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Current Gold Mining Situation in Canaima National Park:
A World Heritage Site in Venezuela

A Report Submitted to IUCN and UNESCO

SOSOrinoco
Caracas, Venezuela
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"We're going to turn all of this upside down..."

A comment made by a mining entrepreneur as he flew over
Canaima National Park recently.

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Acronyms

ABAE: Bolivarian Agency for Space Activities - *Agencia Bolivariana para Actividades Espaciales*

CNP: Canaima National Park

ESA: European Space Agency

FANB: Bolivarian National Armed Force - *Fuerza Armada Nacional Bolivariana*

INPARQUES: National Parks Institute - *Instituto Nacional de Parques.*

IUCN: International Union for Conservation of Nature

MINEA: Ministry of Eco-socialism and Waters, formerly Ministry of the Environment - *Ministerio del Ecosocialismo y Aguas, formerly Ministerio del Ambiente*

NGO: Non-Governmental Organization

PA: Protected Area

PORU: Management Plan and Use Regulation - *Plan de Ordenamiento, Manejo y Reglamento de Uso*

GIS: Geographic Information System

UNESCO: United Nations Educational, Scientific and Cultural Organization

USGS: United States Geological Service

WCPA: IUCN's World Commission on Protected Areas

WHC: UNESCO's Convention Concerning the Protection of World Cultural and Natural Heritage

WHS: World Heritage Site

1. Introduction

In recent years there has been an increase in information pertaining to a boom in gold mining activity within Canaima National Park (CNP), a World Heritage Site (WHS). Furthermore, this situation falls within the context of a strategic policy of the current Venezuelan government that promotes mining activities over vast geographic areas, and encompasses all mining categories. This policy has been named the *Arco Minero del Orinoco* (Orinoco Mining Arc). The present report identifies and locates areas of gold mining activity within Canaima National Park, as well as in areas around its geographic boundaries and analyzes its different modalities. Furthermore, it explains the dynamics and the processes that are making this boom possible, and draws conclusions and offers recommendations concerning steps to be taken in order to succeed in having Canaima rescue its intrinsic traits of naturalness and sustainability that may allow the park to continue to meet the criteria necessary for being a World Heritage Site.

1.1. Geographic Location, Boundaries and its History as a Protected Area

Canaima National Park (CNP) is a Protected Area (PA) as defined by the International Union for Conservation of Nature (IUCN) (Dudley 2008) under Category II, and was created by Presidential Decree on 12 June 1961 (Decree No. 770 published on 13 June 1962) and later expanded in 1975 (Decree 1137 of 9 September 1975).

CNP is located in Venezuela's Guayana region in the southeast part of the state of Bolívar. Officially, it encompasses a total area of approximately 3,000,000 hectares (ha) that fall within the jurisdiction of the municipalities of Piar, Roscio, Sifontes and Gran Sabana, the latter accounting for most of CNP's surface area. Its approximate geophysical location is demarcated by the following geographic coordinates: between 4° 41' and 6° 28' north latitude; and between 60° 44' and 62° 59' west longitude.

Its boundaries are defined by the coordinates established by the Decree for the Expansion of CNP, No. 1137, dated 9 September 1975. The northern boundary of the CNP is defined by a straight line that starts at the confluence of the Antabare and Caroní Rivers, following along this heading until it encounters the dividing line between the townships of Piar and Roscio. It continues in a southeasterly direction along the aforementioned dividing line until it encounters the 62°00'00" west longitude coordinate, from which it continues on a due north heading until it encounters the 500 m elevation contour line. To the south and to the west it borders on the left bank of the Caroní River, and to the east on the eastern side of National Highway 10 and the left bank of the Arabopó River.

In the year 1963, the renowned researcher Kenton Miller (1939-2011), one of the foremost world authorities in the matter of Protected Areas, and who later became Director General of the IUCN (1983-1988), wrote the first proposal for a plan to manage CNP, which was also his master's thesis at the University of Washington (Miller 1963).

His first Master Plan, which today would be called a Management Plan, was developed by an official entity and published in the form of a book in 1974 (Gondelles 1974), but as such it lacked the legal formalities that would give it legal standing as a norm. It conducts the first evaluation of the status of the conservation of the CNP and identifies the areas most impacted by the mining activities at the time (Figure 1). This document

was used as a basis for expanding CNP in 1975, whereby the whole Eastern Sector known as the Great Savanna (*Gran Sabana*) was added. In fact, there is a proposal to change this great park's name from Canaima to Great Savanna, but this was never accomplished. From then on, and for more than 20 years, Canaima was the largest national park in the country, reportedly 3 million hectares (30,000 km²).

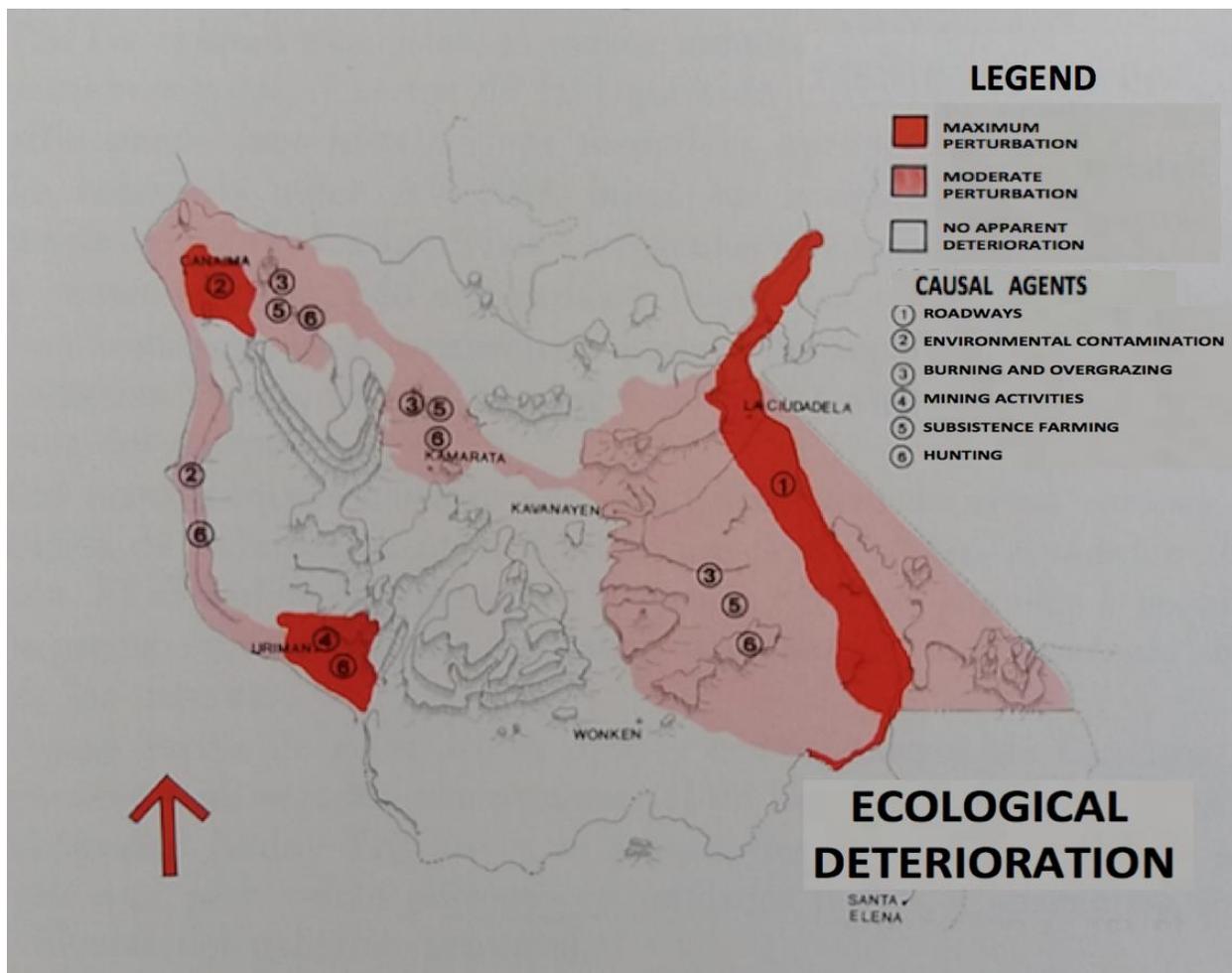


Figure 1. Ecological Deterioration, according to Gondelles et al 1972

With the enactment of the Organic Law for Land Use Planning (Venezuela 1983), still in force currently, and the part of its General Regulations that pertains to national parks (Decree No. 276; Venezuela 1989), also still in force, the current formal structure was created for giving legal force to the fundamental instrument for planning each unit of the national parks system: the Management Plan and Use Regulation (PORU).

CNP is divided administratively into two sectors: Eastern and Western. In 1991, an initial PORU is drafted, there is public consultation, and it is formally approved, but it pertains only to the Eastern Sector (Great Savanna) of CNP (Decree No. 1640 dated 5 June 1991, published in Official Gazette No. 34.758 of 18 July 1991), thus providing regulatory authority over permitted, restricted and prohibited activities, aimed at appropriate management. Meanwhile, Decree No. 276, which does not provide a

specific spatial determination for any kind of zoning, is still in force and continues to be applied in stopgap fashion in the Western Sector, where one finds the Auyantepuy plateau and Angel Falls, the tallest waterfall in the world, also known as Kerepakupay Vena in the Pemón language.

In 2015, the Ministry of the Environment (MINEA 2015) releases a report that serves to encourage draft legislation for a new PORU, this time for CNP in its entirety, which has been discussed at some public meetings, but which has not been made official by way of a presidential decree. Up to now, it can only be considered as a diagnostic and proactive reference.

The National Parks Institute (INPARQUES) is a governmental entity assigned to the MINEA, and is legally responsible for the administration of Venezuela's national parks, including CNP.

1.2. Canaima as a World Heritage Site

At an international level, the most striking aspect of this PA is the fact that it was declared to be a World Natural Heritage Site in June of 1994 by UNESCO's Committee of the Convention Concerning the Protection of the World Cultural and Natural Heritage, and subsequently this was accepted by the Venezuelan government in 1995. This is how Canaima National Park came to be added to the list of World Natural Heritage Sites, which, because of their striking natural features and values, should be preserved for all of humanity, thus assuring their protection by member countries¹. This converts CNP into a common heritage that pertains to all of humanity, thus obligating the Venezuelan State to preserve, guard and share its natural values and scenic beauty.

CNP's landscape displays much physiographic variety and exceptional scenery, most of it in pristine state, consisting of different ecosystems. The topography presents elements of enormous grandeur and beauty, unique in the world. From a geologic point of view, it is part of the Guiana Shield, which extends from southern Venezuela to northern Brazil, and includes Guyana, Suriname and French Guiana; it dates back to the Precambrian Age and contains rock formations considered to be among those having the oldest geological age on the planet. A brief summary of its extraordinary values is presented in Appendix 1.

In 1994, and at the request of the Venezuelan government, CNP is entered in the World Heritage List as part of UNESCO's Convention Concerning the Protection of World Cultural and Natural Heritage², in a decision made at its CONF 003 XI,³ with the recommendation that an effort be made to work with the government so that the boundaries of the registered site would be restricted to the mountainous portions (the tepui formations) and to exclude the savanna and populated areas. The CNP was

¹ <https://whc.unesco.org/en/list/>

² <https://whc.unesco.org/archive/convention-es.pdf>

³ <https://whc.unesco.org/en/decisions/3197>

enrolled, and it was accepted that it met all four criteria for natural heritage sites⁴, vii, viii, ix y x:

- vii. *"contains superlative natural phenomena or areas of exceptional natural beauty and aesthetic importance"*
- viii. *"is an outstanding example representing major stages of Earth's history, including the record of life, significant on-going geological processes in the development of landforms, or significant geomorphic or physiographic features"*
- ix. *"is an outstanding example representing significant on-going ecological and biological processes in the evolution and development of terrestrial, fresh water, coastal and marine ecosystems, and communities of plants and animals"*
- x. *"contains the most important and significant natural habitats for in-situ conservation of biological diversity, including those containing threatened species of outstanding universal value from the point of view of science or conservation"*

Meeting only one of these four criteria would have sufficed; and this demonstrates the superlative characteristics of CNP.

