and power dynamics.

### ***The company***

The first one recognizes that the company, CELCO, needed to maintain access to the environment to continue the extraction and production of primary and secondary materials in the forestry business. The coding of this category was done considering the documents and archival records developed by CELCO, in which the same company defended their actions (CELCO, 2005). The reviewed documents showed this stakeholder's interests and considered its monetary power and capacity to generate jobs for people. Furthermore, the company's statements concerning their involvement with

the affected communities about the contamination of the river indicated that CELCO used the "good neighbor" approach to claim that they had nothing to do with the pollution because their plant was clean. Still, they would do "*anything in their power to help recovering the wetlands' previous state*," agreeing to participate in an integral Management Plan for the Sanctuary and wetland (WWF, 2005). According to the sustainability reports of the plant, the company stated that:

During 2004 the C. Anwandter Nature Sanctuary showed a reduction of the aquatic plant called Elodea (*Egeria densa*, a non-native plant introduced in the area), which caused a mass migration of the black-necked swan population (*Cygnus melancoryphus*) as well as the death of some specimens. In 2004 ARAUCO performed several studies on the wetland ecosystem including quality and toxicity of effluents, the interrelation between effluents and the environment and other research to determine the causes of the reduction of Elodea. None of these studies found evidence indicating that the Valdivia Mill effluents have affected the Nature Sanctuary. The company is convinced that the reduction of Elodea is not related to the Valdivia Mill operation (CELCO, 2005).

However, the literature shows that the high environmental risks in their start-up phase, insufficient controls, and inadequate monitoring from the company's side provoked the contamination of the River (WWF, 2005). However, the company didn't claim responsibility until 2013.

CELCO corresponds to the leading actor regarding interests, considering that it is the owner of the Valdivia Plant and oversees the billion-dollar investment made by the company in the region. The company characterizes for being the actor with the most significant capacity for mobilizing resources and lobbying with political authorities, at both the regional and national levels.

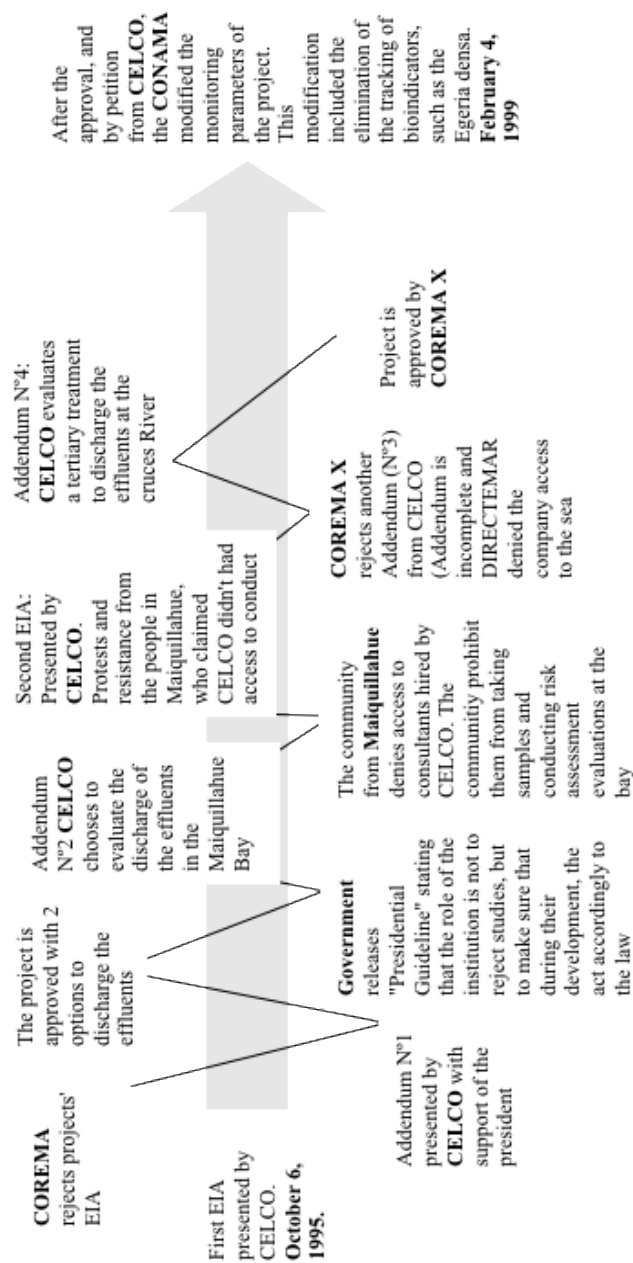


Figure 8. Stakeholders' involvement during 1995 and 1999.

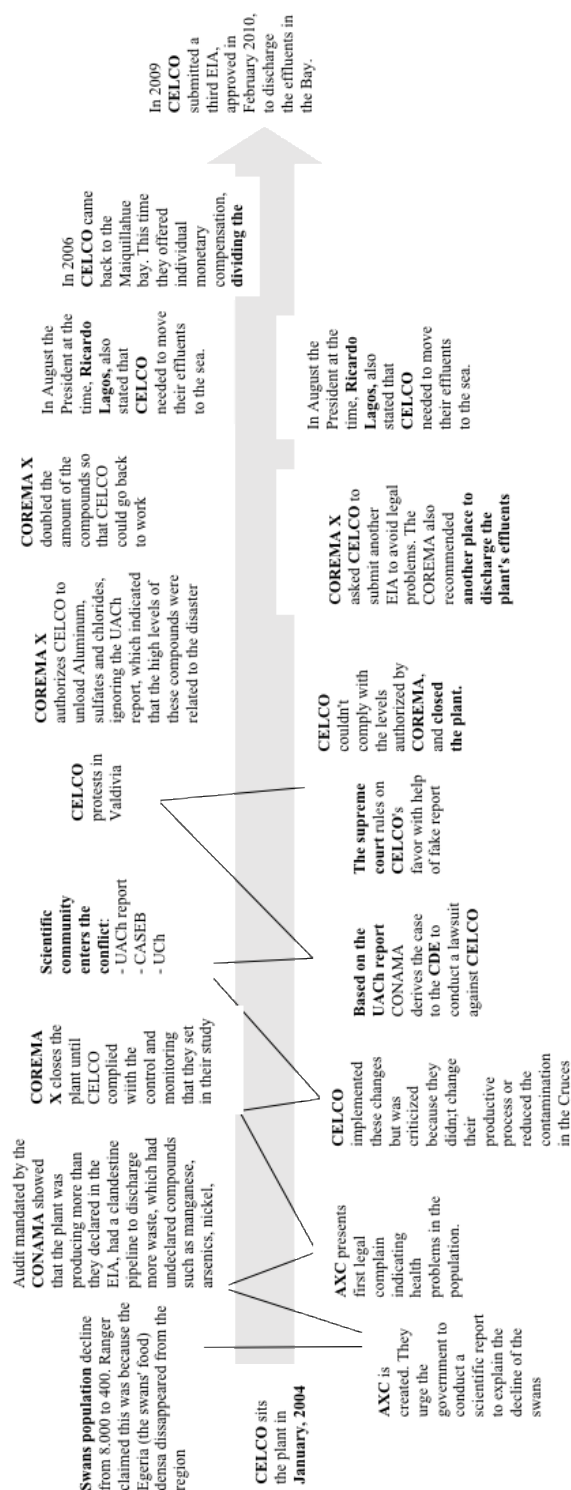


Figure 9. Stakeholders' involvement during 2004 and 2007.

An example of the latter was the millionaire negotiation that they managed to carry out with a part of the Mehuín community, with whom CELCO celebrated a "Collaboration Agreement." Other examples include the public endorsements made by former presidents Eduardo Frei and Ricardo Lagos to the company, in 1996 and 2005. The company presents the attributes of power, by counting with coercive resources; and also, legitimacy, by being acknowledged as a world-class industry in the region and the country. By these parameters CELCO would be a **dominant stakeholder**.

In some events CELCO presented attributes of urgency (e.g., the worker's protests, the company's voluntary closure), where they achieved more things from the environmental authorities and citizens' movements. First, when the plant closed its facilities the authority relaxed the environmental parameters, so the company could return to its production cycle. Second, the workers claimed that the AXC citizens' movement was trying to take away their jobs, taking their legitimacy and attention.

In summary, CELCO was classified as a dominant stakeholder, except in the cases where it presented urgent demands, where it was defined as a **definitive stakeholder**.



