

## Challenges of pit lakes from a sociological perspective

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### Abstract

The research main objectives is to analyze the social adaptation of a new pit lake near a mid-size and semi-rural community, the discourse of the main social actors involved and the controversies arise. The paper ambition to reflect on the sustainability of this and other post-mining regions, especially as they transition to natural resource-based tourism development. Research shows that endogenous factors of the community must also be taken into account in order to explain more thoroughly why transition may occur in some areas and not in others. Evidence suggests that certain conflicts and discourses condition the possibility and success of a new economic model around pit lakes regardless the ecological success of the restoration. Hence, the main challenges of pit lakes from a sociological perspective have to do with an appropriate social communication strategy and the adaptation to the social and economic system they are embedded in. Discourse analysis also shows an omission and/or non-rigorous use of the social dimension.

Key words: pit lakes, sociology, social constructivism, post-mining regions, environmental restoration, mining

### Introduction

Mine waste and remediation has become the main challenge for many post-mining regions nowadays. Particularly relevant for the purpose of this study is the creation of artificial lakes by flooding the old mine holes and arising new natural habitats around. Pit lakes have been developed in the past internationally (Soni et al., 2014); e.g. Alberta Pit Lake in Canada, Sleeper pit lake, Nevada USA and Westfield pit lake, Scotland; and evidence suggests they are becoming one of the most recurrent end use of opencast mining. Geller et al. (2011) estimate the existence of at least 22 European regions with one or more pit lakes. In some of them, as in the so called New Lake District, in the southern parts of Leipzig, Germany, the transformation has led and is still leading to an entirely new landscape including 16 new lakes and natural habitats in a place where, until 1989, 60 million millions tons of coal per year were extracted. A similar scenario is currently emerging in several Polish regions (Gilewska and Otremba, 2015; Szczepinski et al., 2010) and will probably consolidate in the next decade in a context of ecological crisis and environmental concern. Moreover, with an increase in frequency and scale of mining activity in the global south, pit lakes will sooner or later become a common feature not only in the most advance but also in the currently emerging economies. The challenges faced by these and other “*pit lakes regions*” must be seen as the primary motivation for the current research.

Literature recognizes the existence of environmental risks of pit lakes (Soni et al., 2014; Gross, 2010, 2010b; Schultze et al., 2010; Doupé and Lymbery, 2005) which may have profound disadvantageous implications felt for many years, especially by local communities. These risks have to do with the post closure hazards such as excessive erosion and soil, unexpected flooding, leakage of pit lakes due to surface damage and land use, hazard due to proximity of other industries and slope failure, among others.

Especially relevant for the purpose of this research is that pit lakes appear to come not only with environmental risks but also with inherent social uncertainties. To be sure, all over the world, regions exist where human activities have led to vast changes in the landscape via industrial, military, and mining operations; urbanization, deurbanization and the conversion of agricultural land or land for leisure activities (Gross, 2010). These humanmade interventions have often triggered social tension between actors and groups with dissimilar interests and priorities in the local social structure. In other words, the same project may be perceived as either an opportunity or threat in accordance with the

interest of the social actors involved (Gramling & Freudenburg, 1992). In this paper it is argued that pit lakes are not an exception, despite their value as natural resources for miscellaneous purposes.

By mean a social constructivist approach, this paper aims to study the social perception of the new pit lake in the municipality of As Pontes, Galicia, Spain, with particular attention to the conflicts arise in reaction to the new landscape and the challenges faced by the communities around. The As Pontes coal mine was exploited for 3 decades (1976-2007). During this time, more than 260 tons of coal were mined. The surface of the mine hollow and dump reached 38 million square meters (3,800 ha.). Filling began with rain water and water from the Eume (63% of volume), Illade and Meidelo rivers, various streams and run-off water (which circulates above the surface of a drainage basin). The final outcome is a water body with an 18 kilometer perimeter, 205 meters depth and with a beach of “500 meters in length to the practice of nautical sports or to sunbathe on the 370 meter shoreline” according to the mining company website.