In its totality, CNP was registered as a WHS, and its size was recognized as constituting more than 3 million hectares⁵ (ha). Nevertheless, a significant finding by the present report is the discovery that the size is less. We calculated with greater precision the size of CNP and generated a map with the boundaries adjusted to the current geographical reality. The cartography employed by the Venezuelan government for proposing to UNESCO the recognition of the park, as well as what is normally employed in official documents, was based on an obsolete and erroneous cartography. This was detected by MINEA (2015), but no conclusion was drawn in this respect. For our report, we located the most recently updated topographical databases, and through geographical information systems and recent satellite imagery, we plotted CNP's boundaries using as reference the decrees by which it was created and expanded. In this regard, we are presenting an updated map (Figure 2) that reveals CNP's exact surface area, based on more exacting geodesic information, as being 2,790,351.28 ha, which means a difference of more than 200,000 ha compared with the size officially reported.

⁴ <https://whc.unesco.org/en/criteria/>

⁵ <https://whc.unesco.org/en/list/701/>

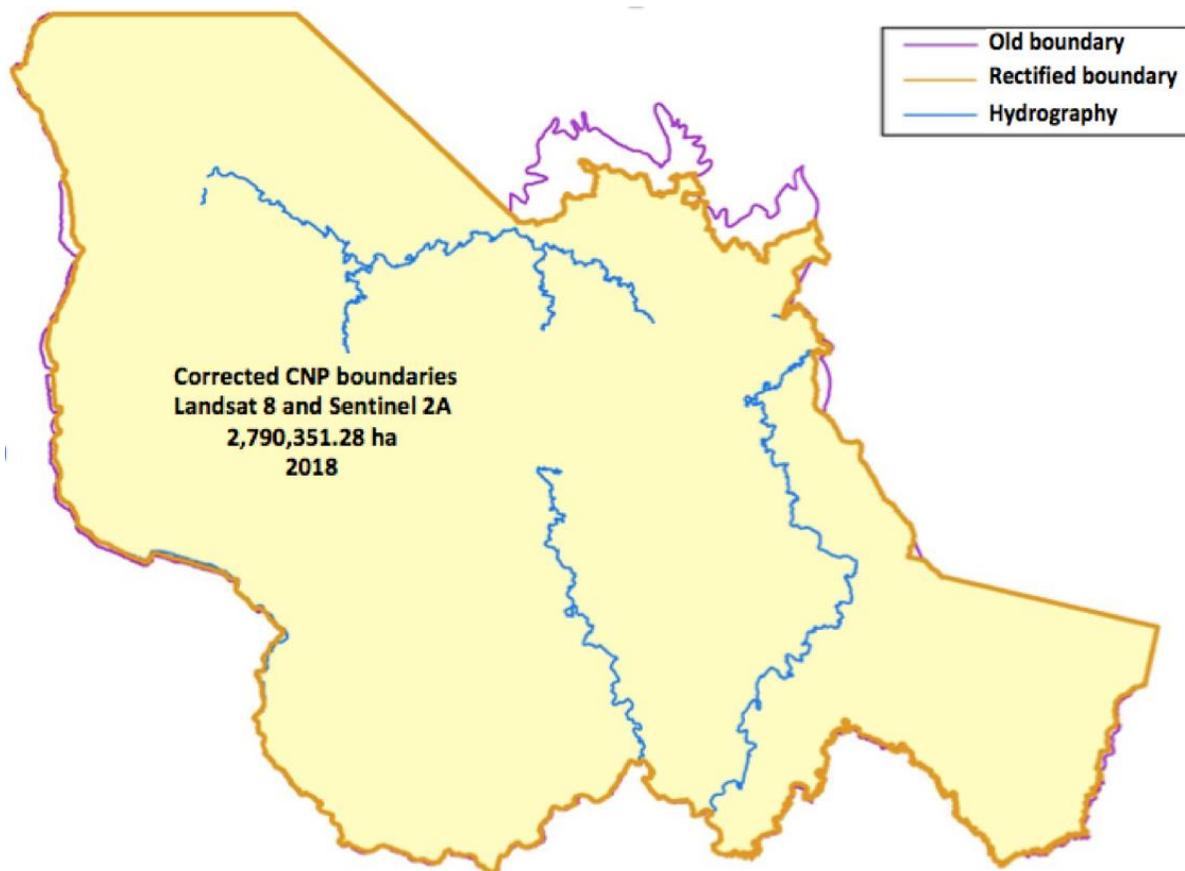


Figure 2. Canaima National Park's rectified boundary vs. old (erroneous) boundary

1.3. A Social Context for Canaima

CNP's world fame once promoted an important inflow of international and national tourism, which meant receiving, every year, thousands of visitors of different nationalities and from different parts of the country. Today that influx is almost non-existent, except for a certain amount of domestic tourism that moves along National Highway 10, and of tourists from Brazil whose destination is almost exclusively the Roraima Tepui.

Access to CNP is by land, air, or river. In the Western Sector, access, including the transfer of people to and from the different populated centers, is mainly by air or, to a lesser degree, by river, as there is no kind of connection with the national highway system. The populated centers with the most dynamism and tourist activity are: Canaima Lagoon with the most visitors, followed by Urimán, Kamarata and Kavak, indigenous communities integrated into the tourism economy in past years.

In the case of the Eastern Sector, most of the road access is by way of National Highway 10, which serves the transportation needs of the current population starting at Puerto Ordaz, going through El Dorado and Santa Elena de Uairén, and ending at Ikabarú, all

located outside the boundaries of Canaima National Park. Among the principal population centers within this sector we also find: Kavanayén, which is 70 km distance from National Highway 10, and Uonkén and San Francisco de Yuruaní, the latter straddling both sides of National Highway 10.

CNP is located in the Guayana Region, whose economy is currently based principally on activities pertaining to mining, trade and services. In this context, CNP contributes to the integrity of the development of the Guayana Region, as it fulfills a regulatory function toward the protection of water resources in much of the Caroní River basin, which is what drives the hydroelectric system of the Caroní, the source of 70% of the nation's electric power generation.

Populations residing in CNP maintain important socioeconomic relations with the principal population centers of the region, in order of importance: Ciudad Bolívar, Puerto Ordaz, Santa Elena de Uairén, Kavanayén and La Paragua. A large portion of the goods and services needed by the people residing in CNP is purchased in these populated centers. This demand is concentrated on the trade and services sector, where there is a demand for food, clothing, construction materials, fuel and specialized medical, educational and other services, among other things. It is important to emphasize that the current economy of the entire southern sector of CNP consists of trade to and from Brazil. This is an unprecedented situation, given its great magnitude.

CNP is inhabited mostly by indigenous people of the Pemón group, who are part of the greater Carib group, which includes the Kamarakoto, Arekuna and Taurepán subgroups. Even though they all speak the Pemón language, one hears dialect variations spoken by the different subgroups. Their indigenous culture, established in this region since time immemorial, has managed to preserve its own identity despite important changes that have taken place in their traditional way of life, which is why they are of authentic anthropological value. A brief summary of the Pemón ethnic group is presented in Appendix 1.

2. Goals, Scope and Issues Analyzed

In Venezuela's social media, in mainstream news media, and in personal conversations among those versed on the subject of Protected Areas, one notices an increasing awareness of gold mining activity within the boundaries of Canaima National Park / World Heritage Site (CNP/WHS). The information is scattered, difficult to verify, and there has been no systematic investigation.

Mining activity is prohibited inside Venezuela's national parks, and, in general, it is an unacceptable activity under international standards for Protected Areas as established by the IUCN. Furthermore, as part of UNESCO's Convention Concerning the Protection of World Cultural and Natural Heritage (WHC), World Heritage Sites (WHS) must not be subjected to mining activities. In fact, a criterion required for inclusion on the List of Endangered Heritage Sites is:⁶ *“Severe deterioration of the natural beauty or scientific value of the property, as by human settlement, construction of reservoirs which flood important parts of the property, industrial and agricultural development including use of pesticides and fertilizers, major public works, mining, pollution, logging, firewood collection, etc.”*

The IUCN's position, through its WCPA concerning mining activities in a PA is the following:⁷ *“Exploration and extraction of mineral resources are incompatible with the purposes of protected areas corresponding to IUCN Protected Area Management Categories I to IV, and should therefore be prohibited by law or other effective means.”*

Furthermore, the International Council on Mining and Metals itself has made a public commitment:⁸ *“Not to explore or mine in World Heritage properties. All possible steps will be taken to ensure that existing operations in World Heritage properties as well as existing and future operations adjacent to World Heritage properties are not incompatible with the outstanding universal value for which these properties are listed and do not put the integrity of these properties at risk.”*

In this respect, the goal of this report is to report and substantiate the presence of gold mining activity, especially inside CNP/WHS, for purposes of calling to the attention of the authorities at IUCN and UNESCO, and the world's court of public opinion, the need for adequate protection for this WHS.

⁶ <http://whc.unesco.org/en/158/>

⁷ <http://whc.unesco.org/archive/1999/whc-99-conf209-20e.pdf>

⁸ <http://www.icmm.com/en-gb/members/member-commitments/position-statements/mining-and-protected-areas-position-statement>

For the purpose of objectively evaluating the situation at CNP with respect to the presence of mining activity, we embarked upon an investigation using three information sources: remote detection and cartography by means of recent high resolution satellite imagery; a systematic audit of the matter over the Internet; and interviews of highly credible and appropriate eyewitnesses who live in CNP. The identity of the eyewitnesses is kept in anonymity for reasons of security, as is being done for the authors of this report. ***As one will notice at a certain point in this report, this gold mining activity is imbued in a grand plot by organized crime that reaches into all levels of Venezuela's current political power structure, which is why it is necessary to protect the identity of the researchers and witnesses.***

Throughout the investigation, it became patently clear that mining activity is not the only relevant human activity that is out of control, and that these unregulated uses are also having a severe impact. We did not delve into evaluating them, but it is urgently necessary to do so, as these activities are contributing, in a significant way, to the deterioration of heritage values of CNP/WHIS.

3. Canaima as a World Natural Heritage Site: History and Previous Evaluations

In June of 2001, the 25th Ordinary Session of the Bureau of the World Heritage Committee⁹ (WHC-2001/CONF.205/5) issues a brief report on the status of CNP/WH and in the minutes it is stated that, as issues of relevance for CNP, they had taken into consideration: *"construction of power lines, involvement of indigenous people and local communities."* Furthermore, they make the following recommendations that reveal a concern over the mining activity situation: *"IUCN has received a number of reports on the situation in the Canaima National Park. As reported by IUCN previously, there is ongoing and increasing concern and opposition to the construction of a power-line, which cuts through a limited proportion of the Park. Indigenous people from the Pemón communities continue to be in opposition to the power-line due to the long-term consequences that the project will have on both the territories they occupy and their cultural integrity. They have been responsible for toppling over thirty towers. The National Guard now has a permanent presence in the park in order to guarantee the continuation of the project. Although the main objective of the power-line is to sell electricity to the Brazilian city of Boa Vista, electricity is also required to exploit the mineral resources in the Venezuelan Guiana Shield area. Apart from existing traditional mining operations, it is expected that the power line will fuel new mining developments in six important buffer zones adjacent to the World Heritage site. Several international mining corporations have started a programme of land acquisition and identification, including Crystallex International and Placer Dome. There are concerns about potential impacts associated with mining around the Canaima National Park. On several occasions, indigenous people have reported an influx of small-scale miners heading towards the headwaters of the Caroni River inside the National Park. Although illegal, these violations have not been persecuted. Without due ecological consideration, the potential industrial development of the region adjacent to Canaima National Park and the advance of mining threaten to isolate the Park within a few years, thus putting in jeopardy its long-term integrity. IUCN reiterated the recommendations made by the 1999 IUCN mission report, in particular the urgent need to create mechanisms to promote dialogue between all relevant stakeholders on the conservation and management of the area. This should include the indigenous Pemón communities, mining interests, and relevant government agencies."* We assume that this text is based on the official (IUCN/UNESCO) field mission report forwarded in 1999 under the charge of Pedro Rosabal and José Pedro de Oliveira Costa.¹⁰

In December of 2001 in Session 25 of the World Heritage Committee (WHC-01/CONF.208/10) a report was issued concerning the status of CNP/WH in whose minutes¹¹ it is stated what they considered to be issues of relevance for CNP: *"Construction of power lines, involvement of indigenous people and local communities, mining."* Nonetheless, no comment is made concerning mining activity, nor do they specify any concrete action that would obligate the government to tend to such specific problems.