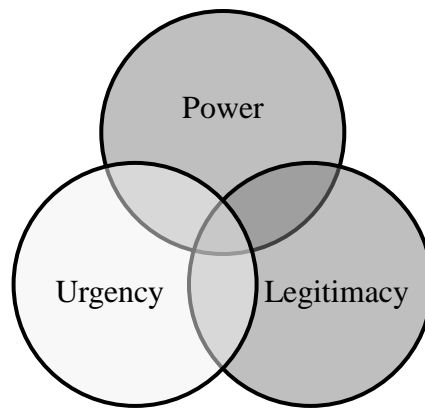


Figure 10. CELCO's influence.

### ***The state***

The second one, which included the data collected and coded from the state and the environmental authorities, resulted in the struggle of the institution to balance the conflicting needs of the environment and the economy and to maintain its authority and legitimacy. These results considered statements and archival records in which the state and environmental authorities were completely sided with CELCO, and others in which the state declared the war against pollution, targeting CELCO for its contaminants and effluents. These statements included an initial support to the plant's project, which was presented to the Maiquillahue bay's community as a clean, low risk and pollution-free endeavor. However, after the air and water pollution that deteriorated the region and the Sanctuary, even the Chilean president of the time, who was an ally to CELCO in other occasions, noted that "the company damaged the country's credibility" (El Mercurio, 2005).

The state and environmental institutions, were identified in this section as influential. However, the influence that they practice is problematic. These actors, the state and

environmental authorities, have power but permeable to political influence and interest groups. The COREMA X represents these characteristics when the organism exceeds its functions and resolve politically in favor of the interest of the Executive Power and the company CELCO. However, they also rejected the EIA studies presented by CELCO and hired scientific reports to clarify who polluted the Rio Cruces, responding to pressures from citizen movements from Valdivia. The environmental authority understood as part of the state's body, has both the attribute of power and legitimacy, being identified as a **dominant stakeholder**. However, during the first events and opposition from the Maiquillahue community, the sea defense committee delegitimized the state body, remaining outside of the environmental regulations and the EIA evaluation system. Hence, in these occasions the government was a **dormant stakeholder**.

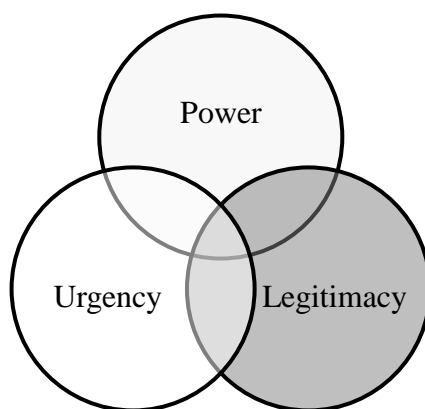


Figure 11. The state and environmental authorities influence.

### ***The citizens movements***

The collected data from the citizens' movements was coded considering these stakeholders claims for jobs, clean air, monetary compensation, participation in the decision-making process, autonomy, and justice for the environment and its people. Their

interests were coded differently in both stages but reflected their opposition and struggle mainly against CELCO, and secondarily against the state. The coding of the Maiquillahue Bay's actions included surveillance tactics used to avoid contact with the company and the state, and educational outreach about the plant's impact around the community. The coding of the activities of the AXC movement included mainly legal actions and dialogue with the state authorities (Skewes, 2004; Skewes & Guerra, 2004).

The committee was the primary opponent of the pipeline that would discard the plant's effluents in the sea. Since the plant's project had received official political support from the President Frei, the people of Mehuín considered that the CELCO pipeline was already approved, so taking part of the EIA assessment would only legitimize that decision. The community recognized CELCO as a powerful entity, reaching a state of sensitive to that power. However, they still claimed urgency concerning their sea resources, and the people from the bay realized they needed to convince people about their struggle, to gain influence. When they presented their uncertainties about the CELCO's project to the DIRECTEMAR, and their claims were considered, they gained legitimacy and power. They gained legitimacy because the navy trusted their practical knowledge concerning the preservation of the bay, and they gained power by proxy because the navy was the authority in charge of granting the permission to use the maritime territory. The DIRECTEMAR denied CELCO the permit to work in the sea, and because of that, the community of Maiquillahue reached the status of a **definitive stakeholder**, stopping the plant from discharging its effluents in the Maiquillahue territory.

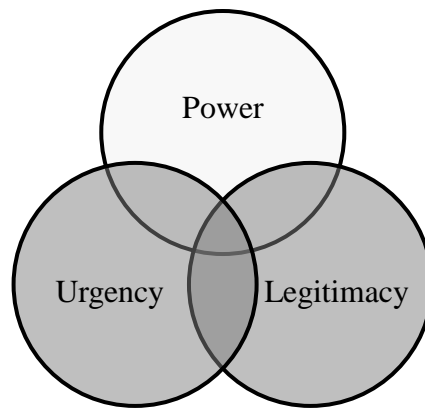


Figure 12. The “sea defense” committee influence.

The "AXC" movement is one of the resisting actors of the second timeline of events examined in this thesis. The movement, which appeared after the pollution of the Nature Sanctuary, represents the feeling of the Valdivian people. The movement accused CELCO for being the main responsible of the pollution of the Cruces River and mobilized to get the company's permit revoked. Between other interests, the group also focused on the recovery of the Nature Sanctuary. The influence attributes of this movement included urgency, both towards the access to environmental decision-making, and the restoration of the wetland. The movement was identified as a **demanding stakeholder**. However, if they had managed to win any of the appeals that they filed at court, the AXC movement would have consolidated itself as a **dangerous stakeholder**, understanding this stakeholder as a highly influential stakeholder that would have been able to cause a definitive closure of the plant. Moreover, in some occasions the environmental authority legitimized the demands of the citizens' movement and supervised CELCO more actively. During these events AXC was understood as a **dependent stakeholder** of the State and the environmental authority.

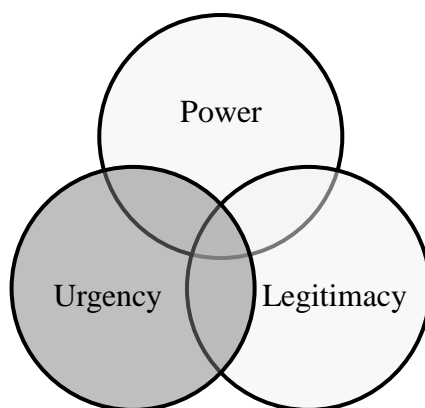


Figure 13. AXC influence

Lastly, the data collected from the scientific and scholars' community was included in the case study because of these stakeholders' participation and capacity to provide information about the risks of hazardous discharge of pollutants into the Cruces River. These actors gained influence particularly when the COREMA ask them to determine the causes of the contamination of the Nature Sanctuary. The job was taken by the UACH and given that their report blamed CELCO for increasing the levels of heavy metals in the Cruces River and wetland, and for decimating an entire species of black-necked swans, the UACH became a relevant actor in the conflict.

### ***The scientists and academic community***

These actors gained influence particularly when the COREMA ask them to scientifically determine the causes of the contamination of the Nature Sanctuary. The job was taken by the UACH in 2005.

Given that their report blamed CELCO for increasing the levels of heavy metals in the wetland and for decimating an entire species of black-necked swans, the UACH became a

relevant actor in the conflict. However, the company exercises their power, hire new studies that could refute the thesis originated from the UACH.

The university influenced the conflict by claiming urgency about the damage of the wetland. The institution was also legitimized for being the home university of the region. Nonetheless, the scientific establishment was pervaded by CELCO and its mobilization of resources to refute the University's report, provoking a loss in power, diminishing their legitimacy.

Ultimately, it was determined that the scientific community and academics correspond to a **dependent stakeholder**. To achieve full influence in the conflict these scientific and academic institutions required another stakeholder with power, to be validated. The latter would have been the case if the COREMA had reacted and use the results of the UACH's report once these delivered the products that blamed CELCO for contaminating the River. However, they didn't.

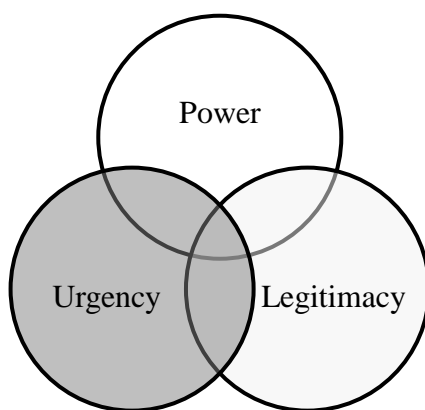


Figure 14. The scientists and academic community influence

### **How do these stakeholders negotiate different environmental outcomes in the case study?**

The second level of coding abstraction showed that the different environmental outcome in the geographical settings of the Maiquillahue Bay and the Cruces River included a coincidence component, race explanations, and issues concerning the access to local knowledge versus scientific knowledge.