It is important to throw into relief that the study of pit lakes from a sociological perspective may strongly vary from region to region. Some lakes occur close to large community centers, as they often do in Europe and Africa; while in Australia they tend to do it further (McCullough, 2011). In this sense, the pit lake studied in this paper is near a community of around 10.000 inhabitants. It is 65 km far from the nearest city, A Coruña and 500 km from the Spanish capital. Moreover, the community has experienced a strong socioeconomic transformation since the beginning of the mining activity in the late seventies, having double the population and moved from a primary sector oriented economy to a mining oriented one. Hence, this case it is an opportunity to assess the challenges of pit lakes located in semi-rural areas and particular those where the mining has supposed important changes in the community around.

In conclusion, the research main objectives is to analyze the social adaptation of a new pit lake near a mid-size and semi-rural community, the discourse of the main social actors involved and the controversies arise. By mean this analysis, the paper ambition to reflect on the sustainability of this and other post-mining regions, especially as they transition to natural resource-based tourism development.

## **Method**

The presented example is part of a larger project on Impact of Large Scale Energy Mining Projects from a Sociological perspective (Pérez-Sindín, 2015a). In this project, the researcher conducted theory-informed case study on the social changes occurred in the municipality of As Pontes since the beginning of the mining activity up to date. Toward that end, the author undertook a mixed method based fieldwork consisting of the conduction of 19 in-depth interviews and two focus groups among the main social actors involved, postal self-administrated questionnaire among early retired miners, observation, particularly online observation, that is, the analysis of certain debates held in local Internet local forums, as well as secondary data collection, including both official statistics and relevant content from the main newspapers.

Thematic analysis is performed by a coding process divided in six phases: getting familiar with the data, generating initial codes, grouping codes into themes, reviewing the themes, defining and naming the themes and preparing the final report (Braun, 2006). This process was conducted by the computer program Nvivo. This research was based on the analysis of the codes related to the ecological restoration. Particularly, the aim was to identify the different opinions around the lake as well as the quantification of the most important. Especially noteworthy here was a debate held in the main local online community, composed by more than 2.500 members (25% of population). A total number of 38 comments were codified and classified in three main categories (neutral, critique and praising).

## **Results**

### **1. “Social openness could break out political riots”.**

The company has reported several times on the quality of water and its availability for human use. However, evidence suggests that the degree of social openness of the whole process is lower than in

similar scenarios. Two objective facts indicate it. First of all, with regard to the very beginning of the restoration project, the final model of restoration was not the result of any competition or any sort of public exposition, but just the contracting of a German firm specialized in these types of projects (Bustabad, 2011). Hence, the model was planned by the own mining company and with the participation of external experts funded by the company. In other cases, as in the pit lakes occurred in the southern parts of the city of Leipzig, Germany, literature shows how the final model was first assessed in a process of both “public competition” and “citizen hearings” (Gross, 2010). Something similar had occurred around the pit lake located in Carmaux, France, where a public competition took place and government, several public services and citizens were involved in the whole decision making process (Pérez-Sindín, 2015b). Moreover, this fact is consistent with the stated by one of the engineer interviewed in 2008, during the years of flooding “openness could break out political riots” (Op. cit., p. 8).

**2. Positive for the 60% of residents.**

As far as the social acceptance of the new landscape, it is worth referencing the results of a survey performed during the years of flooding, in 2008 (Pérez-Sindín, 2015c). As observed in the table 1, up to a 60% of the respondents consider that the lake is something “very positive” or “positive”. On the contrary, only an 18% of the total sees it as something “negative”, “very negative”. The results indicate the existence of a mostly positive opinion of the restoration process. However, it is important to note that negative options, indifferent and DK/NA/REF ratings sum up 40% of the total responses, which point towards the existence of certain social fragmentation. It is not easy to compare the results with other cases. The lack of equivalent question formulation and the different contextual factors make it complex to do consistent comparison. However, it is worth mentioning the results of a survey conducted in order to assess people opinion around the pit lakes occurred in the southern of Leipzig, Germany (Schmidt & Abel et al., 2014). In this case, respondents were asked about their willingness to use lakes and hardly a 10% of the total answer was negative. Assuming the contextual and methodological limitations, data shows a greater division in the case of As Pontes.