⁹ <https://whc.unesco.org/en/list/701/documents/>

¹⁰ <https://whc.unesco.org/en/documents/134048/>

¹¹ <https://whc.unesco.org/en/list/701/documents/>

The last official report from the Convention on the status of the WHS is in the year 2001,¹² and in summary, in its entire historical record, the following threats are reflected:¹³ Year 1997: *major linear utilities, management systems/management plans*; Year 1998: *major linear utilities, management systems/management plans*; Year 1999: *major linear utilities, management systems/management plans, conflicts between the Pemón communities and the National Guard*. In no case is there any explicit mention of mining activity, despite that fact it had been considered in some detail in the minutes of Session 25.

In the year 2001, the project "*Mejorando Nuestra Herencia*" (Improving Our Heritage) (Real et al 2002) was launched using funds from the United Nations Foundation, under the auspices of the World Commission on Protected Areas of the IUCN (WCPA/IUCN), UNESCO and the Center for Heritage Sites. We assume that this project was financed using funds in the amount of USD 30,000.00 by decision of CONF 209 XV.4.1.¹⁴ This project, conducted by Vitalis, a Venezuelan NGO, in collaboration with INPARQUES, sought to improve the effectiveness of management and monitoring activities, and reports on the status of CNP/WHS to the Center for Heritage Sites, by utilizing a prototype tool for the effectiveness of management. In this report, the term "mining activity" is mentioned only 4 times, in a generic way, giving the impression that it was an activity of little importance and is referred to in general terms as a threat to bodies of water. The importance attributed to mining activity, which we assume was certainly underway during that year, is low. As for threats, the same report reflects upon: fire, cattle grazing, agriculture, erosion, fragmentation of habitats, extraction of rocks for construction purposes, intense use for tourism, proliferation of roadways, discharge of household sewage, hydrocarbons and solid residue, an absence of "site plans" specifically for tourism purposes, a lack of policies for the comprehensive management of the park, an absence of a management plan, uncontrolled tourism, an absence of alternate sustainable economic activities, sparse access to basic services, an increase in, and concentration of, population, and the absence of a policy for the harmonious management of the increase in population.

In 2007, the final results of the aforementioned project are published (Novo and Díaz 2007), stating, as one of its conclusive findings, the "identification and prioritization of threats against the resources of CNP." It maintains that "among the 27 identifiable threats one finds: fire, unregulated tourism activity, metallic and non-metallic mining activity and the lack of policies for the sustainable management of CNP. In general, the threats that were identified in CNP in 2004 continued, and became more intense in 2007, which is why it is urgent to take action in this respect." As for "mining activities," these words are mentioned only 20 times in the report, yet it is always specified that as far as metallic mining activity (gold, obviously) is concerned, this is taking place in

¹² <https://whc.unesco.org/en/soc/2506>

¹³ https://whc.unesco.org/en/soc/?action=list&id_site=701

¹⁴ <https://whc.unesco.org/en/decisions/2702>

"areas in the vicinity of CNP."

The most recent document globally evaluating all WHS's (Osipova et al 2014) considers Canaima to fall within the category "Of Significant Concern," which is equivalent to a score of negative 4 on a scale where negative 5 represents the worst. "It means that its values are threatened by a number of current and/or potential threats and that significant additional conservation measures are required to preserve these values over the medium to long term... It is hoped that the information on threats and conservation issues compiled through the IUCN World Heritage Outlook will be used to help identify and tackle the most pressing conservation issues affecting a certain site and measures needed to address them." (Osipova et al 2014). No specification is made as to the current or potential threat in the specific case of CNP, but it appears to be obvious that it must have to do with mining activity.

4. Previous Reports on Mining Activity in Canaima National Park

The 1974 Canaima Master Plan (Gondelles 1974) dedicates 7 pages to mining activity and the ecological degradation of the area under study, including the Great Savanna (today the Eastern Sector of CNP). Therein it is stated that as of that date, diamond-mining activity was more important than alluvial gold production, which was considered to be "very sparse." The mining centers at the time were San Salvador and San Vicente de Paúl, and Urimán (on the internal and external boundaries of CNP on the Caroní River). These were now well-established diamond mining centers that even had public utilities. There are also reports of *bombas* (locations with a high concentration of diamond deposits) on the Carrao River (inside CNP). At that time, and in these sectors, legal governance over this kind of mining operation permitted "free exploitation." The reported systems for extraction were basically gravimetric, and at the time motorized pumps were used for breaking up the sedimentary banks. Technical experts predicted that the discovery of such diamond-producing *bombas* was very unlikely within the Roraima formation. Inside the park boundaries there were no mining concessions, but there was one (4,900 ha) in the vicinity of its southeastern boundary, near the Kukenán River, awarded to the firm CODSA, which was operative at the time and had a good infrastructure. This study acknowledges the "vast ravages upon the terrain" brought about by surface diamond mining operations, and maintains that it was likely that damage "within the park might not be as severe as may be assumed." But the study concludes by saying that "there is other evidence that suggests that the devastation may occur within the reserve (the area proposed for expanding CNP, which in fact later became part of CNP), should such activity intensify and should the population doing such work spread and settle in, since the damages to the physical environment caused by occupiers is also derived from their abuses against the local plants and wildlife."

The map of "ecological deterioration" published by the Master Plan (Figure 1; Gondelles 1972) synthesizes and gives an approximate location of the negative human impact they considered significant, in addition to the mining activity: the presence of traffic on National Highway 10, which was not yet paved at the time, and despite the fact it had relatively little traffic, was already considered to be a source for erosion; the pollution generated by effluents and solid human waste in Canaima Lagoon itself and around populated centers; the slash and burn activity in the savannas and forest areas in general, as well as overgrazing by bovine livestock; subsistence farming at the expense of the forests; and hunting. They reported that maximum perturbation levels were generated along National Highway 10, in the environs of Canaima Lagoon, and in the mining area surrounding Urimán (Figure 1).

Sosa (2010) wrote her masters thesis with the objective of evaluating the adequacy of satellite imagery for determining the changes in groundcover and land usage resulting from mining activity in CNP, as a WHS. She studied two sectors that cover segments of CNP's boundaries for purposes of detecting changes: Sector I (Cuyuní River, Northeast Corner of CNP, between the years 1987 and 2004), and Sector II (between the Caroní and Cucurital Rivers, west of the Auyantepuy plateau, between 1987 and 2005). Her study attempted to quantify and draw conclusions concerning the changes in mining

activity in both sectors. Nonetheless, her more reliable estimation is only for Sector I (Cuyuní) where it was found that mining activity had increased the area it affected from 18.63 to 33.49 km² (i.e., it had multiplied by a factor of 1.79 in 17 years). Her findings for Sector II (Caroní) are not reliable according to our evaluation, since she reports certain areas as being affected by mining activity when in fact they are not, according to our own analysis of present and past satellite imagery. The author has a methodological problem whereby she is interpreting as mining activity a reflectance in the satellite imagery that is attributable to what is certainly a natural cause (possibly rocky escarpments lined up with, or parallel to, the Caroní River). Figures 3 and 4 show the changes in both sectors. Therein the author makes another mistake in her graphic representations since she is saying "Cuyuní" where she should be saying "Caroní," and vice versa. Elsewhere, the study does not indicate, especially for Sector I, the precise boundaries of CNP, for which reason the major focus of mining activity in Figure 3 is considered to be outside of CNP, although very near to its boundaries. In Sector II, because the Caroní River is the boundary of CNP, it is evident that it is either outside or inside of CNP, but as we have already indicated, her results are not reliable. In general, the conclusion to be drawn by this study would be to demonstrate the accelerated increase in mining activity in the Cuyuní sector, adjacent to CNP.

Among the problems cited by an assessment of CNP, published by the MINEA in the year 2015 (MINEA 2015), which may be considered to be an official source, were: mining activity, ground and water pollution from waste materials and residues, the depletion and loss of soil, the depletion and loss of biodiversity, the extraction of endemic plants and wildlife, management and oversight, forest fires, the reduction in the quality of life and welfare of the indigenous people, and tourism. Furthermore, the report presents a highly explicit assessment of mining activities inside CNP, covering 6 pages, stating the following: there is illegal mining taking place inside CNP affecting a surface area of 2,521 km² (252,100 ha), which is uncontrollable. It recognizes the illegality of this activity and furnishes a map (Figure 5) derived from satellite imagery from the years 2014 and 2015 that shows the affected areas. Within these areas, the study reports that the Kavanayén, Wonkén and Arabopó indigenous communities are pursuing this activity, and that the growth of this activity has been dramatic during the last decade (2005-2015). It acknowledges that the impact resulting from mining activity has been not just environmental, but also social and economical, as well as detrimental to health, and that mining activity is crowding out tourism. Nevertheless, this assessment by the MINEA (2015) is overblown in its quantitative part by reason of errors in processing and interpreting the satellite imagery. Another error is not detecting the mines at Campo Carrao and in neighboring areas. The value of this report resides in its acknowledgement of the existence and severity of the problem stemming from mining activities, but not in its mapping and quantitative estimation.

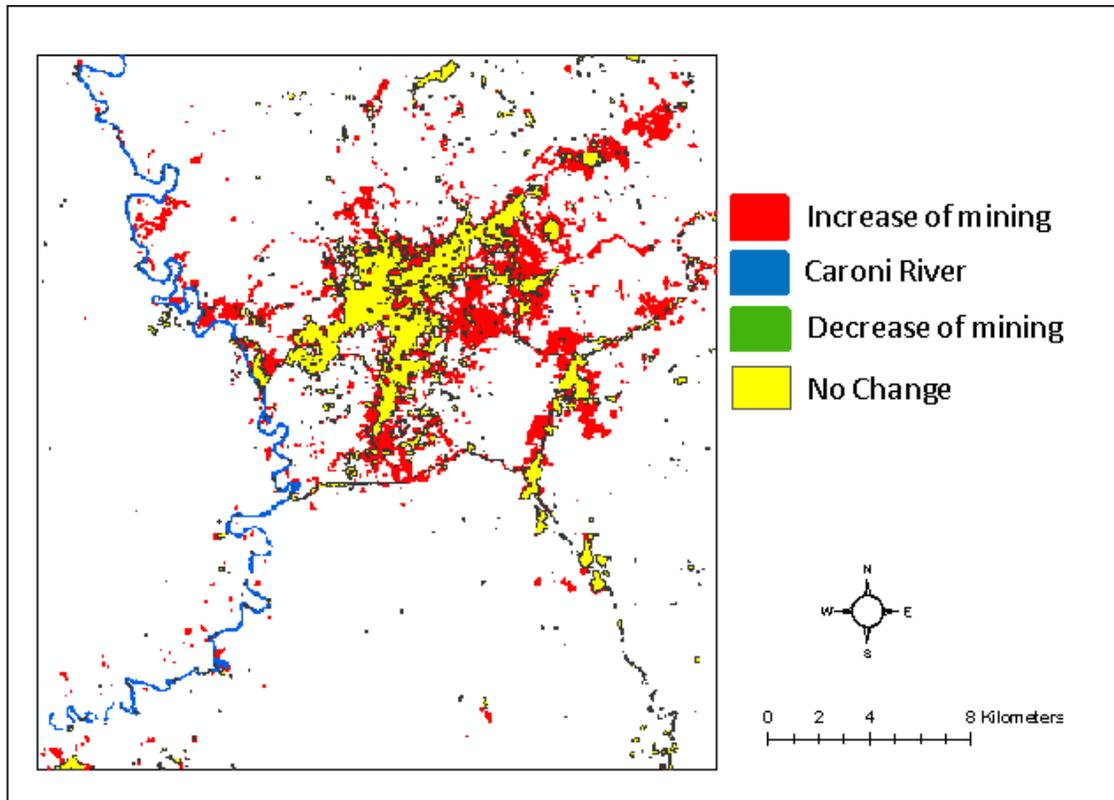


Figure 3. Detection of changes in Area I, increase in mining areas from 1987 to 2004.