#### ***Accidental component***

The abstraction of the coding techniques after the analysis of the gathered data found that the accidental component of the siting of the hazardous facilities played an important role in determining the different environmental outcome in both geographical locations. In the Maiquillahue Bay, the analyzed documents showed pivotal moments that differentiated this community from others. These results and analysis show that the behavior of the state and the company towards the community fueled the movement when two events happened. First, when the environmental authorities rejected the EIA project submitted by CELCO, but then changed the resolution approving the study with the condition of changing the stationary point of the effluents, the community in Maiquillahue distrusted the government, and wanted anything to do with them (TVN, 2011). For the Maiquillahue Bay's community, the EIA studies were just a formality to get the company's investment projects approved, so they excluded themselves from the SEIA system (Sepúlveda & Villarroel, 2012). Second, back in 1995, the consultants hired by CELCO arrived at the bay saying that the company wanted to evaluate the soil to make improvements in what is known as "the barra," a fishing zone. The fishers from

Maiquillahue were happy about the possible improvement and invited the consultants to a party with the entire town. As discussed in the literature review, one of the consultants had too many drinks and admitted that the improvements of the barra were a lie and explained that they were there to take samples to update the company's EIA study to build a waste pipeline in their shore (TVN, 2011). This deception generated distrust and paranoia in the community. The consultants were kicked out of the bay, and the town implemented a 24/7 watch to prevent any EIA study to ever be conducted in the area. Whenever CELCO tried to enter the harbor, the sea defense movement would close the road with barricades or got into the sea in their fishing ships to prevent CELCO from entering their territory (TVN, 2011).

The siting of the plant in Mariquina, on the contrary, was presented to the community in a public forum, in which the members of the community celebrated the arrival of jobs and dynamism to the region (Valdivia Project, 1995).

These findings conclude that there was a coincidence component that allowed the Maiquillahue Bay to have a different environmental outcome in comparison to the Valdivia plant's nearer communities. If the consultants had remained quiet about their real activities in the bay, there is a possibility that the environmental outcomes would have been different.



### ***Race***

The race component found in these results show that there were three major arguments that contemplated this factor as relevant when discussing the different environmental inequality formation between the Maiquillahue Bay and the Cruces River basin

The first argument conveys the level of organization of the indigenous communities. According to Skewes, the relation that the indigenous groups in the Maiquillahue Bay had with their cultural heritage was strongly related to their coastal identity. This profound sense of identity as a coastal community resulted in high levels of organization and unity in the movement, which allowed them to stay together to resist the company's pipeline (Skewes, 2004).

A second argument was found to have relation to the indigenous meanings and understandings about the environment. Representatives from the Maiquillahue bay' community claimed that:

The Mapuche culture and language derive from nature, and this language, which comes from our natural resources, are right here. It is a language that comes from the ocean. What would it be not to defend these places? It would be as if culturally dying (excerpt of a conversation with Boris Hualme, in Skewes & Guerra, 2004:225).

The understandings about their natural environment gave them strength in their struggle against the pipeline and further differentiated them from the communities that inhabited near the Valdivia plant. For instance, to reach consensus, CELCO offered the Maiquillahue Bay one million dollars in infrastructure, labor dynamism, and other job opportunities. The community felt insulted for being asked to lose their identity and

change their ways of life and claimed that they would never receive money from the company (Sea defense Committee, 1996).

The third and last argument refers to the indigenous movement's 500 years of struggle against the state and corporations (Carruthers, 2008; Carruthers & Rodriguez, 2009). For some of the members of the Lafkenche community, the struggle against CELCO was no different than the claims of autonomy that they were demanding for over centuries in their territory (Skewes & Guerra, 2004). The people from the bay claimed that the fight against CELCO was one of many (Skewes, 2004). Moreover, the indigenous communities in Chile have received recognition thanks to the involvement of international organizations, such as the ILO. Chilean indigenous communities are protected by international native laws, which allow them to claim their rights for access to any decision-making process concerning their territory (CONADI, 2017). When this access is denied, indigenous communities such as the one in Maiquillahue Bay, have more leverage to litigate in comparison to regular communities (Carruthers & Rodriguez, 2009).

### ***Local knowledge v. scientific knowledge***

The people from the Maiquillahue Bay knew that the bay's outsiders would understand their fight if presented with scientific arguments, so one of the leaders of the movement, Teresa Castro, researched the pollution from other cellulose plants in the world. She discovered that local marine species would be affected by the chlorine contained in the effluents (El Diario Austral, 1997). Moreover, due to the tidal regime, ocean depth and strong winds, Castro determined that the bay would have to spend more than 20 years to

recover from this type of pollution (Skewes & Guerra, 2004). Teresa Castro, and other members of the “sea defense” movement, explained these scientific arguments and possible outcomes to the DIRECTEMAR, convincing them about the hazards (Skewes & Guerra, 2004). Later on, the same institution denied CELCO access to the bay, unless they conducted a comprehensive study that included the oceanographic currents, water columns, and biological communities of the bay (Skewes, 2004). This was impossible to achieve as long as the Maiquillahue people stayed united against them.

The EIA studies elaborated by CELCO were never contested in the Cruces River basin, and the plant was built without any mayor opposition. In addition, the inability of the company to conduct the EIA study at the bay allowed their second EIA, which incorporated the tertiary treatment of the effluents discarded in the Cruces river, to get approved with less regulations and scientific rigorosity about the environmental impacts in the River. One clear example was the elimination of the monitoring activities for the *Egeria densa*. According to scholars from the UACH, the monitoring of this alga would have avoided the pollution in the Cruces River (Muñoz, 2005). The scientist and scholar, Eduardo Jaramillo, principal investigator in the UACH report, mentioned that "It was an error of the CONAMA to leave this variable outside the activities, because the biological communities are the best indicator of possible contamination" (Muñoz, 2005).

It is important to note in this section of results that, while local knowledge provided more rigorous examination and research about the effects that the effluents would have in their environment, scientific knowledge, usually provided by the company and the state, didn't provided a serious work and impact assessment, and on the contrary, they focused in the

materialization of the Valdivia plant project, differentiating these types of knowledge production in both settings. This firstly because during the Maiquillahue conflict, the company and the state's knowledge (in the form of the EIA studies) were not available, and local knowledge gained traction and received scientific recognition; secondly, because during the swans' catastrophe research, the knowledge production of EIA studies, and other academic work, were manipulated to protect and ensure the plant's production and economic performance.

### **How did Environmental inequalities unfold as an outcome of these stakeholders' relationships?**

Following Pellow's definition of Environmental Inequality (2000), which is produced when "different stakeholders struggle for access to valuable resources within a political economy in which the benefits and burdens of those resources become unevenly distributed," the analysis of the gathered data and third level of coding abstraction showed that the stakeholders' relationships were producing environmental inequality. This was explained looking at the structural and local forces that resulted to be linked to the unequal access to decision-making processes, the historical facts behind the implementation of environmental laws and regulations, and the lack of access to scientific knowledge production of ecological impacts.

#### ***Unequal access to decision-making processes***

The environmental authorities and their impact assessment and evaluation system (SEIA) have operated as the only conduit by which the uses of the territory are being decided (Sepúlveda & Villarroel, 2012). This has been performed on a "case-by-case" basis

mediated by the investors who have had the advantage of proposing the location of their projects without the responsibility of environmentally assessing alternatives, as in the case of the EPA in the US (Tecklin, Bauer, & Prieto, 2011). Moreover, the current system excludes most of the people from the decision-making process because the opportunities of involvement are placed at the end of the process, when all the important decisions regarding location, scale, and technology have already been made (Sepúlveda & Villarroel, 2012). The AXC citizens' movement was formed in response to this lack of participation. Actions were agreed upon and organized inside of the AXC, where the objectives of the group were four:

Support the search for the truth about the causes of the disaster; Inform citizens, authorities and local opinion groups about the disaster and its causes; Take legal action and citizen mobilization; and systematize and disseminate information to assess the gravity of the disaster and repair its causes (AXC, 2004).