**Table 1** "In relation to the transformation of coal mine into a lake, you think that this is going to be for the town..." Fr., % of the total and cumulative.

Options	Frequency	%	Cumulated %
Very positive	48	15,38	
Positive	141	45,19	60,58
Indifferent (Not mentioned)	20	6,41	66,99
Negative	32	10,26	77,24
Very negative	24	7,69	84,94
Dk/NA/REF	47	15,06	100,00
Total	312	100,00	

Source: Pérez-Sindín (2015c)

This fragmentation contrasts with the appropriation of the public opinion by certain institutional actors. Discourse analysis accounts for a tendency among certain decision makers to stand as representative of the whole community by publicly suggesting that “all town” is delighted, while no objective source is provided: “you go to As Pontes and people are delighted with the mine” Former mine director (Rodríguez, 2013) or “Lake is a commitment of all the people” As Pontes Major (La Voz de Galicia, 2013).

**3. “It is almost drinkable” vs. “10.000 times more acid than normal”.**

The company has reported several times on the quality of water and its availability for human use. For instance, in April 2010, two years before the end of the flooding, the director of mine was interviewed in the Galicia Autonomous Community public television. In that occasion, the director assured that the water quality would be suitable at the end of the process. This information was also upheld in subsequent years up to date in different Galician and Spanish level newspapers. Previous studies suggest the existence of certain distrust during the years of flooding, based on the lack of accurate information about the whole process, and encourage by certain ecological organizations (Pérez-Sindín,

2015b, Sierra, 2012). This skepticism could have fallen after the flooding and once the company appears in several occasions in media and the beach was made public. Indeed, most of the participants during the fieldwork even reproduce mining company's statements *"you can almost drink it"*.

Nevertheless, the analysis throws into relief the persistence of a skeptical opinion about the quality of water among some of the participants in the fieldwork. This view could be fuelled by different sources, first of all, by ecologist groups who challenge the official version. They have criticized the project repeatedly. In August 2012, when the official inauguration of the lake took place, the main ecologist organizations in Galicia (ADEGA, Verdegaia and SGHN) put into consideration the quality of the water by showing the results of their own tests. Despite such parameters as pH level were acceptable in the beach and swimming area of the lake the acidity in the streams and run-off water is, they maintain, *"10.000 times more acid than normal"*. Secondly, the existence of informal information channels. Certain members of the community see the whole process with skepticism even when they are aware of quality test made public by the company. The bellow verbatim represents this perception. The way the participant expresses concern: *"someone who knows someone working in the company..."* it is truly indicative of the existence of informal channels that come to contradict the official version.

*"No, no, let's see, [someone\_anonymized] who knows someone working in the company, says that bathing is not recommendable, that it was added don't know which substance, and it is not good, oh well"*. In-depth interview: local businesswoman and long term resident.

**4. "...for me the lake is an illusion, it is a terrible passion" vs. "This f\*\*\*\* shit of lake that we see through a fence"**

Another attention-grabbing aspect is the existence of extreme views around the lake, as well as they way different community members project their own emotions when talking about it. The bellow verbatim illustrates the *"passion"* the lake is raising among certain members. Concretely, among those who were previously employed in the mining company.

*"I think the lake is an attractive and that will bring jobs, and that will bring leisure things, and that will change the people way of living. I am absolutely convinced. I hope...for me the lake is an illusion, it is a terrible passion. But I think so, but like I see it eh..."* In-depth interview: mining company employee.

The emotional discourse is also present in the words of local politicians as it echoed media the day after the lake inauguration. Here, the major's word emotively refer to the importance of the mine for the community, as well as the inhabitants who where resettled after mining activity buried their villages.