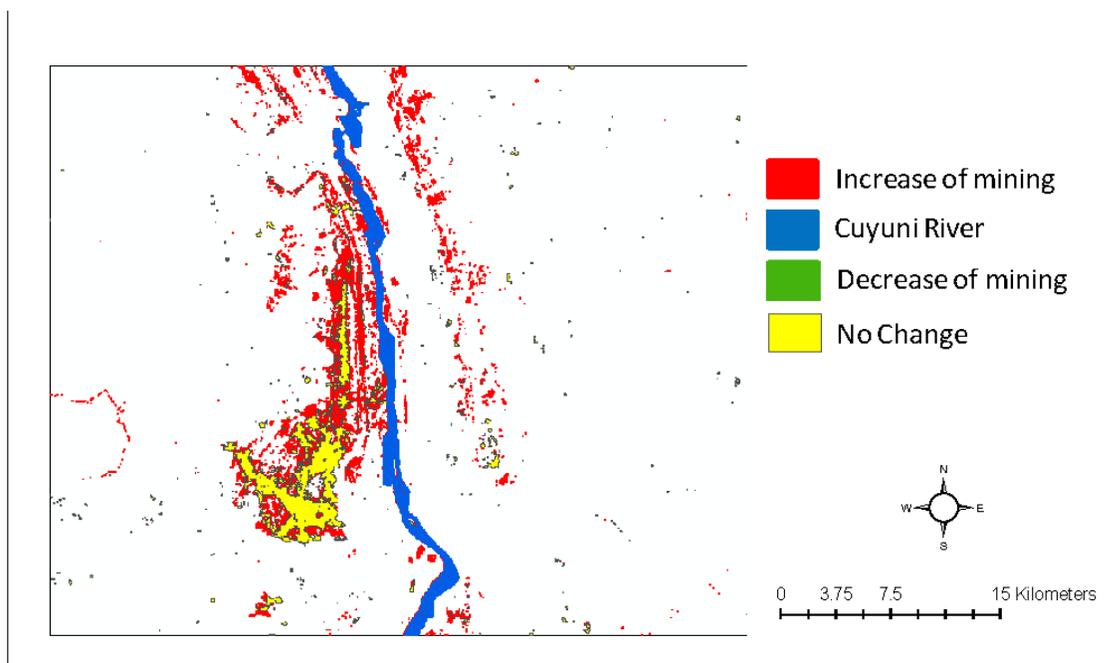


Figure 4. Detection of changes in Area II, increase in mining areas from 1987 to 2005.

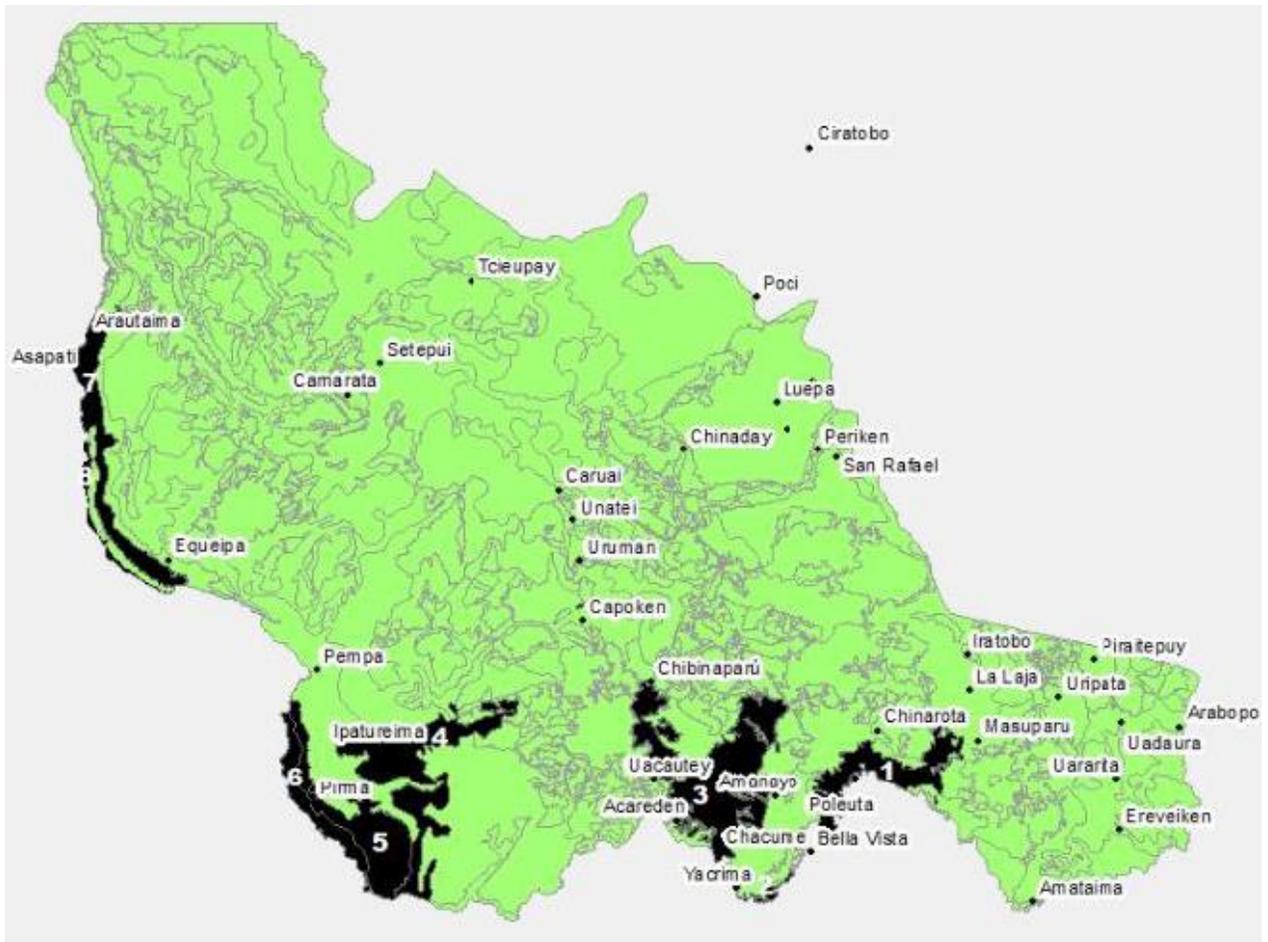


Figure 5. Mining sectors according to MINEA (2015).

5. The Discovery: Mining Activities Today in Canaima National Park

5.1. Analysis of Satellite Imagery

Sectors showing gold mining activity inside, and in the vicinity of, CNP were identified on a first approach, on a generalized scale, and later geographical precision was verified by medium and high spatial resolution satellite imagery from the Landsat TM+/OLI 8, Sentinel 2 sensors; all available on freely accessible Google Earth Pro, United States Geological Service (USGS) and European Space Agency (ESA) platforms.

The results of this procedure demonstrated the existence of a total of 33 mining sites inside, and in the vicinity of, CNP, all of them verified through digital and visual interpretation of satellite images available for the years 2017 and 2018. Of the total mining sites identified, 15 are located inside the CNP boundaries and 18 in the vicinity of the park. The latter are located at a linear distance ranging from 0 to 11.5 km (Figure 6, Tables 1 and 2, Appendix 4). The sites referred to constitute unequivocal proof of the presence of mining activity inside, and in the vicinity of, CNP. Nonetheless, it is important to emphasize the existence of other mining activity sites of lesser magnitude that could not be identified by way of the orbital data utilized in the present report, given the requirement of very high spatial definition sensors (at the centimeter level or less than 5 meters) for their correct identification.

Figure 7 shows an example of the validation technique employed in this report for the identification of mining activity sites inside, and in the vicinity of, CNP, utilizing medium (30 m) and high (10 m) spatial resolution satellite images. Once the mining activity sites were identified in the medium spatial resolution (30 m) images, they were then verified with images from Sentinel-2 sensors (10 m). In the satellite images one can observe the presence of mining activities, clearly and visibly identifiable by way of a pattern of anthropic intervention (a pattern resembling bombardments), where one can see the ground devoid of the vegetation so characteristic of CNP, ancillary infrastructures, and the presence of ponds having bluish-green tints (a result of the presence of polysulfides in the subsoil - pyrites and other minerals - which break down into sulfides as a result of the oxygenation process induced by the jets of pressurized water coming from the motorized pumps). Furthermore, one often notices in the satellite images the direct relationship that exists between mining activity sites and the proximity of populated centers (within a radius of approximately 20 km), landing strips, penetration roadways or rivers that provide access (Appendix 4).

Table 1 Location and name of mining sites inside Canaima National Park. In reference to Figure 6. Coordinates according to UTM Projection, Zone 20N/WGS84. Surface Area in hectares (ha)

No.	Name	X	Y	Area Affected (ha)
1	Campo Alegre	699338	544957	82

2	Acaredén	653679	531003	70
3	Lower Amac River	631602	536552	9
4	Apremé River	573747	525721	36
5	Pirma River	563849	538306	70
6	Titica River	560777	555563	41
7	Boquini_1	513377	606024	27
8	Guacharaca_1	511884	616146	13
9	Chicharrón_1	511571	627692	76
10	Asapati	510506	638164	35
11	Rio Karrao_1	509320	698658	16
12	Rio Karrao_2	574486	660259	18
13	Wadety	584654	658934	2
14	Kuana	578012	651302	2
15	Mowak	637198	605402	4
Total Area Affected				501

Table 2. Location and name of mining sites adjacent to Canaima National Park. In reference to Figure 6. Coordinates according to UTM Projection, Zone 20N/WGS84

No.	Name	X	Y
16	San Luis de Kukenán	679873	543450
17	Mosquito River	682391	541878
18	Salva La Patria Creek	675180	533859
19	Apoipo	665681	525366
20	Surucún River	665294	522594
21	El Polaco and El Valle	648336	519624
22	Yacrimá	652451	527762
23	Upper Amac River	640136	533640
24	Apremé River_2	572090	526289
25	Pirma River_2	565438	535311
26	Pempa or Cusaribara	560310	573768
27	Urimán	525898	583912
28	Boquini_2	511504	609709
29	Guacharaca_2	510559	616386
30	Chicharrón_2	511563	625013
31	San Salvador de Paúl	512614	666696
32	Chicanán Headwaters	607371	685419
33	Las Claritas	671933	685032