The AXC movement stated from the beginning that the "Angelini Star" forestry company was the sole responsible for what happened to the swans (La Nación, 2004). Acting in coordination, and with full knowledge of the law, the movement presented claims to the court on several occasions. The latter led by the lawyer of the AXC movement, Vladimir Riesco (Austral Valdivia, 2004b). By submitting protection claims against the company and its executives, the AXC was actively looking to get a reversal of the RCA of the plants' project (AXC, 2014). However, the claims they filed to the court rejected the option of a revocation of the RCA, because the court stated that the company had already been fined accordingly. Nevertheless, the movement's members manage to put themselves in the discussion and in the decision-making process surrounding the

environmental impacts of the region, by elaborating reports and documentation about the company's infractions and transgressions, and by influencing the state authorities (Sepúlveda & Villarroel, 2012; AXC, 2005). Still, there was something wrong with the environmental laws and regulations.

### ***Environmental Laws and regulations***

The lack of environmental protection was visible in this case study. Even when the first EIA submitted by CELCO to the environmental authorities was rejected, the Chilean president at the time, Eduardo Frei, endorsed the plant, forcing the technical committee of the COREMA X to reconsider their decision, showing a fragile and permeable environmental institution, and an even a more skeptical public (Sepúlveda & Villarroel, 2012). This section presents a relevant historical finding related to the structural and local forces that produced environmental inequalities by looking at the formulation of the environmental institutions in Chile.

In the 1970s, an economic policy based on free-market doctrines was initiated in Chile (Harvey, 2007). The new development strategy sought economic growth through the deregulation of the economy and openness to foreign trade (Kay, 2002) The most characteristic measures of the new development style was the substantial reduction of tariff protection and the incentive of participation coming from foreign capital in domestic economic affairs (Torres et al., 2015). The ongoing process also included the decline of the State's participation in the productive development of the country and the progressive privatization of its companies. In the forestry sector, the native forest was considered as a renewable natural resource that was called to contribute notably to the

economic development of the country (Kay, 2002). Moreover, it was argued that forestry activities were one of the most sustainable practices because the reforestation of thousands of hectares in an advanced erosion process would have allowed the recovery of these soils, increasing their value and productivity, and incorporating them to the economic development (Susaeta & Benedetti, 1990). Furthermore, the development of environmental awareness in Chile allowed the inclusion of the Article 19 No. 8 in the 1980 Constitution, which "*assures all people the right to live in a pollution-free environment*" (Ministerio del Interior, 1980). This law established specific restrictions on the exercise of certain rights and freedoms to protect the environment. The presidential elections of 1989 and the installation of the democratic government of Patricio Aylwin (1990-1994), allowed the Country to define a new period in the environmental history of Chile (Camus & Hajek, 1998).

Citizens and media worries about the environment became more intense at the end of the 1980s, however the principles that guided the country's environmental policy were those of economic stability. The environmental authorities were seeking not to discourage the economic development by gradually incorporating the ecological dimension in reasonable terms when considering both the magnitude of the environmental problems and the form and opportunity in which they were approached (Camus & Hajek, 1998).

By these political principles, on June 5, 1990, the President of Chile signed the Decree-Law that created the National Commission of the Environment (CONAMA). This Commission was responsible for defining an environmental policy and institutional framework for the country (BCN, 1994). In the legislative aspect, the CONAMA, aware

of the vast amount and dispersion of legal norms with environmental relevance in the country, carried out a complete inventory that allowed to fully identify the norms related to the environment (Camus & Hajek, 1998). The CONAMA also started the "Law on General Bases on the Environment." This Law, N°19.300, was published on March 9, 1994, and it created the new structure of the National Commission of the Environment (CONAMA) (Presidential Message, 1992).

One of the first initiatives of the CONAMA was to incorporate the environmental dimension in the ministries' management and to generate coordination aimed at integrating and strengthening the sectoral capacity of each ministry or State institution that had environmental topics in their statutes. In addition, this agency initiated an environmental impact evaluation program, which, despite not being mandatory, began to be applied by the ministries in their investment projects, according to the "Presidential Instructions for the environmental evaluation of investment projects" among other studies and texts of support elaborated by this institution (Presidential Message, 1992).

Chile managed to base its growth toward the ends of the 1970s in the market economy. Since then, the development of the external sector of the economy has maintained a rate of permanent increase (Camus & Hajek, 1998). Moreover, "the dynamic growth, together with a very orthodox and obsessive neoliberal economic policy [in Chile], was associated with a weak environmental protection in sectors such as mining, cellulose, fishing, forestry and fruit production" (Alvarado, 1995).



### ***Knowledge production and access to the truth***

Access to scientific knowledge and its production in Environmental impacts is not always possible, and it was found that the struggle surrounding truth produced environmental inequality in the study area. At the same time, power affects who produces the legitimate knowledge. Examples of both locations explain this more generally and in relation to the power dynamics between the stakeholders and the functioning of this institution (SEIA) and the neoliberal state.

Concerning the EIA evaluation process and its creation, the president of the republic, Patricio Aylwin, addressed the following in his presidential message:

The project has gradualism as an inspiring principle, and it does not intend to require from one day to the other the most demanding environmental standards, nor to subject all the activities of the country, regardless of their size, to the environmental impact assessment procedures. Nor does it intend to contain all the environmental provisions that need to be created. On the contrary, the intention is to begin a process of environmental regulation, of which this is the first step, but there are still many more to be done. Consequently, it will only give the general framework that will be applicable to all activities or resources in which, subsequently, a special legislation will be created. In this way, the appropriate framework is created so that, immediately after the project has been dispatched, we can begin to discuss, for example, a law on air quality. The evaluation process will not claim that all projects, of any nature and scope, are subject to the environmental impact assessment system, since neither the public nor the private sector are prepared to face a challenge of that nature (Presidential Message, 1992).

Following this principle, in November 2004, the national director of the CONAMA (in charge of the already approved EIA studies of the plant) hired the UACH to conduct a scientific study about the causes of the massive death and migration of the black-necked swans from the wetland. This action was pursued only as a result of the AXC movements' pressures to the institution. The scientists and academics from the university

delivered the final report in April 2005, concluding that the discharges from the plant were the ones that contaminated the stream of the Cruces River, provoking the death and migration of the black-necked swan (UACH, 2005a). However, the CASEB contrasted the results, along with other scientific and academic organizations, downplaying the work done by the UACH. The CASEB argued that among the 37 conclusions determined by the UACH, only nine were right, 13 were not, and 15 were doubtful (CASEB, 2005). The UACH responded to the report commenting that the work done by the CASEB was barely a study. It didn't presented samples, or analysis of visits to the wetland, and provided only comments, and no new data, to the results of the scientific report made by the UACH.

It was later found that the CASEB was hired by CELCO, discovering how pervasive knowledge production of environmental impacts and risks can be in this case study. Moreover, the scientific and academic community felt that the environmental institution was in debt with the truth in their organization (UACH, 2005b).

The report and study conducted by the UACH were validated by the CDE to lead a lawsuit against CELCO (El Ciudadano, 2006). But even then, the inclusion and validation of counter-studies were legitimized by the Supreme Court at the trial against CELCO. The Supreme Court exonerated the company based on a fabricated report that exculpated CELCO from being responsible for the pollution of the River (EULA, 2005). The report, which was allegedly written by the EULA institute of the Concepcion University, argued that the effluents did not presented an excess of iron, the compound found in the dead swans' bodies. After the ruling in the company's favor, CELCO admitted that they made a mistake with the quotations of the report, which was written by

them, not the EULA institute (Duran, 2005). Still, the supreme court did not change the ruling, and CELCO continued their activities (OLCA, 2005). It was found that the UACH struggled to validate their report showing how the environmental regulations and institutions were design to support the materialization of investment projects in the country, and to keep social actors not only outside of the decision-making process, but also outside of the knowledge production system, where their understandings are not considered unless they are aligned with the neoliberal model of production, characteristic of Chile.

As a summary of the results, the analysis of the collected and analyzed data revealed that: firstly, the stakeholders' participation was not passive; secondly, the identification of the factors that allowed different environmental outcomes to happen in the Maiquillahue Bay and in the Cruces River included an accidental component, different emphasizes in local/practical knowledge and scientific knowledge, and racial discrimination explanations; and thirdly, the linkages between the stakeholders' relationships showed that the unequal access to decision-making processes, the historical context of the Chilean environmental laws and regulations, and the lack of access to knowledge production, were relevant to explain the structural and local forces that produced environmental inequality in the case study.

## **CHAPTER 6. DISCUSSION**

This thesis aim was to examine the Environmental Inequality produced in the Valdivia plant case study, doing so by qualitatively assessing two stages of events inside the case study with the help of secondary sources of information. The examined events were useful to identify the stakeholders' relationships and to determine: 1) their interest and actions, 2) their different outcomes in two geographical spaces, and 3), the structural and local forces that moved them to co-produce environmental inequality in the study area. This chapter reiterates this thesis' research problem and hypotheses to answer the research question, discuss and interpret the results, and connect this thesis' findings with other similar studies. Moreover, this section will conclude with the study's limitations, a summary of the key findings, and further research opportunities to cover these research topics.