*"The mayor of As Pontes, reminded" all of those whose more than 50 years ago began to exploit the mine and those who followed, and who make the memory of thousands of workers remain under the water". But above all, "the inhabitants of the parishes that disappeared with the mining and were expropriated...Thanks to those parishes that sleep their sleep under these waters," he added.* EuropePress (2012).

This view contrasts with another emotional version, this time rather negative one, among certain members of the community. The critical and belligerent tone of the comments bellow is certainly illustrative in this regard. Participants in a local forum debate showed their discontent with the whole restoration project. Particularly, they complain against the limited accessibility to the lake. The company, claiming security concerns, has a policy that limits for great part of the year the access to the bathing areas, while the rest of lake remain completely closed. This has been criticized on numerous occasions.

*"That's really nice and not this f\*\*\*\*\* shit of lake that we see through a fence!!!! I've had it up to here with these f\*\*\*\*\* photos from..."* Long term resident. [Answering the previous comment] *"Agree with you somehow, they deceive us with the lake in front of our nose but the f\*\*\*\*\* multinational [In reference to the mining company ENDESA], let's see when they open it to the public, don't think I can enjoy it while all this junk is there... paper havens..."*

**5. “As Ponte has an impressive potential around” vs. “...with the beautiful landscapes in Galicia, who really want to spend vacations just next to a power plant...”**

Both the power plant and coal mine were the main source of direct and indirect jobs. Such jobs, especially the direct ones, rapidly improved the income level of many families. This economic boom turned into “depression” as of the mining restructuring occurred in mid-90s, i.e. layoff, early retirement plan, problems of employment and demographic shrinkage. The social perception of the lake largely depends on its capacity to drive economic development and, therefore, return to the “good times”. In this context, one part of the population has a great hope on the lake. This hope is not only fuelled by the mining company but also by the local government. Moreover, the local government has performed important investment both in advertisement campaign and in the organization of sport events. It is worth mentioning the organization of a so called Ironman, a triathlon macro event that is usually organized in larger cities, but in this case, the determination of the local politicians and other stakeholders, together with relatively high incomes of the council thanks to the still active power plant make it possible.

*“The new lake will be in a closer future than we now imagine a new economic alternative for many people”.* As Pontes Major, La Voz de Galicia (2013).

This view becomes even more optimism when interviewing former employees of the mining company. They give hope for greater growth and employment in the future thanks to the lake and they express it enthusiastically, as suggested before. Not only for its potential for tourism or leisure, but also as an asset to attract new industrial projects.

*“It is a necessary investment, a VAST INVESTMENT...because the lake itself can bring a leisure and touristic transformation, and it may also be an industrial transformation...because here, it was already spoken, perhaps...cellulose or other industries”.*

*“I think the lake is an attractive and that will bring jobs, and that will bring leisure things, and that will change the people way of living. I am absolutely convinced.*

*“Well, I think As Ponte has an impressive potential around eh:::(0.1) THE LAKE. The lake and, ps! I say the lake together with everything, the power plant, the new recovered areas, EVERYTHING” [interviewer: But potential for what?] Potential to redesign an industry, something that does not damage the lake and the surrounding but that it can, at the same time, seize the content of the lake, I mean, an industrial project, mainly, we are talking...YEAH; YEAH, there is something in progress actually, well, someone told me...someone bring it up that a pumping plant, another biomass plant, and...”*

There is, however, a whole counter narrative about the entire restoration process. Particularly, the discourse analysis shows the existence of a skeptical view toward the transition from an industry based to tourism based economy. This skepticism is based upon the incredulity about the possibility to create jobs out of the new restored area, despite the optimism of the official discourse. The bellow comment best illustrate this point of view. The proximity of more consolidated leisure, touristic and coast areas in the Autonomous Community of Galicia is seen as a drawback in order for the lake makes profit of such activities. Hence, it is seen as an attractive area for locals but with low capacity of local development.