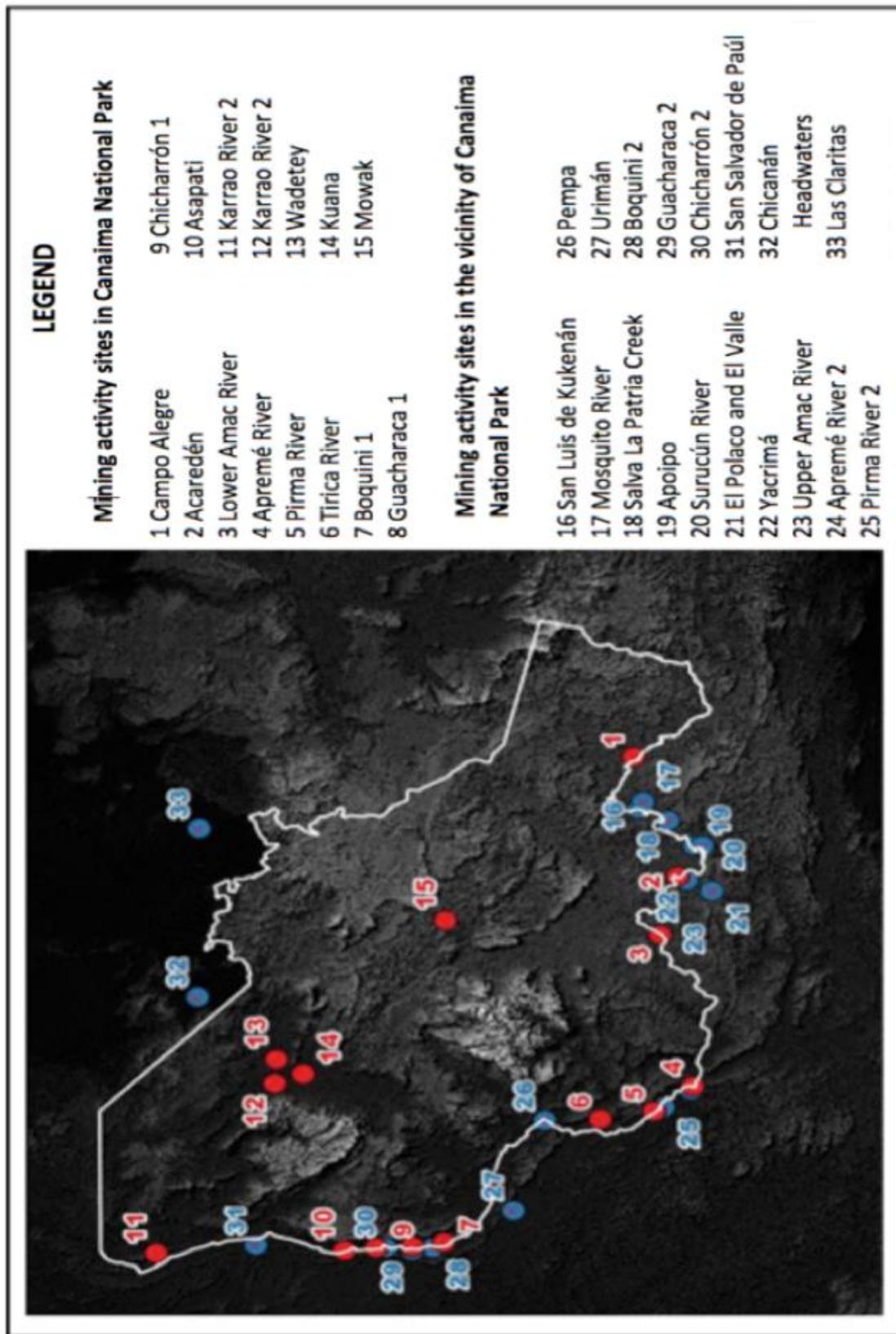


Figure 6. Map of mining activity sites in Canaima National Park and its vicinity

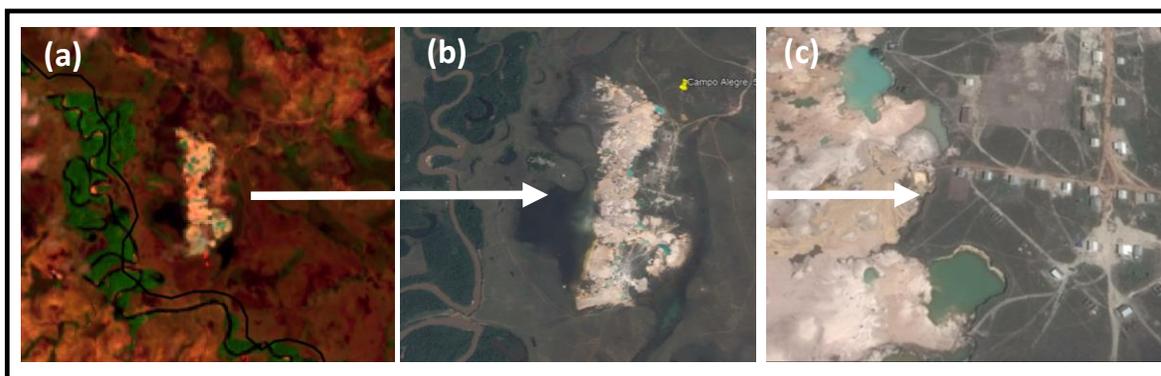


Figure 7. Validation of mining activity sites utilizing high spatial resolution imagery: (a) mining activity detected on medium spatial resolution imagery, verified by interviewing individual persons; (b) mining activity validated by high spatial resolution imagery; and (c) mining activity validated by very high spatial resolution imagery.

It is important to emphasize that not all mines are detectable by means of the procedure utilized. The satellite images employed lack sufficient resolution for detecting small mines. It is very likely that the actual number of mines may be greater than what is reported here. On another note, mining rafts are likewise not detectable by way of this procedure.

An important fact, in addition to finding the precise location of the mines, is that of calculating the surface area occupied by each of them. Table 1 shows the total area for all mines as being 501 hectares. This is the amount of terrain that is dug up and directly impacted by mining on dry land, and does not consider or calculate the impact from mining operations using rafts. This figure must also be considered to be an underestimation, because we know that there are mines that could not be detected because of the limitations of the satellite images that were used.

In proportion to the size of CNP, the 501 ha are but 0.018% of its surface area. One may argue that this is an insignificant amount of land in terms of percentage and that, therefore, the damage done is not so severe. This argument is deceitful and lends itself to manipulation, and one must instead go beyond the local or punctuated destruction to the terrain and plant communities, and consider the impact these mining centers are having on significant portions of CNP's ecosystem. Each one of these mining operations is dumping large amounts of sediments into the rivers, and the watershed in general. The rivers are ecosystems in and of themselves, and they are the "circulatory system" of the greater ecosystem. Through them flow the genes, the matter and the energy that are essential for CNP's natural condition. The murkiness of all the rivers associated with mining activities is the factor that reveals that the aquatic ecosystem has been modified. Before there was any mining activity, under natural conditions, the rivers of the great ecosystem of CNP were rivers with crystalline "blackwater."¹⁵ Owing to the

¹⁵ This is a technical term referring to fresh waters that have very little sediment, are quite transparent and have a high content of humic acid that give them a reddish color that looks "black" at a distance. For a rapid glimpse of the phenomenon see: https://en.wikipedia.org/wiki/Blackwater_river)

effects of mining activity, these rivers are turning into murky brown-colored rivers. Obviously, this means there has been an impact on the river's ecosystem, since that murkiness means conditions have changed totally for aquatic life, and certainly many species of fish, insects, plankton, etc. that had adapted to living in the blackwaters can no longer live in the murky waters. In fact, these blackwater ecosystems have a heritage value in and of themselves; turning them murky is evidence that there has been a loss of heritage. The effect that 501 ha of mines are having on hundreds of kilometers of river ecosystems is evident and probably catastrophic.

It is necessary to conduct an evaluation of the impact that these mines, consisting of 501 ha, are having on the river ecosystem, and for this we should seek the concurrence of limnologists (fresh water ecologists) and ichthyologists (fish experts), founded on a thorough scrutiny of the technical literature on the subject. It will also be necessary again to process satellite images, but this time focusing on rivers only, which means using a different and specific methodology, so as to determine, with precision, how many rivers and how many kilometers of these rivers are being affected by the mining activity.

5.2. Systematic Web Search

During April and May of 2018, a systematic web search was conducted seeking information regarding the matter of mining activities in CNP, following the methodology outlined in Appendix 2. This appendix presents a synthesis derived from the raw data produced by the systematic web search. On the basis of these results we can arrive at the following synthesis:

In the year 2007, mining activity is reported on the southern edge of CNP, at a site known as Playa Blanca, on the Kukenán front. In 2009, spokespersons for environmentalist groups report that 300 mining crews are operating on the Caroní River front inside CNP, and they demand intervention by the authorities. They explain that tourists flying toward Canaima Lagoon are surprised to see the mines from the air. In 2010, the same environmentalists report that there is mining activity already underway on the Cururital River and the lower Carrao River, and that the mining activity continues on the Caroní front. In 2011 the spokesperson from the indigenous communities of the Western Sector of CNP states that a boom in mining activities had started right before the eyes of the authorities, that this activity is readily visible and detectable, and that heavy duty equipment is being used, especially rafts, and also that operations are being conducted at night so as to avoid detection. The indigenous peoples' complaints are intensifying this year, demonstrating that there is a fear that tourists may start to avoid the Canaima Lagoon sector.

On 10 June 2014, the then Minister of the Peoples' Power for Tourism, Andrés Izarra, publicly denounced over the program *"En Contacto con Maduro No. 11"* (In Touch with Maduro) the current depredation inside Canaima National Park caused by "illegal mining," especially on the Carrao and Caroní Rivers, and mentioned the Arekuna mine, which, he said, had been recently seized by the armed forces. He also stated that there

were rafts throughout the park. He said the illegal mining activity *"is today the biggest threat being faced by this Natural Heritage of Humanity; illegal mining is devastating the entire park."* During the program he showed photos of areas "devastated" by the mining activity, in sites such as *"near Campo Carrao,"* and stated that *"there are also mines encroaching upon Kavac."* He said, *"That brings with it many consequences, especially for the Guri Dam. This is because the waters of the Caroní and Carrao Rivers flow into this important reservoir, and their sediments affect the turbines that generate electricity for 70% of the population."* He finally stated that, in order to attack this grave problem, joint action by the entire State is required. In official parlance, the phrase "illegal mining activity" is recurrent, yet in reality all mining activity, of whatever nature, is by definition illegal inside CNP.

On 19 October 2014, Valentina Quintero, a renowned journalist specializing in the subject of tourism, widely denounces the ravages and the extent of the mining activities inside CNP. She especially makes reference to the drop in tourist visits to the Canaima Lagoon sector. Also in the year 2014, the introduction of mining activities in the Great Savanna sector (Eastern Sector of CNP) is denounced for the first time and the first "military operation" against mining activities in the Western Sector is made known (probably the same one referred to by Minister Izarra). In 2015, the big mine at Campo Alegre is mentioned for the first time, this being on the Kukenán front at the southern end of CNP, and there is a proliferation of complaints by the indigenous population concerning mining activities in the Western Sector, with reports of as many as 30 rafts operating on the Carrao River.

In 2015, the Minister of Indigenous Peoples refutes the Defense Minister's stance and acknowledges that indigenous people are mining inside CNP. In 2016, complaints continue to be voiced concerning the expansion of mining activities in the Western Sector, and there is a new and growing persistence in reporting the mine at Campo Carrao, which is operated by outsiders. By the year 2017, there were open reports of complicity by the authorities, and it was being reported that the Ciudad Bolívar airport was the operations center for all of the mining activity on the Caroní and in the Western Sector.

Concurrent with the denouncements we find information about military operations intended to dismantle mining activities, starting in the year 2009 in the Canaima Lagoon sector itself, including the dismantling of two rafts, as well as the impoundment of equipment. In 2010, the Caura Plan is launched, aimed at removing miners from the Caroní River, as well as the Paragua and Caura Rivers. There is also information about actions being taken on the flatlands of the Great Savanna. In 2014 a so-called Roraima Plan is launched, and yet another Operation Canaima, which reportedly dismantled more than 200 mining camps, 100 mines and removed 870 people, all inside CNP. In 2015 there is new talk of mining operations being dismantled on Canaima Lagoon and 2 rafts being confiscated. In 2017 there is talk of a so-called Boquete Plan, directed against mining activity, reportedly to include CNP also.

As for such military operations, it is noteworthy that there are years that are devoid of any information, as for instance, the years 2011 through 2013, and the year 2016. On the other hand, it becomes evident that these operations had been ineffective, since the mining activity has resumed. Also, it is interesting to note that only a small number of rafts are being dismantled, something not commensurate with the large number of such rafts known to be operating on the Carrao River, for example.

The findings of this web search also serve as additional elements for assembling the dialogue and discussion presented in this report.