The examination of the Valdivia plant' case study showed that the company's environmental responsibility, the market dynamics, and the relative lightweight of the environmental law in comparison to other laws, e.g., private property laws, were the principal worries reflected in this case study (Garcia et al., 2006). According to Garcia et al. (2006) the Valdivia plant was considered particularly problematic because of the political nature of the decision-making process.

### **The identified stakeholders**

Starting with the first sub-question and considering the multistakeholder perspective from Pellow's EIF model, this thesis' first hypotheses seek to find that the stakeholders

involved in the case study are not inserted in a simple perpetrator-victim scenario, but that instead, they participate actively in the formation of environmental inequality. This is found to be true, mainly when looking at the analyzed events. These show political intervention, alliances, negotiations, and resistance practices between the identified stakeholders; all of which can avoid or produce environmental inequalities, according to their levels of influence (Mitchel, Agle, & Wood, 1997). Pellow paid attention to the multistakeholder activity in his work on "Environmental Inequalities Formation," where he applied his model in the case study of the Chicago WMI recycling plant (Pellow, 2000). He determined that the negotiation and collaboration between stakeholders, independently from their race or income, provoked environmental inequality outcomes inside the workplace of the recycling plant. In Pellow's case, only one group of stakeholders was burdened with uneven exposure to environmental hazards: the workers of the plant. Coincidentally, these were the only group left out of the decision-making process concerning the recycling plant, who celebrated a collaborative approach between the company, state, environmentalist and the community (Pellow, 1999; 2000). EJ studies document these situations, paying attention to this deliberative/non-deliberative consideration of some stakeholders over others.

Many EJ scholars argue that there are sociopolitical explanations that elucidate that power dynamics, in the context of unjust decision-making processes, exclude the communities that are weak in comparison to those who are strong (Camacho, 1998; Mohai et al., 2009).

In Pellow's case study, these "weak" workers were the ones who started the resistance to the plant's activity, achieving compensations, litigations, and penalties against the recycling plant because of the dangers associated to the workers' occupational hazards (Pellow, 2000). These events are important for many reasons: the relationships between stakeholders produce environmental inequalities at the moment they do not consider all of the actors that may be affected by an environmental decision. Moreover, in these relationships, resistances practices from one of the left-out groups are bound to happen, and they are critical to moving the scale down or up in the production of environmental inequalities. In this case, Pellow notes that even the stakeholders with relatively little power in comparison to the company, such as the plant's workers, can shape environmental inequality when changing or altering some of the conditions of their burdened environment (Pellow, 2000).

The tensions between the company, state, scientists, and citizens portrait in this thesis, expose how essential it is to look at the background, interest, and influence that these stakeholders possess when contextualized in environmental conflicts. As it was illustrated throughout this case study, the relationships between CELCO, the state and environmental authorities, the scientific and academic community, and the citizens' movements from Maiquillahue and Valdivia (the AXC movement), showed that their role in the conflict of the Valdivia plant was highly political. Their influence in producing environmental inequalities was determined by their political clout when negotiating their interests (Camacho, 1998). The analysis of the process of formation of Environmental Inequalities, to which vulnerable groups of peoples are unevenly exposed to, considers

these hierarchies of power, and the context in which these develop in the Chilean setting (Budds J. , 2004).

In this regard, this thesis revisited the uneven access to environmental decision-making processes in the Chilean regulatory entities, which benefit a few, in detriment of many. These regulatory bodies include the environmental law, regulations, the highly technical and "private" scientific knowledge production in risk assessment studies. Moreover, the appearance of resistance movements was also important to understand their ways to get into the debate.

The stakeholders left behind are mainly the communities, which commonly have to struggle against the state or corporations to improve their burdened status. However, sometimes they receive support, as it was seen in the Maiquillahue Bay events. In the case study context, the recognition of the fishers knowledge by the navy, and the need to explain the truth coming from CELCO consultants, showed that the struggles for recognition and justice are also extended and legitimized by other actors, commonly thought of as in positions of power, showing how stories of success in avoiding hazardous facilities can be explained under the context of cooperation between different stakeholders.

The state and the corporations are also relevant in the model. Many authors discuss that the state acts as an "ambassador," or is colluded to the industry, exercising its power more often in the name of the corporation, than the communities (Pellow, 1999; Pellow et al., 2001). In the Valdivia plant, the findings showed a conflict inside the state, which

struggled with trying to separate the health of the economy, with the stability of the environment. In the Chilean context, the state is usually portrait as "in the middle", particularly for this situation.

In summary, these findings show that the understanding of the stakeholders as relevant is key to avoid future environmental inequalities in the study area. The multiple stakeholders' perspective can be useful to inform the state, corporations, environmental Planners, and the communities, about the need for inclusion of all groups in environmental issues.

**The role of the stakeholders' relationships in the avoidance or production of environmental inequalities: race, autonomy, and accident components**

The second sub-questions hypothesis seeks to explain if the avoidance and the production of environmental inequalities were a product of the negotiations and conflicts between the stakeholders involved in the two stages of the case study. In this question, the goal was to answer to what were the reasons behind the different results in the Maiquillahue Bay and Cruces River' study area. The question is answered, and the hypothesis is achieved, but it leaves out other important factors in the avoidance of production of environmental inequalities, such as the accidental component, which was an unexpected result from this case study.

The negotiation and conflict between stakeholders in both stages showed that, while in the case of the Maiquillahue Bay the claims of autonomy and inclusion of local knowledge helped the community to stop the plant from locating a waste pipeline in their



territory, in the Cruces River basin the public acceptance of the plant's siting was the main cause of environmental inequality. In both settings the resistance practices coming from citizens movements actively shaped these outcomes too. As discussed by Pellow (2000), the wrongly categorized "weak" stakeholders, such as vulnerable community members, can also be active agents in the production of environmental inequality, and in the Valdivia Plant, both movements could have been the trigger of environmental inequality. When the Maiquillahue Bay stopped CELCO from siting the waste pipeline in their territory, they might have indirectly prompted an environmental inequality outcome in the Cruces River. Although, this assumption is unfair considering that the initial EIA's project submitted by CELCO was supported by the public of Mariquina and Valdivia even when the study contemplated the discharge of effluents into the Cruces River.

The main findings from this section showed that the positive internal discrimination of indigenous communities and their identity towards their territory played a fundamental role in the avoidance of environmental inequalities. This was explained considering that ethnic communities have better access to environmental laws and a strong connection with their land (Skewes, 2004; Skewes & Guerra, 2004). Their environmental claims when protecting their territory were also discovered to be significant.

The community members of the Maiquillahue Bay have been demanding autonomy to manage their resources for over more than 500 years (Skewes & Guerra, 2004). In this dynamic, the community excludes themselves from any conversation or collaboration with the state or the company when these types of conflicts arise (TVN, 2011). Unlike them, the communities affected by the Cruces River contamination, even when looking to

reform the entire way the state envisions the environment, still legitimize their actions. In an interview conducted by Laura Pulido, David Pellow mentioned that becoming complacent with the state, as the community of the Cruces River did, is a colossal mistake (Pulido, 2017:49). This statement is shared by Peña, who mentions that when a community looks to accommodate their demands within the existing bureaucratic regulatory regime, problems arise because these regulations are committed to exclusionary politics which many times include expert-driven EIA studies (Peña, 2003). In this same line, the Maiquillahue community had no other choice than to produce their scientific knowledge, and this was ultimately fundamental to consolidate their claims to avoid the siting of the waste pipeline in their territory. Considering Peña's point about participating with and legitimizing the state, the AXC citizens' movement only ensured that they would comply with the undemocratic environmental institutions. Being inside of the system would have never allowed them to achieve their goal of closing the Valdivia plant.

Another relevant finding of this section showed that the avoidance or production of environmental inequalities could also be a result of a mere accident. Although these results do not fit the theoretical framework under which this research is framed, it is impossible to discard this possibility, especially considering the events in the Maiquillahue Bay. Considering this occurrence, in which the member of the community discovered the true intentions of the company's consultants, this finding provides further evidence about the harms of hiding relevant information about possible impacts on the environment.

These findings are significant because of two reasons: they inform about how citizens' movements can get their demands heard, and they explore deeper aspects concerning the social composition of a community. They are also important because they show opportunities in which indigenous communities can develop strategies to avoid the common discriminating factors of polluting facilities.