*“What is the aim of the lake? With the beautiful landscapes in Galicia, who really want to spend vacations or just next to a power plant? If people come is just for curiosity. So, what is the function of the lake to me? Just a leisure area for locals or young people without car that cannot head other places”.* Source: online community “As Pontes Política e Sociedade.

*“They aim to make As Pontes a touristic hotspot but they omit that we must be an industrial area, where are the thousands of visitors that were to visit the As Pontes thanks to the lake?”* Source: online community “As Pontes Política e Sociedade.

*“It is obvious that the public investment will not have effect in the town, you've got to be joking, neither in the shops nor in the hostel industry. Ironman is a way to advertise the lake (not even As Pontes town), show it in the media and make it fashion for four curious that one Sunday come to*

*visit it because they saw it in the newspaper*". Source: online community "As Pontes Política e Sociedade.

**5. "The largest artificial lake in Spain" vs. "Public investment will not have effect in the town".**

The strong landscape transformation has also led to major changes in community identity terms. The lake has become a new identity symbol for one part of the community. This is reflected in, for instance, the growing number of Internet side and Facebook pages aiming at highlighting the beauty of the new landscape. But such transformations could have also led to a certain rejection among one part of the population, especially among long term residents, that is, those related to the pre-mining community. This divergence was evidenced on July 14, 2014, after a program broadcasted in one of the top audience television stations in the Autonomous Community of Galicia. The program had as its ultimate goal to promote both the industrial and tourist side of the town. This event may be seen as part of the local government strategy to project a post-industrial, modern and renovated image. Without having delved into the program content, suffice to say that the central figure of the show was undoubtedly the restoration process and, particularly, the lake and its "espectacularity". The format and content of the program is a clear attempt to project an image of modernity. In this image, the lake stands as centerpiece and other elements of the mining universe were also proudly mentioned, as the power plant chimney.

At the end of the program, one As Pontes neighbor posted a comment on the greatest local Internet Communities judging by the number of members (2,500 members in April 2015 in a town with 10,000 inhabitants); in which he criticized the program intended to give a picture of As Pontes exclusively associated with "chimney" with the "central" [power plant] and "lake" when "in fact" there is "something else" to finish by saying "I hope not disturb anyone with my opinion". The publication gave way to 38 comments. Some of them claim that old symbols of the town, as the old town or river were overlooked.

*"I do not think they refer to something unique or singular, but ENDESA, this is a very important part of our history, and it changed the town, but one misses to take care and put in value, for example the river, or the oldtown".*

As shown in Table 1, 23,7% of these comments had a critical attitude toward the attention given to the lake as new symbol of the town, while the majority of the people, around 61% showed a more positive view. The distribution of praising/critical attitude gets more equalized as regard to the number of likes, 53% against 41%. The same occurs according to participants. In this case, 44% of participants show a praising attitude, while 31% shows rather a critical view.

**Table 2** Attitude toward the lake as a new symbol of the town

Attitude	Comments		Likes		Participants	
	Frequency	%	Frequency	%	Frequency	%
Neutral	6	15,79	4	5,33	4	25
Attitude of praise	23	60,53	40	53,33	7	43,75
Critical	9	23,68	31	41,33	5	31,25
Total	38	100	75	100	16	100

**Source:** debate at Internet community "Eres de As Pontes si..." search under keyword "lake", access April, 2015.

**6. Inter-community conflicts.**

This study has mainly focused on analyzing the social perception of the lake among locals residing in the adjacent community around. Existent surveys and other sources indicate that the majority of population assesses positively the whole restoration project. Hence, despite the difference with regard to other cases studied, the social acceptance has been relatively high. Nevertheless, evidence suggests that the opposition to the whole project could be higher in further communities, particularly those located in the course of the Eume River in its direction to the estuary in the Atlantic Ocean. It is worth remembering that the mine itself has always been a reason of inter-communities conflicts since the beginning of the activity. The pollution of the natural habitats around and particularly, the River