5.3. Interviews

On the basis of exploratory inquiries conducted with the help of technicians from the environmental sector (government officials and non-governmental organizations) we prepared a list of possible people, from different professions and occupations, who live or work in CNP, and who would be willing to participate in a semi-structured interview for the purpose of substantiating the mining situation. From that list, eight people were willing to be interviewed. These were people who could be considered to be informants or high-order witnesses, in other words, highly reliable, based on their direct firsthand current knowledge of the mining situation inside CNP and in its spheres of influence. The information provided by the interviewed persons served as primary elements for assembling the discourse and discussion presented in this report. The principal elements of their testimony are summarized in Appendix 3.

5.4. Socio-environmental Impacts

There is an extensive bibliography on the socio-environmental impacts of alluvial gold mining operations on tropical ecosystems. In order to provide a context for the findings, and to offer an understanding of how detrimental they can be for the natural and cultural heritage, we present the following summary of the impacts that can be perceived as being real for CNP.

Table 3. Summary of socio-environmental impacts

Settings	Impacts
Ecological	Destruction of the ground surface Destruction of ground-covering vegetation Creation of artificial bodies of water in which disease-carrying insects proliferate. Sedimentation in natural bodies of water Severe alteration of physiochemical parameters of waters Alteration of plankton and nekton communities in rivers Alteration of benthic communities in rivers Destruction of natural lentic bodies of water (lakes, bayous) Alteration of river morphodynamics Chemical contamination of bodies of water, with mercury and human waste. Increased deforestation in adjacent areas Increase in brush and forest fires.
Biodiversity	Extinction of local fauna due to hunting Depletion of native plant communities.
Scenery	Damage to and deterioration of scenery
Pemón - Social	Confrontation between communities Discouragement and loss of tourism Greater dependence on the <i>Criollos</i> (Venezuelans of Hispanic cultural heritage) Economic diversification at a minimum Increased deforestation Loss of cultural identity Breakdown of traditional social structure. Greater incidence of insect transmitted diseases Mercury poisoning. Transculturation. Crime. Violence.
Institutional	Adequate environmental management has become impossible Inefficient performance by environmental management entities

6. Understanding Mining Activity in Venezuela's Guayana Region

6.1. The Actors

In the region of the state of Bolívar, mining activity is driven by 5 fundamental actors: politicians, military officers, non-indigenous miners, criminal gangs, and indigenous people.

In the first group, one finds officials from the central government, or from the regional government (executive branch of the state of Bolívar), and the rural municipal authorities, and in general, members of political parties who are present in all spheres of the state's entities (legislative bodies). The fundamental decision to activate, or not, the legal mechanisms for regulating mining activity falls on their shoulders. Such activation may be formal or informal. In this group, we must also take into consideration prosecutors from the Public Ministry, the Ombudsman's Office, the state and municipal police, etc. In general, one may draw the conclusion that this set of actors has a hierarchical structure controlled by the apex of Venezuela's political power. The different officials at the different levels obey, in a more or less efficient way, instructions for action that emanate from the higher echelons of government. One can also say that there are two political hubs, one is regional, with the state governor at the head, and the other is national, and spins with the Office of the President of the Republic at its center. At some point, the regional line also answers to the central or national line. This group partakes in a high percentage of the earnings from the gold trade. The generalized opinion is that, at best, a very low percentage of the gold production is reported and transferred to the Central Bank of Venezuela (BCV), which sets monetary policy and is responsible for the gold reserves, while the rest is distributed among the different groups of actors.

The military actors are members, mostly officers, of the Bolivarian Army, the Bolivarian Navy (river component) and the Bolivarian Military Air Force, all of whom operate jointly as part of the so-called Bolivarian National Armed Force, and cooperate among themselves and have under their command the troops of the Bolivarian National Guard. It is not clear whether the operation of this military structure, at the service of the mining activities, is performed as part of the unified command; however, it appears that it does so in coordination with the civilian political group. For example, the Air Force controls supplies that are shipped in by air to the mining centers (Western Sector of CNP), the Navy controls river navigation, and the Army the fuel that is distributed by land (Eastern Sector of CNP). One can say that the logistical base in remote sites is controlled by the military, or at least supervised by them. The Ciudad Bolívar airport is a fundamental focus for air logistics operations, which are controlled by the military. This group partakes in a high percentage of the production from a given mine (taken as mineral) or they collect a "toll" for allowing passage of supplies, or collect directly for fuel supplies. The amount collected may be in cash or in gold mineral.

The non-indigenous miners' group consists of all those who finance and operate the mines, but who are not members of the Pemón indigenous communities. Some are originally from other regions in the country, some are of diverse nationalities and still

others come from indigenous ethnic groups from neighboring territories. The financiers appear to be operating out of Ciudad Bolívar, Puerto Ordaz, Barcelona, Puerto La Cruz, Porlamar or Santa Elena, but may also be doing so out of Boa Vista (Brazil). Also, civilian mining logistical operators must make use of air or river transportation, which are both under the control of the civilian and military authorities. Mechanics, motorized pump operators, distributors of supplies (food, fuel, mercury, etc.) and builders of storehouses, are an essential part of this group. Finally, there is the miner, a manual laborer, who operates the rafts and the hydraulic monitors, carries out the mercury amalgamation, and in general the process of extraction as such. This group partakes of a high percentage of the earnings from the gold trade. There are those who work the mines in a relatively autonomous way in groups having a small number of members, and there are those who work within a network or more complex organization. Generally, those who operate rafts must do so as part of a structure that is controlled and financed in a more complex manner than is the case with mining on dry land. At the present time, at least in CNP, there is evidence that the entire non-indigenous population is working in the gold mines (school teachers, physicians, nurses, public officials from different governmental entities, etc.).

The criminal gangs consist of people who are a part of organized crime and they may grow to have a considerable number of members. They have a hierarchical structure and may be controlled or directed from inside the prisons. In the vernacular, such organizations are known as "syndicates." These are well-armed civilians, extremely violent, and their function is to provide "security" for the miners, from whom they extort protection money known as "a vaccine" or a percentage of participation in the production of gold, on a territorial basis. Fundamentally, these gangs have come to an understanding with the military sector in that they coordinate their activities with them or let them partake of the money collected. There is also information that they gained control of the mines with the consent of, and promotion by, the public sector, starting with the beginning of Rangel Gómez's term as governor, especially in the rural municipalities in the mining district of the state of Bolívar adjacent to CNP. Several "syndicates" operate in the region.

The Pemón indigenous people, who make up the majority of the inhabitants of CNP, are actors in the mining activity insofar as they control the miners' access to Pemón lands, or participate in activities similar to those of the non-indigenous miners. This sector partakes of a certain percentage of the earnings from the gold trade. Mining activity in CNP very likely yields less (in kilos/year) than what is produced by the rest of the state of Bolívar. At this moment it is impossible to calculate the amount produced, and it is very likely that all the indigenous communities inside CNP are involved in mining activities. They go to great lengths to keep their mining sites secret and prevent outsiders from entering their own mining areas, including other Pemón people from other communities. This is done by way of direct action. There is also information about armed Pemón self-defense groups being organized ("Pemón territorial guard").

Establishing or estimating the proportion of participation in the earnings by any of these sectors was beyond the scope of our research, but one can assume that there must be a distribution hierarchy, from higher to lower rank in the following manner: military/politicians, gangs/civilians, indigenous people. Nonetheless, it is possible that

indigenous participation may be much greater in very hidden and remote areas of CNP, or, that the distribution hierarchy may be turned upside down.

6.2. Types of Mining Activities

From a technical perspective, there are four drivers that characterize gold mining in CNP: a) the financial investment: from high to low; b) the method for extracting the gold: gravimetric and mercury; c) the geomorphological location of the mine: rivers, riverbanks or solid ground; d) the method for removing sedimentation: manual or hydraulic.

The low end of the first driver, financial investment, accounts for mining activities that are financed by the miners themselves. These miners purchase their supplies in close proximity to their mines. This may involve working in groups, in the manner of cooperatives that may have a more horizontal structure. Generally, they do not require the procurement of machinery on a large scale. The high end of the financial investment driver accounts for mining activity of a greater order of magnitude, which requires capital investment on a larger scale, as this larger operation creates a need to provide logistics over vast and remote geographical areas in order to provide supplies that are difficult to obtain, such as gasoline or diesel fuel, motorized pumps, hydraulic monitors, etc. In sum, what we have is a financial driver that ranges from very local investments to those having broader ramifications in large cities, or outside the country, controlled by economic groups of considerable magnitude. Along this continuum one may find related activities that may be financed locally in the vicinity of the mining activity, such as lodging in hotels and inns, fresh produce stores, hardware stores, etc. In conclusion, we may be talking about mining activities that depend on financial investments of a low, medium or high order.

The second driver relates to extractive methods, and is of importance relating to impacts on the environment. The gravimetric methods (made possible by the difference between the density of gold and that of other mineral material) can be artisanal or semi-industrial. The artisanal method may consist of simply panning for gold, while the semi-industrial method uses what is called "sluicing," which consists of channeling the water along a slightly inclined trough called a "sluice box" with grooves on the bottom intended to slow down the flow so that the gold settles and becomes trapped on a surface resembling a plastic carpet. There is also the chemical method that uses mercury to amalgamate the gold. The resulting amalgam is then heated so as to separate the mercury from the gold, and then the mercury is recovered using a retort (evaporation and condensation). This last method is very harmful to the operators' health, as they inevitably absorb the poisonous mercury into their bodies through their skin, or by breathing the mercury vapors during the process of recovering the mercury. Furthermore, the injurious contamination that this creates in the ecosystems is well documented. In fact, this method is being questioned and is prohibited in many countries.

The third driver operates as a function of the geomorphologic location of the place where the alluvial gold-containing deposits are extracted. Basically, in the CNP region, gold and diamonds are extracted from the alluvial deposits resulting from the erosion of the tepui formations. In a geomorphological sequence, the first source for the

deposits is found in the alluvial flatlands that are far removed from the contemporary course of the rivers and secondary channels; then come the riverbanks, cliffs, shorelines and former channels, especially where the rivers have meandered, and finally the riverbed itself.

The fourth driver operates as a function of the method employed for removing the sediments and transferring them away from their natural locations, so as to process them in order to extract the mineral. This can range from removal by the use of manual tools to using pumps applying pressurized hydraulic force by way of hoses or monitors, intended to crumble the sediment columns, or suction pumps or dredges, mounted on rafts or floating platforms, which extract the sediments from the bottom of rivers, channels, lagoons or bayous.

The four drivers can be combined so as to create different kinds of mines, as for example: a) a mine funded by high-level financing and utilizing gravimetric methods (sluicing), extracting sediments from the riverbed with dredges or suction devices; b) a mine funded by medium-level financing operating on alluvial flat land making use of hydraulic monitors and amalgamation with mercury; c) a mine funded by low-level financing using manual gravimetric methods and manual extraction. Thus, in theory, any combination is possible. The only combination that does not seem to be possible is a mining operation funded by low-level financing that intends to use motor-driven pumps and dredges. For a more detailed description of the different kinds of mining operations inside CNP see Appendix 5.

6.3. The Reasons for the Mining Boom

6.3.1. Canaima Trapped in the Orinoco Mining Arc

"Orinoco Mining Arc" is the name the Venezuelan government has devised to conceptualize its policy for opening up more than 11,000 km² of the nation's territory to mining activities. (See Figure 7; <http://desarrollominero.gob.ve/tag/arco-minero-del-orinoco/>) Even though CNP is not formally included in the geographic boundaries of such project, it is obvious that it is "trapped in," flanked by it on the south as well as on the north. To the north it borders on "Area No. 4," pertaining to the Imataca Forest Reserve and adjacent zones, where anarchic gold mining activities are concentrated, as well as concession blocks¹⁶ such as Las Cristinas, Las Claritas, Las Brisas, among others. And on the south by the "Special Icabarú Block," bordering on Brazil, where for many years there has been a focus of social and environmental conflicts stemming from the extraction of diamonds and gold from a territory that is part of the upper basin of the strategic Caroní River.¹⁷

¹⁶ Mining activity in conflict with legal status as a forest reserve.