Finally, this information reveals the relevance of defining autonomy or more moderated claims when looking to fight for environmentally just environments.

### **Environmental inequalities formation (EIF)**

The third sub-question, which asks how the environmental inequalities unfold as an outcome of the stakeholders' relationships and their struggles over resources was answered to reflect what was also postulated by this questions' hypothesis. The stakeholders' struggles reveal the structural and local forces that produce environmental inequality. The findings surrounding this question showed that the linkages between the stakeholders' relationships, along with the search of structural and local forces to explain the formation of environmental inequality, were revealed when examining the unequal access to decision-making processes, the historical context of the Chilean environmental laws and regulations, and the lack of true knowledge in environmental impacts studies.

Moreover, EJ studies are largely understood to "have a relationship with the conditions produced by the region's insertion in the international economy" (Borg Rasmussen & Pinho, 2016:8). These social dynamics generate inequalities that are visible not only because of the existence of hazards and pollution, but also because of the unequal access

to procedural/political justice, recognition, participation, and capabilities (Fraser, 1996; Hunold & Young, 1998; Nussbaum, 2011) of marginalized communities that resist and struggle over resources in Environmental Justice studies. This thesis found that the resources that are being fought for included the lack of access to democratic decision-making processes in environmental policy, weak laws and regulation, and access to objective knowledge production in environmental impact assessment studies, all of which work as structural and local forces that mold and produce environmental inequalities.

One particularly interesting finding in this section was the relevance of the context in which the environmental laws were funded in Chile, bringing to the fore the importance of socio-historical issues in the studies of the formation of environmental inequalities. In this section, this factual finding was the most important to explain the broader causes of environmental inequality in Valdivia. First, and as noted by Camus and Hajek (1998), Chile's democracy period, which started in the year 1990, opened the political realm to start making laws for the environment, but the impulse did not come from national authorities, but instead appeared in response to external environmental demands that required minimal environmental standards in their commercial treaties (Camus & Hajek, 1998). Thus, the new environmental regulations in the country were conceived and design by economic elites who were committed to the neoliberal agenda of the country (Sepúlveda & Villarroel, 2012). This not only partially explain the internal conflict that the current environmental authorities hold in environmental conflicts, but also explains the lack of inclusion in environmental decision-making process, leaving the “citizens’

participation” aspects of the regulation to be interpreted and followed by EIA experts, politicians, and lobbyists (Silva, 1997).

The hypothesis and the findings of this section relate to previous studies done in EJ, such as the work of Bullard and Johnson (2000), which shows that environmental protection and regulation apparatuses can sometimes reinforce and create inequality in the environment (Bullard, 1996). Looking at the findings about the lack of access to the truth in scientific knowledge production, authors such as Bryant argue that "because of immediate demands for certainty and solution embodied in issue-oriented research, scientists often find themselves in a position of not knowing more than those affected" (Bryant, 1995:15). Moreover, the scientists that produce the EIA risk assessment studies are not 100% sure about the environmental risks and usually venture into uncertain decision-making. Meanwhile, the community affected by uncertainty is rarely a part of that decision-making process (Bryant, 1995). Knowledge production in the Valdivia plant shows that this resource is treated as a commodity, which is "purchased in the market by the highest bidder" (Bryant, 1995). In this case, the bidders are CELCO and the state.

This finding shows how under the social control of powerful forces, the use of science can be more beneficial for some interest groups in detriment of others, causing inequalities in society, and finally producing environmental inequalities in the physical environment.

Bailey et al. (1995) argues that environmental authorities and industrial interests "usually attempt to protect themselves by founding their decision on objective criteria and the

rational logic of risk assessment studies. However, “scientific criteria and logic often ignore the disproportionate burden of environmental and human health risks imposed on minority communities” (Bailey et al., 1995:38).

The struggle among these topics between the stakeholders is visible in the Valdivia plant, where local scientist and scholars fought and failed to include their expert knowledge about the contamination of the Cruces River. The opposite happened in the Maiquillahue Bay where grassroots organizations had the access and influence to publish their local knowledge, educating the public in the streets and accessing to other non-academic platforms to socialize their knowledge (Skewes, 2004).

The authors mentioned in this literature reveal that EIA studies and environmental regulations do not inform and leave the general public out of the most critical stages of the decision-making process, which usually include the negotiated risks, the location of the hazardous facility, and other technical aspects (Garcia et al., 2006; Sepulveda & Villarroel, 2012). Moreover, other findings in this section showed that even when the community can participate in the EIA process, this participation only happens after the project is already outlined (Garcia et al., 2006), leaving out all of the modifications that can be done following the citizens' participation time window, which is 60 days. After this time window, the corporations can rewrite the entire project, as seen in the background and timeline of events on the Valdivia plant, where the company submitted even four ADDENDUMs concerning their interests in the region, but the overall study only had one instance of citizens’ participation.

In the 1970s, an economic policy based on free-market doctrines was initiated in Chile (Harvey, 2007). The new development strategy sought economic growth through the deregulation of the economy and openness to foreign trade (Kay, 2002). And as it was mentioned while reviewing the Political Ecology literature, the causes that explain the production of environmental Inequalities can be concealed behind the social relations that develop in these neoliberal settings, in which the conception of what “environment” is gets distorted include the myriad discourses and right-wing ideologies that leave local knowledge, such as the one of indigenous people, out of the decision-making processes. The Political Ecology approach provides a large social and political economic framework to study the role of neoliberalism in the marginalization of the analyzed communities, along with causal explanations (Robbins, 2004) to the environmental degradation in the Rio Cruces basin, relating these environmental inequality issues with the politics and political economy developed in the country since the privatization led by Pinochet in the 1970s.

By concluding the examination of the Valdivia plant events, this case finds that environmental inequalities/injustices in the study area are not merely outcomes/effects of unilateral relationships between perpetrator and victim. Instead, these relationships and outcomes show a complicated and continuous process that includes different ties between stakeholders that resist, make alliances, negotiate, and change along both stages and timelines of events. These results may help to think about what policies could be used to improve or end the problem of environmental inequality. At the same time, these explanations can also help movements when considering their claims and demands,

which could be guided, for instance, towards the demands of environmental law reforms, or more radical claims of autonomy and independence from the environmental regulation of the EIA system. The inclusion of these three sub-questions contribute to the understandings about the causes and production of environmental inequality, seeing the phenomenon as a process (and not a discrete event), which is mediated by multiple stakeholders' relationships. These relationships are subjected to continuous changes, shifts in interests, and resistances that shape and reorganize the social and environmental disparities along the way. More research should be guided to these topics and understanding about the occurrences of environmental inequality, giving more attention to the linkages between Environmental Justice and Political Ecology studies.



## **CHAPTER 7. CONCLUSION**

Much of Environmental Justice studies document if a community suffering from an environmental hazard is non-white or low-income, ignoring the community's context and relationships with other actors involved. These relationships might reflect the Environmental Inequality Formation as the continuous shaping and change in alliances between multiple stakeholders. By following Pellow's model of Environmental Inequality Formation, this thesis investigated the role that various stakeholders play in the formation of Environmental Injustice in Valdivia. The paradigm used in this thesis is highly relevant considering that much of the Environmental Justice research only documents if the community suffering from an environmental hazard is less powerful, non-white or low-income, ignoring the community's context, dynamic, inputs, relationships, and outcomes with other actors involved (Pellow, 2001).

The key findings of this thesis revealed that the stakeholders involved in the Valdivia plant case study, and the relationships between them played an important role in determining environmental inequality outcomes. The main findings included the description of the stakeholders' interests and adverse events within the case study; the identification of the factors that allowed different environmental outcomes to happen in a geographical area and not in other, and the linkages between the stakeholders' relationships and the production of environmental inequality. These linkages showed that the unequal access to decision-making processes, weak laws and regulations, and the lack of access to true knowledge were the main structural and local causes that serve as the underlying causes of environmental inequality in Valdivia.

This thesis hopes to bring new insights to the environmental inequality literature.

However, there are still other areas that are understudied and deserve attention in future research endeavors. The recognition of knowledge production in environmental inequality studies is helpful, and more research should incorporate local knowledge from citizens who have experienced environmental inequalities in their daily lives, to enable a deeper understanding of specific Environmental Justice struggles to give groups that are characterized by powerlessness more leverage to resist and protect their environments.

Moreover, further work concerning the bridging between Political Ecology studies and Environmental Justice in the future could result in better analysis concerning justice in countries with neoliberal dictatorships, such as Chile.