Eume, has always been at the center of controversy. The mining company plan to drain to the river the sludge accumulated in the reservoir formed by the Eume River, which could have “moderate to severe” (Bustabad, 2011) negative impact on water, landscape and leisure activities on both Eume Natural Park and river estuary. Thus it could compromise the local economies around. Against this background, the perception of the lake in the whole region is inherently negative and could grow in the future. Lake was flooded by mean the channeling of water from the river. Water circulates above the surface and return to the river through output channels. Several events have been organized by ecologist organization to assess the possible impact. Furthermore, mining company engineers acknowledge the existence of additional menaces (personal conversation). New fungal and bacterial species may impact river native species as far as the leisure and the use of certain infrastructures is not regulated in the lake. Hence, greater tourism development around the lake could be at the expense of near local economies, thus raise new inter-community conflicts.

## Conclusions

There is a tendency to think that the main explanatory factor of a successful restoration projects is ecology. In the best case scenario, economy is also estimated, that is, the existence or not of potential market to develop certain activities around the new landscape. Without denying the irrefutable influence of these aspects, this research shows that endogenous factors of the community must also be taken into account in order to explain more thoroughly why transition from mining to leisure or other alternative economies may occur in some areas and not in others.

Results come to confirm William Freudenburg theory on social impact assessment. Environment and society are “jointly constituted”. Environment can affect and construct identities, but identities can also socially construct environment in one or another way. Pit lakes are not an exception. Certain local identities and discourses may condition the possibility and success of a new economic model around pit lakes. The new landscape may be seen as opportunity or threaten in accordance with different social groups interests. Neither one nor another view guarantees sustainability. The overestimation of the pit lake as an economic driver could lead decision makers to invest in the lake without bearing in mind environmental risks. On the contrary, an underestimation of the new lake for exclusively identity reasons could lead to a waste of resources and, in the worst case scenario, to an environmental degradation.

In this context and doing reference to the title of this paper, the challenges of pit lakes from a sociological perspective have to do with two main aspects:

**1. Social communication.** Further positivist research need to be undertaken in order to examine how environmental, social and economic risks are being socially communicated, how pit lakes are being treated by mass media and whether they acknowledge the existence of risk or not. Judging by the results of this research, evidence suggests that the social acceptance and appearance of extreme discourses could be explained by a closed communication strategy. This strategy may include both lack of permanent information channels, inappropriate mass media in terms of proximity with the locals and uneven and/or informal dissemination of the information. Permanent and reliable information channels need to be available for the whole society, which may also contribute to planning and development. This is consistent with Ulrich Beck idea of second modernity, i.e., when human society realizes that not all risks can be controlled and that they must be coped with and incorporated into planning and development.

**2. Socio-economic embeddedness.** Engineering of the pit lakes must be consistent with the social and economic system the lake is embedded in. To what extent can a pit lake achieve tourism development if it is located near a traditional touristic destination? How this and other factors affect the creation and design of certain elements as beaches, natural areas etc. Are engineer taking into account the economic model of the region. Are social scientists taking part of the pit lakes planning before the flooding in order to assess adaptation capacity to the local economy? What criteria are being used to design pit lakes? This may also affect decision making during mining activity and earlier. The lack of adaptation of a pit lake in a given region may discourage the beginning of an opencast mine.

This research also shows that pit lakes can also revive social and identity conflicts originated during the mining period. In the same token, it is pertinent to think that an appropriate social adaptation may

be an opportunity to solve them. For this reason, the integration of local and pre-mining culture into the restoration process may reinforce social cohesion: place names, revaluation of old symbols, urban integration of new and old landscapes, extol the pre-mining history in the new landscape, etc.

**3. Sociological rigor.** Discourse analysis accounts for a either omission or misuse of the social aspects of pit lakes. The social dimension is often reduced to frivolous or even emotional statements. This contrasts with the often very technical jargon when addressing ecological and more technical aspects. Social communication of lakes must include rigorous social assessment of the public opinion.