¹⁷ Aside from the Simón Bolívar Hydroelectric Center, known as the Guri Dam, on the Caroní River, one also finds the Caruachi, Macagua and Tocoma (under construction) dams, all of which jointly supply more than 75% of Venezuela's electric power through high voltage transmission lines.

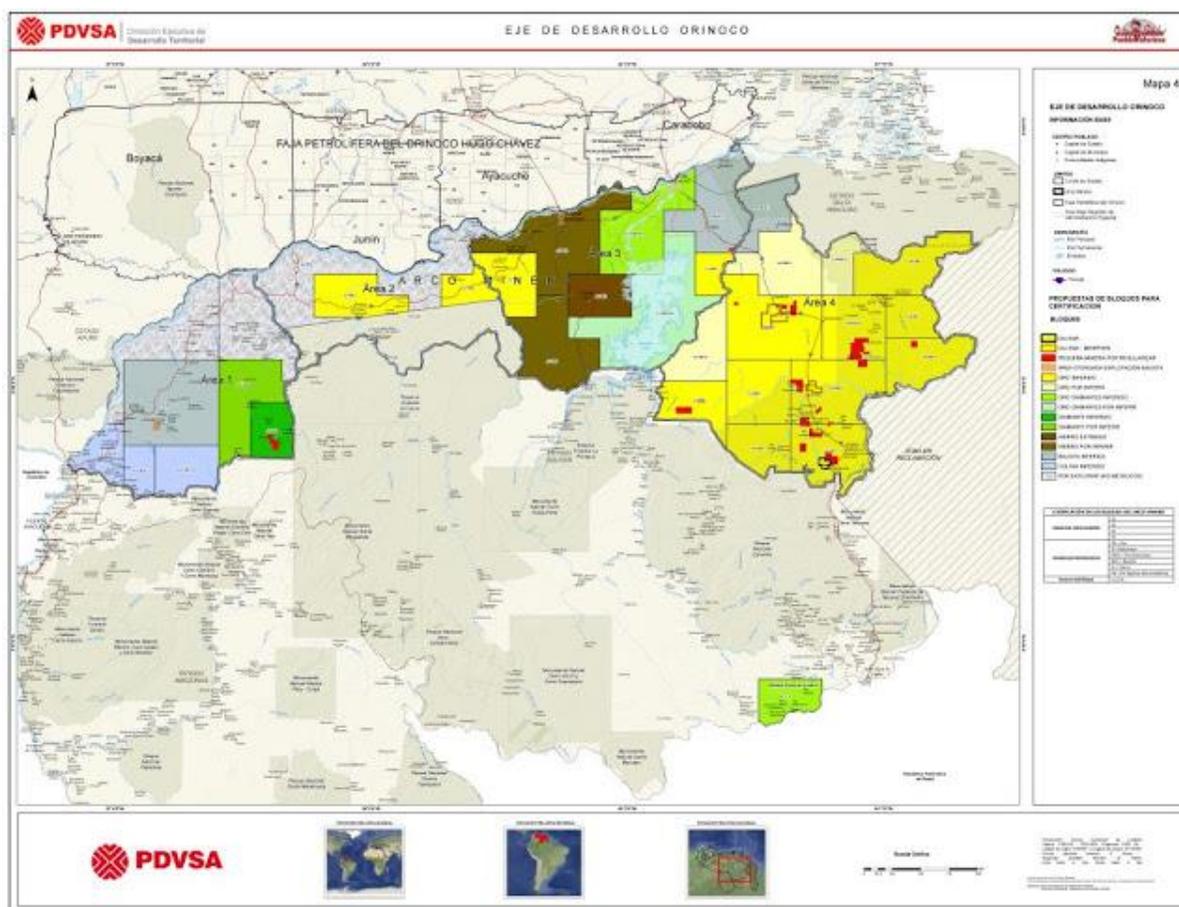


Figure 8. Geographical space encompassed by the Orinoco Mining Arc

Canaima cannot be considered immune to the promotion of mining activity announced for Guayana by the Nation's Executive starting in February of 2016. In that month, as an alternative economic strategy,¹⁸ and in response to the drop in oil prices, ongoing since 2014, Nicolás Maduro announced the creation of the Orinoco Mining Arc Strategic Development Zone, officialized by way of Decree No. 2248,¹⁹ for promoting the extraction of resources consisting of gold, diamonds, iron, bauxite, coltan and other minerals traded internationally. The plan seeks to conduct the extraction by means of joint ventures that will generate new sources of revenue for the State. Included in their

¹⁸ Some economists, such as Víctor Álvarez, former Minister of Basic Industries and Mining (2005-2006), refer to it as short term acquisition of foreign exchange, "Stemming from the collapse of oil prices, Nicolás Maduro's government has declared itself to be in desperate search of foreign exchange. And as his luck would have it, as soon as the biggest oil boom ever experienced by Venezuela was over, and not having saved anything for the lean years, Maduro has had to decree an economic state of emergency and his will to survive turns to reconciliation with the mining transnational companies aimed at having them resume mining projects that had been suspended by Chávez."

<<https://www.aporrea.org/actualidad/a224434.html>> Consulted on 22 April 18.

¹⁹ Published in Gaceta Oficial N° 40.855 dated 24 February 2016.

execution are transnational companies, private domestic enterprises, new as well as preexisting state-owned entities, among which are included enterprises managed directly by the FANB. According to the aforementioned Decree, this involves a surface area of 111,843.70 km² (covering approximately 12.2% of the nation's territory) within the states of Bolívar, Amazonas and Delta Amacuro.

Many individuals, NGO's and institutions are in disagreement as to the execution of the Orinoco Mining Arc policy, and with the expansion of mining activities as such, in the southern part of the country, given that this represents a high risk for the preservation of spaces that are crucial for guaranteeing the production of hydroelectric power - more than 62%²⁰ of the nation's electricity - and the country's most important reserves of fresh drinking water,²¹ as well as its cultural and ethnic diversity, and its biodiversity. At <http://www.arcominerodelorinoco.com/> there is a summary of a preliminary draft on the general repercussions of this project. But much beyond the opinions, there are the doubts about the legality of the Mining Arc project. Venezuela's National Assembly has declared it to be unconstitutional and illegal, yet despite this the Executive Branch forges ahead in its implementation.²²

It is a foregone conclusion that the wave of expansion of mining activities will reach CNP. In fact, we believe it has already reached that far, and this been demonstrated by the increase of mining activities inside CNP, which we have documented in this report. Nevertheless, the scope of the Mining Arc goes much beyond, and will undoubtedly have repercussions in other PA's south of the Orinoco and areas influenced by its reach: "The national parks system is being endangered by illegal mining, and by mining that has been legalized by Decree 2248, signed by President Maduro, which, if executed as planned, will lead to mercury and cyanide contamination of the Orinoco; which in turn is considered to be a transnational problem, as the Caribbean Sea will be affected; the same goes for fishing and agriculture."²³

6.3.2. The Socioeconomic Context

Beyond the matter of the Mining Arc, which is definitely nothing more than the government's stated intention of aggressively opening up new mining areas and exploiting currently operating mines to a maximum degree, there is the general situation of Venezuela's economic system within the context of the international gold market. Starting in the year 2000, Venezuela entered into an economic dimension characterized by the following key factors²⁴: a continuous and unstoppable local monetary devaluation, an ever-increasing rate of inflation, and a growing scarcity of consumer products of all kinds. These three factors have combined with the increase in international gold prices, and, furthermore, with a fifth internal factor: the plan known

²⁰ <http://www.corpoelec.gob.ve/generación>

²¹ <http://www.asambleanacional.gob.ve/actos/acuerdo-sobre-el-decreto-de-creacionde-la-zona-de-desarrollo-estrategiconacionalarco-minero-del-orinoco>

²² <http://www.asambleanacional.gob.ve/actos/acuerdo-sobre-el-decreto-de-creacionde-la-zona-de-desarrollo-estrategiconacionalarco-minero-del-orinoco>

²³ Diario 2001, *El Estado es el gran depredador ambiental* 21.04.18 < <http://www.2001.com.ve/en-la-agenda/185847/el-estado-es-el-gran-depredador-ambiental.html> > Consulted on 17 May 2018.

²⁴ <http://www.imf.org/en/Countries/VEN#countrydata>

as *Misión Piar*. Starting in the year 2013, these five factors unleashed the "perfect storm" that pushed gold mining activity to peak levels never before seen in the country's history.

The first three factors are undisputable facts that have been reported²⁵ and debated to no end by experts in economics. The jump in gold prices happened between the years 2008 and 2013 (peak year), and even though gold dropped a bit, it has remained at relatively stable levels ever since.²⁶ *Misión Piar* was originally the government's plan intended to promote "small mining operations," even though at some point the plan attempted to apply a sort of "mining reconversion,"²⁷ in other words, encourage miners in certain locations to switch over to other occupations that did not harm the environment, especially along the Caura and Caroní Rivers, based on the premise that mining activity, through the generation of sedimentation, threatens to diminish the life cycle of the hydroelectric equipment downstream, where approximately 70% of the country's electric power is generated. Currently *Misión Piar* is actively recruiting young unemployed workers to turn them into agents of the mining activity.^{28 29}

Economic factors have led to unemployment and have brought about, especially in the last 5 years, a brutal drop in the people's purchasing power. There are no jobs that can compensate for the highly elevated cost of the basic household food basket, and the already runaway hyperinflation³⁰ makes it impossible to live off of regular remunerated endeavors. Mining and trade related to mining are the only alternatives that will yield personal or family income sufficient enough to cover expenses for food, transportation and medications, given the elevated prices that are being paid for the gold.

Around the year 2013, the aforementioned factors, as a consequence of the government's intentions to "reconvert" the miners from the Caura and Caroní Rivers, have served to encourage mining activities to move further into the heart of CNP, way beyond its traditional boundaries (marked by the Caroní and Kukenán Rivers) and to intensify even more the extraction from already existing mines, as well as the reactivation of old abandoned mines. The "retreat" of miners from the Caura and lower Caroní Rivers translated into a wave of miners entering into CNP as a way of retaliating against the evictions, or as a way of evading the military's eviction operations.

Finally, a sixth and last factor that may be weighing upon the previous five is that the non-indigenous miners find it necessary to flee or stay beyond the reach of the "syndicates." Some of the testimony that was gathered points in that direction. The miners prefer to operate under the "protection" of the military, rather than the extremely violent "syndicates." Especially inside CNP, in the Caroní and Carrao Sectors, this protection is provided by the military. As for indigenous miners, and in areas more

²⁵<http://money.cnn.com/2016/10/25/news/economy/venezuela-breaking-point/index.html>

²⁶<https://goldprice.org/gold-price-history.html>

²⁷<http://correodelcaroni.com/index.php/politica/item/15018-gobierno-ensaya-quinto-plan-contra-la-mineria-ilegal-en-bolivar>

²⁸<http://desarrollominero.gob.ve/tag/mision-piar/>

²⁹<http://desarrollominero.gob.ve/mision-piar/>

³⁰<http://bruegel.org/2018/02/venezuelas-hyperinflation/>

toward the interior of CNP, this group prefers to operate under the protection of their own Pemón communities, where the military influence is not as direct.

These five factors under analysis are objectively more direct. An analysis that delves deeper may reveal other factors, such as for example, the institutional collapse of the Venezuelan State, which has degenerated into anarchy, impunity and violence, as well as a series of other more complex factors to be considered that are necessarily subsumed in the abysmal political crisis in which Venezuela is now submerged.