Lastly, by examining the histories behind environmental inequalities, this type of research can further move to understand complex human - environment relations and social inequality in EJ studies.

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## APPENDIX. SECONDARY SOURCES OF INFORMATION

Type of source	Name	Author	Stakeholder	Date
Archival records	National surveys INE 1992	INE	State authorities	J-92
newspaper article	The Cellulose Plant does not imply ecological damage	El Diario Austral	CELCO	6/29/95
newspaper article	The Sanjosinos speak: "Pulp mill is hope " [Las Comunas / report]	El Diario Austral	CELCO	7/16/95
Archival records	Environmental Impact [Letter to the editor by Alvaro Mardones]	El Diario Austral	CELCO	9/9/95
Archival records	Development and nature [Editorial Column by Gregorio Papic Garcia]	El Diario Austral	CELCO	10/5/95
Documents	Project File: Valdivia Project (Celulosa Arauco y Constitución) First Presentation: Background, EIA study.	SEIA	CELCO	10/6/95
newspaper article	Cellulose Plant [Editorial]	El Diario Austral	CELCO	10/28/95
Archival records	Environmentalists [Letter to the editor by Vladimir Riesco]	El Diario Austral	Community and Environmentalist	12/18/95
newspaper article	President Frei comes to Valdivia in March [Local News]	El Diario Austral	State authorities	1/10/96
newspaper article	they will try their destiny in Osorno! CELLULOSE PLANT IS ON THE SCALE!	El Diario Austral	Community and Environmentalist	1/17/96
Archival records	First Newfoundland ... [Letter to the editor by anonymous]	El Diario Austral	Community and Environmentalist	1/20/96
newspaper article	Senator Gabriel Valdés: DEFINITIVE: THE PLANT IS BUILT IN MARIQUINA.	El Diario Austral	State authorities	1/26/96

Archival records	Martín Fierro [Letter to the editor by Alfredo Schüler von Delitz].	El Diario Austral	Community and Environmentalist	2/17/96
Archival records	The swans also fly [Editorial by Alfredo Ross]	El Diario Austral	CELCO	2/26/96
Documents	Report of the technical committee of COREMA X regarding 1 EIA, ADDENDUM and MEMORANDUM presented by the project: Celulose Valdivia Plant	COREMA X	State authorities	3/8/96
newspaper article	In September of the 96 will begin tasks in Plant of Cellulose	El Diario Austral	CELCO	6/5/96
newspaper article	For cellulose: Fishermen opposed consulting work	El Diario Austral	Community and Environmentalist	6/20/96
newspaper article	The Mehuín Committee confirmed: "They will have install it by force, because we will not allow it"	El Diario Austral	Community and Environmentalist	6/21/96
newspaper article	Mapuches announce mobilizations	El Diario Austral	Community and Environmentalist	6/21/96
Archival records	Another Newfoundland [Letter to the editor by anonymous]	El Diario Austral	Community and Environmentalist	6/27/96
Archival records	Effects [Letter to the editor by Mehuín Community Defense Committee of Mehuín]	El Diario Austral	Community and Environmentalist	7/2/96
newspaper article	Uncertainty [Editorial]	El Diario Austral	Community and Environmentalist	7/5/96
newspaper article	Resistance in Mehuín: Community will defend their shore at all costs	El Diario Austral	Community and Environmentalist	7/7/96
Archival records	Mehuín [Letter to the editor by Mehuín Community Defense Committee of Mehuín]	El Diario Austral	Community and Environmentalist	7/9/96
newspaper	They propose to create	El Diario	CELCO	7/19/96



article	cellulose support front	Austral		
newspaper article	Lamentations in Mariquina " The company never informed us about the installation of a pipeline towards Mehuín "	El Diario Austral	State authorities	7/20/96
Archival records	Cellulose [Letter to the editor by Osvaldo Lunecke Anwandter]	El Diario Austral	Community and Environmentalist	7/23/96
Archival records	Mr. Director [Letter to the editor by Ricardo Henriquez Perede]	El Diario Austral	Community and Environmentalist	7/24/96
newspaper article	Mehuín-Mariquina [Letter to the editor by Mehuín Community Defense Committee of Mehuín]	El Diario Austral	Community and Environmentalist	7/24/96
newspaper article	Slow support reaction	El Diario Austral	State authorities	7/25/96
newspaper article	Councilman Kunstmann: " We would not stand a new failure "	El Diario Austral	CELCO	8/9/96
newspaper article	Dialogue and mobilization	El Diario Austral	Community and Environmentalist	10/8/96
newspaper article	"Caleta de Mehuín" it's a huge headache.	El Diario Austral	CELCO	11/22/96
newspaper article	Vice President Figueroa: People from Mehuín " are exalted for no reason "	El Diario Austral	CELCO	11/23/96
newspaper article	It is very delicate to oppose just for opposing.	El Diario Austral	CELCO	11/23/96
newspaper article	We are going to take measures to guarantee public order"	El Diario Austral	State authorities	11/27/96
Documents	Exempt Resolution No. 11/97 welcomes 2 EIA procedures	CONAMA	State authorities	8/5/97
newspaper article	Cellulose Forum: Neither company nor committee Mehuín.	El Diario Austral	CELCO	10/15/97

newspaper article	Mehuinese women broke into the workshop.	El Diario Austral	Community and Environmentalist	10/15/97
Documents	Project File: Valdivia Project (Celulosa Arauco and Constitución S.A.) Second Presentation: Background, EIA study, Monitoring, Administrative paperworks, Sanctions.	SEIA	CELCO	10/23/97
Documents	Addendum -Informacion adicional relacionado con la evacuacion de effluents en la bahia de Maiquillahue	ADDENDUM	CELCO	12/1/97
Documents	Addendum -Informacion adicional	ADDENDUM	CELCO	12/1/97
Documents	Addendum-Additional information related to the evacuation of effluents in Maiquillahue Bay Addendum -Additional information ICSARA - Corema requires information that is not clear regarding the potential impacts in Maiquillahue Bay	COREMA X	State authorities	12/1/97
Documents	Exempt Resolution No. 73/97 extension of terms	CONAMA	State authorities	12/16/97
Documents	Addendum-Additional information related to the evacuation of effluents in Maiquillahue Bay	ADDENDUM	CELCO	1/7/98
newspaper article	In Bahia de Maiquillahue: Government Will Give Protection to Celco for Measurements	El Mercurio	State authorities	1/7/98
newspaper	Nobody has subjected	El Diario	State authorities	1/15/98

article	the Mapuches	Austral		
newspaper article	Fishermen of Mehuín in vigil Maximum alert!	El Diario Austral	Community and Environmentalist	1/22/98
newspaper article	Committee is unaware of the validity of Celco measurements	El Diario Austral	Community and Environmentalist	1/26/98
Documents	Exempt Resolution No. 18/98. Suspension of deadlines	COREMA X	State authorities	1/27/98
newspaper article	Environmentally viable: Plant does not involve risks	El Diario Austral	CELCO	1/28/98
Documents	Exempt Resolution No. 87/98	COREMA X	State authorities	4/28/98
Documents	Exempt Resolution No. 219/98 Suspension of terms	COREMA X	State authorities	8/26/98
Documents	RCA Resolution No.279 / 98	COREMA X	State authorities	1998
Documents	File of follow-up and control of the project	COREMA X	State authorities	2/13/04
newspaper article	CONAMA delivers UACH report to the State Defense Consul (CDE)	CONAMA	State authorities	4/18/04
newspaper article	OLCA asks for a commission	El Diario Austral	Community and Environmentalist	10/29/04
Documents	History of the infractions of celco to the laws of Chile and its responsibility in the environmental damage of the Sanctuary of Rio Cruces	AXC	Community and Environmentalist	11/1/04
newspaper article	Citizen's open forum	El Diario Austral	Community and Environmentalist	11/16/04
newspaper article	Waiting for answers	El Diario Austral	Community and Environmentalist	11/17/04
newspaper article	New dead swans found in the Cruces River	El Diario Austral	Scientist and scholars	11/17/04
newspaper article	30 days till the UACH final report	El Diario Austral	Scientist and scholars	11/17/04

newspaper article	Veterinarians from Valdivia and Mariquina denounce strange death of animals near the cellulose plant	La Tercera	scientist and scholars	11/24/04
newspaper article	Problems with pulp mill	El Mercurio	State authorities	11/25/04
newspaper article	PURE ALEGRIA: kindergartners " took " the streets. Celebration and called for the end of pollution	El Diario Austral	Community and Environmentalist	11/26/04
newspaper article	The Austral Journal, 2004b. Children call to become aware	El Diario Austral	Community and Environmentalist	11/26/04
newspaper article	The plant is not killing the Swans	El Diario Austral	CELCO	11/27/04
Archival records	Swans [Letter to the editor by Roberto Valdivia]	El Diario Austral	Community and Environmentalist	12/11/04
Archival records	Commitment [Letter to the editor by Alejandro, Valdivia]	El Diario Austral	Community and Environmentalist	12/11/04
Archival records	Protests [Letter to the editor by Francisco Kenner H.]	El Diario Austral	Community and Environmentalist	12/11/04
Archival records	The truth [Letter to the editor by Rebeca Escobar, Valdivia]	El Diario Austral	Community and Environmentalist	12/11/04
newspaper article	People think: we should protect our swans	El Diario Austral	Community and Environmentalist	12/19/04
newspaper article	First lawsuit against CELCO	El Diario Austral	Community and Environmentalist	12/24/04
newspaper article	Protest agains the Plant	El Diario Austral	Community and Environmentalist	12/24/04
Archival records	They are obsessed [Letter to the editor by francisco Saliunas]	El Diario Austral	CELCO	12/25/04
Archival records	That do not conform [Letter to the editor by Juan Lillo]	El Diario Austral	Community and Environmentalist	12/25/04