### References

- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative research in psychology*, 3(2), 77-101.
- Bustabad, L. (2011). Endesa planea verter al río Eume lodos acumulados durante 50 años. Retrieved May 04, 2016, from [http://elpais.com/diario/2011/06/24/galicia/1308910689\\_850215.html](http://elpais.com/diario/2011/06/24/galicia/1308910689_850215.html)
- Doupé, R. G., & Lymbery, A. J. (2005). Environmental risks associated with beneficial end uses of mine lakes in southwestern Australia. *Mine Water and the Environment*, 24(3), 134-138.
- Europa press (2012) "As Pontes (A Coruña) Abre Al Público La Playa Del Mayor Lago Artificial De España." [Europapress.es](http://Europapress.es). N.p., 20 Aug. 2012. Web. 02 Aug. 2015.
- Geller, W., Schultze, M., Kleinmann, R., & Wolkersdorfer, C. (2013). Acidic pit lakes. *The legacy of coal and metal surface mines*. Springer, Berlin/Heidelberg, 63(4).
- Gilewska, M., & Otremba, K. (2015). Water reservoirs under construction as a result of the activities of “Konin” and “Adamow” brown coal mines. *Journal of Ecological Engineering*, 16(5), 138-143.
- Gramling, R., & Freudenburg, W. R. (1992). Opportunity-Threat, Development, and Adaptation: Toward a Comprehensive Framework for Social Impact Assessment1. *Rural Sociology*, 57(2), 216-234.
- Gross, M. (2010). *Ignorance and surprise: science, society, and ecological design*. MIT Press.
- La Voz de Galicia (2013). Valentín Gonzalez Formoso: El lago es una gran apuesta de todo el pueblo. *La Voz de Galicia*, May 24, 2013.
- McCullough, C. D., (2011). Pit lakes and mine closure - Liability or opportunity?. *AusIMM Bulletin* April(2):20-21
- Pérez-Sindín López, X. (2015a). Megaproyectos y comunidad: impacto de un proyecto minero-eléctrico a gran escala desde una perspectiva sociológica.
- Pérez-Sindín López, X. (2015b). De mina a lago. Actores sociales y discurso. El caso de As Pontes (España) y comparación con el caso de Carmaux (Francia). Repositorio Institucional da Universidade da Coruña.
- Pérez-Sindín López, X. (2015c). De mina a lago. Actores sociales y discurso. El caso de As Pontes (España) y comparación con el caso de Carmaux (Francia). Repositorio Institucional da Universidade da Coruña.
- Rodríguez, M. (2013). Francisco Aréchaga: 'No habrá ningún problema en la mina de Corcoesto, hasta yo iría a vivir allí'. Retrieved May 05, 2016, from <http://www.laopinioncoruna.es/galicia/2013/09/15/francisco-arechaga-habra-problema-mina/762361.html>
- Schmidt, R., & Abel, F. (2015). Umfrage zum Leipziger Neuseenland 2014: In der Stadt Leipzig sowie in den Landkreisen Leipzig und Nordsachsen; Ergebnisbericht [Survey Leipzig New 2014: In the city of
- Schultze, M., Pokrandt, K. H., & Hille, W. (2010). Pit lakes of the Central German lignite mining district: Creation, morphometry and water quality aspects. *Limnologica-Ecology and Management of Inland Waters*, 40(2), 148-155.
- Sierra, D. (2012). “As Pontes, La Mina Que Se Convirtió En Un Lago - RTVE.es.”
- Soni, A., Mishra, B., & Singh, S. (2014). Pit lakes as an end use of mining: A review. *Journal of Mining and Environment*, 5(2), 99-111.
- Szczepinski, J., Fiszler, J., Stachowicz, Z., & Szczepanik, P. (2010). Reclamation of Polish lignite open pits by flooding. *Biuletyn Państwowego Instytutu Geologicznego*, (441 Hydrogeologia z. 10), 167-174.