Archival records	What difference there are? [Letter to the editor by Felix Sanhueza]	El Diario Austral	Community and Environmentalist	12/25/04
Archival records	Something dies [Letter to the editor by Margrita Carrasco Pedreros, Santiago]	El Diario Austral	Community and Environmentalist	12/25/04
Archival records	Victims or Victims [Letter to the editor by Gaston Oyarzon]	El Diario Austral	Community and Environmentalist	12/25/04
Archival records	Committed authorities [Letter to the editor by Angela ...]	El Diario Austral	Community and Environmentalist	12/25/04
Archival records	Ecological damage [Letter to the editor by Fernando Neyra Palomino]	El Diario Austral	Community and Environmentalist	12/25/04
Archival records	Multifactorial [Letter to the editor by Ricardo Gpnzálex Jiménez]	El Diario Austral	CELCO	12/25/04
Archival records	The case of Lima [Letter to the editor by Marcelo Montecinos]	El Diario Austral	Community and Environmentalist	12/25/04
Archival records	All the support [Letter to the editor by Mariela Cartes]	El Diario Austral	Community and Environmentalist	12/25/04
Archival records	About the report [Letter to the editor by Mirta C. Sanhueza D.]	El Diario Austral	Community and Environmentalist	12/25/04
Archival records	Dark Macha [Letter to the editor by Marcos Salas]	El Diario Austral	Community and Environmentalist	12/25/04
Archival records	More respect [Letter to the editor by Nicole Grandjean Burgos]	El Diario Austral	Community and Environmentalist	12/25/04
Archival records	Studio [Letter to the editor by Leonardo Hernández]	El Diario Austral	Community and Environmentalist	12/25/04
Archival records	Dialog of the future [Letter to the editor by G.P.M]	El Diario Austral	Community and Environmentalist	12/25/04
Archival records	Velatón por cisnes [Letter to the editor by]	El Diario Austral	Community and Environmentalist	12/25/04

	cisnes@surtel.cl]			
Archival records	Ignorant [Letter to the editor by Aldo Da Bove A.]	El Diario Austral	Community and Environmentalist	12/25/04
Archival records	From Spain [Letter to the editor by Juan Alvarez Latorre, Madrid]	El Diario Austral	Community and Environmentalist	12/25/04
Archival records	The Austral Journal, 2004z. Concerned [Letter to the editor by Andrea Aquilera]	El Diario Austral	Community and Environmentalist	12/25/04
newspaper article	Closing of the Valdivia plant: Lagos demands compliance with the Environmental Law	El Mercurio	State authorities	1/20/05
newspaper article	Angelini in a black collar	El Mercurio	Community and Environmentalist	1/23/05
newspaper article	Plant stays closed	El Diario Austral	State authorities	2/9/05
newspaper article	Citizens movement denounce agreements between the government and CELCO	Cooperativa.cl	Community and Environmentalist	2/16/05
newspaper article	COREMA X lifted the sanction against the cellulose plant	El Diario Austral	State authorities	2/16/05
newspaper article	Iron and manganese hurt the wetland	El Diario Austral	Scientist and scholars	2/17/05
newspaper article	COREMA X sanctions CELCO with 66 Chilean million pesos	El Diario Austral	State authorities	3/9/05
Archival records	Critical position of action by the swans before the final report of the ZAROR consultant	AXC	Community and Environmentalist	4/7/05
Documents	Study on the origin of mortalities and population decline of aquatic birds in the Carlos Anwandter	UACH	Scientist and scholars	4/18/05

	Nature Sanctuary, in the province of Valdivia			
Newspaper article	Ecologists ask for the closure of the plant	OLCA	Community and Environmentalist	4/20/05
newspaper article	Senator Valdés lamented damage to the Sanctuary	El Diario Austral	State authorities	4/20/05
Documents	Comments on the final report of the Universidad Austral de Chile for the Regional Directorate of CONAMA X region of the Lakes "Study on the origin of mortalities and population decline of aquatic birds in the Carlos Anwandter Nature Sanctuary, in the province of Valdivia"	CASEB	Scientist and scholars	4/25/05
Documents	University of Chile report - exculpating CELCO under 3 hypotheses: absence of rain in the area, low river flow, and low temperatures.	CASEB – PI: Victor Marin	Scientist and scholars	4/30/05
Archival records	Open letter of action by the swans to the professionals, technicians and officials of the CONAMA	AXC	Community and Environmentalist	5/30/05
Documents	EULA - Official press release from the Eula center - Universidad de Concepcion	EULA	Scientist and scholars	6/1/05
newspaper article	Contractors do not rule out mobilizing	El Diario Austral	CELCO	6/9/05
newspaper article	Workers back the board's decision	El Diario Austral	CELCO	6/9/05
newspaper article	Labor concern	El Diario Austral	CELCO	6/9/05

Archival records	Reposition of exempt resolution 377/05 of the regional commission on the environment	AXC	Community and Environmentalist	6/10/05
newspaper article	Private fear escalation of search for new " Celcazos "	El Mercurio	CELCO	6/10/05
newspaper article	Workers criticize Girardi	El Diario Austral	CELCO	6/11/05
newspaper article	The other side of the Currency, Celco widowers	El Mercurio	CELCO	6/11/05
newspaper article	Contractors will carry out national mobilization	El Diario Austral	CELCO	6/24/05
Archival records	Hierarchical remedy against exempt resolution 377/05 of COREMA X and, in a binding manner, to exempt resolutions 462/05 and 461/05 of the same entity, which rule on two appeals filed against the first	AXC	Community and Environmentalist	8/1/05
newspaper article	Nobody will do projects in Chile without having resolved the environmental issue	El Mercurio	Community and Environmentalist	8/2/05
newspaper article	Celco solution is subject to exit to the sea	El Mercurio	CELCO	8/8/05
Archival records	Lawsuit before the Latin American water court	AXC	Community and Environmentalist	12/1/05
Documents	Project File: Definitive Works of the Emergency Spill Lagoon in the Valdivia Plant: Background, EIA study, Monitoring, Sanctions.	SEIA	CELCO	12/13/05
newspaper article	CELCO prepares key report on Valdivia case	Business and economy (E&N)	CELCO	11/16/06
newspaper article	Doctors say House representative Fernando	El Diario Austral	Scientist and scholars	11/16/06



	Meza is ignorant			
newspaper article	RAMSAR convention experts arrive to Valdivia next week	Valdivia Noticias	Scientist and scholars	11/22/06
Archival records	National surveys INE 2007	INE	State authorities	J-07
Documents	Project File: Incorporation of a Membrane Filtration System for the Treatment of Effluents and Other Environmental Improvements in Valdivia Plant: Background, EIA study, Monitoring, Administrative paperwork.	SEIA	CELCO	6/12/07
Documents	Project File: Arsenic emission limit update in Valdivia plant effluent: Voluntary commitment to comply with Chilean drinking water standard as emission limit for arsenic in the discharge. Background, EIA study.	SEIA	CELCO	11/3/07
Archival records	National surveys INE 2002	INE	State authorities	J-2002
Documentary	Paper City: Celco in Valdivia	Jirafa/Valdivia productions	Community and Environmentalist	J-2008
Documentary	Chile mobilizes: Mehuin	TVN	Community and Environmentalist	J-2011
Archival records	Sanctioning process	COREMA X	State authorities	2004-2010