6.4. The Mining Scheme

By knowing who the actors are and what the context is, it is possible to understand how the mining scheme works in the state of Bolívar, and in particular inside CNP; even though there are two dynamics with important differences. The more complex scheme is what takes place along the corridor between El Callao and Las Claritas, along National Highway 10, which is the road that later crosses the Great Savanna portion of CNP. This corridor, approaching CNP from the north, moves along the operations base of the "syndicates," who in turn have territorial control of the mines and allow non-indigenous miners (who are in the majority) to operate for purposes of obtaining their own share (reportedly around 30% of each miner's production), and then they, or the miners themselves, also bring military actors and politicians into the game as participants. An obscure aspect of this scheme has to do with the identity of the end buyers of this gold, in other words: Who exports it, and what then happens with the gold bullion bars? Under Venezuelan law, all gold must be sold to the Central Bank of Venezuela,³¹ but in reality only a small percentage gets there (60% according to official sources,³² but some mining engineers are of the opinion that in reality it may actually be 10% at most), and the rest is smuggled out of the country. The smuggling routes for taking the gold out are through Brazil, Guyana, Trinidad, and Colombia, but it is also assumed that most of this done through Curaçao.³³ The official production, which is what goes to the Central Bank, is calculated to be 8 tons/year at most.³⁴ Taking into consideration the amount that is smuggled out of the country, it goes to reason that the real figure may exceed 80 tons/year.

Inside CNP the scheme is different, but it varies according the particular mining sector in CNP. Basically, there are 4 sectors: the northwestern, which we shall call Carrao-Canaima; the western front, which we shall call Caroní; the southern front, which we shall call Kukenán, and the disperse front consisting of the center and eastern part of the park, which we shall call Great Savanna. All the fronts, except for Great Savanna and Kukenán, are located in a dynamic situation, where territorial control of the mines is guaranteed by military actors, who allow the mines to operate without any apparent perturbation by the syndicates. Pemón leaders that maintain trade and operations relations with non-indigenous miners reportedly control the Kukenán and Great

³¹ <http://www.correodelcaroni.com/index.php/economia/item/33873-decretan-obligatoriedad-de-venta-del-oro-extraido-en-el-pais-al-bcv>

³² http://200.74.197.135/orobcv/index.php?option=com_content&view=article&id=75&limitstart=9

³³ <http://atodomomento.com/internacionales/contrabando-oro-venezolano/>

³⁴ <https://mineriaenlinea.com/2018/01/estiman-triplicar-produccion-oro-en-venezuela-presente-ano/>

Savanna fronts. The role of the military actors and the politicians on these two fronts is that of indirect control, as miners are dependent on them for the delivery of basic supplies such as gasoline and diesel fuel; the role is one of participation. In this respect, control of the mining sites has been a point of honor for the Pemón, who use this as a way of wielding power over what they consider to be their own territories, which, as a matter of fact, have not been demarcated nor recognized by the Venezuelan State. There have been violent confrontations between indigenous and non-indigenous groups that have attempted to control the mines. Apparently, there is a status quo whereby the military actors and the politicians allow the Pemón to maintain control, as a result of political and physical clashes that have occurred between them. Presumably, the gold from these two fronts, Kukenán and Great Savanna, is traded primarily in Santa Elena. The other two fronts direct their trade toward Ciudad Bolívar.

The Las Claritas center, outside of, but nevertheless near CNP, applies pressure intended to wield control by using the "syndicates" inside CNP. The miners in CNP struggle to keep this from happening, and one can say that, to a great extent, fear of the "syndicates" has served to incentivize mining activity inside CNP, where, under the control of the military or the Pemón, conditions are better for personal safety.

6.5. How is it possible that mining activity in CNP has gone unnoticed?

It is difficult to understand why Canaima National Park, undoubtedly one of the most spectacular and impressive World Heritage Sites on the planet, and which will always appear among the top places³⁵ in any objective ranking, has not been a matter of concern for UNESCO. It is remarkable that, given the known potential for extracting diamonds and gold from CNP's territory, and the fact that mining has always been an important activity in the region, no attention has been given to the park's vulnerability to this activity that is highly degrading to the landscape, the ecosystem and to the indigenous societies.

The UICN/UNESCO mission for the year 1999³⁶ had already warned of the risk posed by mining and of the presence of such activity and, now that we know that starting in 2000 the mining activity curve had started to climb it is shocking that the project financed by the UN, "Mejorando Nuestra Herencia" (Improving Our Heritage) (Real et al 2002, Novo and Díaz 2007) did not detect the magnitude and gravity of the problem. Nonetheless, since the year 2001, there has been no new report on CNP/WHS from UNESCO.³⁷ The report by Osipova et al (2014) does not mention what factors are threatening to CNP/WHS, even though it does not have as its goal delving into details. It is inexplicable why in 2015 MINEA (2015) itself acknowledges the extent and gravity of the mining activity, yet their report ignores the existence of mining centers located in the heart of the national park, and no measures are proposed, at least ones dealing with zoning, aimed at eradicating such mining.

Since the latter years of the 1990's, it would seem that there has been a tacit agreement of sorts between the environmentalists and the politicians not to draw attention to the

³⁵ <http://www.traveller.com.au/unesco-world-heritage-status-sites-10-of-the-best-glw357>

³⁶ <https://whc.unesco.org/en/list/701/documents/>

³⁷ <https://whc.unesco.org/en/list/701/documents/>

situation. It is entirely possible that the designation of CNP as a World Heritage Site, in and of itself, may have been a factor weighing on the failure to acknowledge the presence of mining activity, since admitting that the country's most important and famous national park, also a WHS, was being subjected to mining activity would entail a loss of prestige and a blow to Venezuela's pride. By the first decade of the 2000's it can safely be assumed that the nation's authorities themselves had been making an effort to conceal this situation, because it was precisely the Venezuelan State, the military and the politicians who were participants in this activity. Finally, the country's economic collapse has created a "situation of necessity" and most of the inhabitants are using this as grounds for justifying their mining activities, which means that environmental and legal arguments run counter to satisfying the pressing need for survival. The Pemón indigenous people have been a fundamental part of this concealment, despite the fact that there are some Pemón communities that resist and reject mining activity, conceptually and ethically.

7. The Near Term Future of Canaima as a World Heritage Site

There are no objective elements that would allow us to foresee an improvement in the mining situation in CNP, in the short or in the medium term. An improvement would mean closing down the mining sites, whether by police action by the Venezuelan State, or because of a change in socioeconomic circumstances that would favor tourism. Currently there is no economic alternative to the mining activity, and given the complex situation of illegal mining that has penetrated the very heart of the Venezuelan State, there are no alternatives in sight.

In this respect, the most probable scenario is the continued increase in mining activity. This may come from two directions: a) an expansion of mining activity within the current schemes operating in CNP, or b) an expansion of mining activities under schemes similar to those currently operating outside of CNP. The worse of the two sub-scenarios is b) as it would mean penetration by the "syndicates" and an increase in violence, with inevitable clashes between the Pemón communities and the non-indigenous actors. Unfortunately, there are indications that the situation, especially on the Great Savanna mining front, and the Kukenán River mining front, are pointing in that direction. The creation of an alleged "Pemón territorial guard" appears to be in preparation for that scenario. In a scenario of violent confrontation there is no doubt that the Pemón will bear the brunt of the burden.

From the social point of view, the consequences of this scenario are horrifying, environmentally speaking, and the expansion of the mining activity will lead to a focus of intensification in the mining sites and to another focus of spatial expansion toward abandoned mines or toward sites never before mined. Given this possibility, the most logical move would be to have the existing mining sites be used as supply bases, or stepping-stones, for colonizing new sites in the vicinity of previous sites. In this respect, what is to be expected is a sort of domino effect that originates in current mining sites. All of this means that more hectares of alluvial flatlands, river shores, and rivers will be incorporated into the mining activity, leading to greater sedimentation and greater ecological changes in the river systems. The Caroní, Kukenán and Carrao mining fronts will undoubtedly be expanded and there will be deeper penetration into CNP. A special focus of perturbation will be at Campo Carrao, at the very heart of the park, and at Campo Alegre, adjacent to the Kukenán River.

The doubt remains as to what will happen to the summits of the tepui formations in the face of a scenario such as this. It is common knowledge that Jimmy Angel, the famous explorer and "discoverer" of the Kerepakupay Vena, also known as Angel Falls, the tallest waterfall in the world, deliberately crash-landed his aircraft atop the Auyantepuy plateau while on a gold prospecting mission.³⁸ Today, such an event would not seem likely, especially considering that throughout all of CNP, on lower and more accessible ground, there is an almost infinite supply of gold-containing alluvial deposits.

In any case, mining activity cannot be dismissed as a minor or irrelevant threat to the ecosystems of the tepui formations. Even though it is true that UNESCO originally

³⁸ <http://www.jimmieangel.org/Rio.html>

suggested to the Venezuelan Government that it exclude the low areas and include only the mountainous areas in the WHS,³⁹ it is also true that today that would be an unacceptable objective under the criteria of safeguarding the integrity of the ecosystems and the landscape. Just the forests alone, which show a minimum or an absence of human impact and stretch from the adjacent flatlands up to the table-shaped mountains, merit being considered as a WHS. On the other hand, it is inconceivable to have a policy of ecological integrity for the ecosystems that attempts to protect the CNP/WHS, at least its biodiversity, without taking into account the entire ecological gradient from the top of the mountains to the lowlands and vice versa, as well as the genetic flow of matter and energy. Therefore, it is absurd to think that it is possible to give effective protection to the attributes of this WHS without taking into account the total spatial integrity of CNP within its current boundaries, including the heritage value of the Pemón culture.

Without a doubt, CNP must be re-categorized as being in "critical" condition from a "conservation perspective," in the sense defined by Osipova et al (2104). "Sites with a critical conservation outlook are severely threatened and require urgent, additional large-scale conservation measures, or their values may be lost. These sites face a range of threats and in many cases have low capacity to address them." (Osipova et al 2014) The current situation in Venezuela is such that there are no institutional or financial means available for addressing this.

Canaima needs to be added to the List of World Heritage Sites in Danger. This is an essential step for encouraging the adoption of conservation measures within the scope of the World Heritage Convention. If this is not done, the political significance of the Convention itself will no longer be understood.

³⁹ <https://whc.unesco.org/en/decisions/3197>

8. Conclusions and Recommendations

- It has been demonstrated that CNP/WHS is currently being besieged by an increase in gold mining operations, with no kind of attenuation or effective assistance coming from government authorities, especially environmental authorities, as well as INPARQUES and MINEA.
- The prediction is that this onslaught will continue to intensify in the years to come, as there is no current evidence of any political will to contain it or to regulate it adequately, and that it will therefore devastate the more ecologically pristine areas and the entire social base of the Pemón indigenous people who have CNP/WHS as their habitat. Currently CNP/WHS finds itself with no institutional defenses against this barrage from the mining operations.
- With the methodology followed in this study, given the resolution available for the satellite images to which we had access, it is not possible to detect all mining activity in CNP, especially the smaller mines and the floating rafts, which could not be detected spatially, but one can draw inferences as to their existence thanks to other information sources we employed. This only serves to reinforce the assumption that the mining situation may in fact be worse than what is reported here. It is necessary to continue to delve deeper into the question of detecting mining activity of lesser magnitude.
- UNESCO should, as soon as possible, add CNP/WHS to the List of World Heritage Sites in Danger, as a precautionary action aimed at encouraging the Venezuelan Government to act with assertiveness and decisiveness and put an end to mining operations in CNP and place other uses and activities under sustainability plans that are in fact compatible with the status of CNP as a WHS.
- It is absolutely unthinkable to contemplate the effective protection of the attributes of this WHS without considering the total spatial integrity of CNP, including the heritage value of the Pemón culture.
- Mining activities have been taking place in CNP since the days it was declared to be a national park, specifically at four centers; since the year 2000 such activity has expanded, even more so since the year 2013; old centers of activity have been reactivated and new ones have been created in the very heart of CNP/WHS. Among them the most worrisome center is Camp Carrao, because it is relatively recent, and because of its size and the injurious extent of its effect on the landscape and the indigenous communities, in addition to the fact that it is located at the heart of CNP. Likewise, the Campo Alegre mine, because of its dimensions, is a matter of great concern.
- Gold mining operations are causing severe damage to the ecosystems, the biodiversity and the social structure of the Pemón indigenous communities that inhabit CNP/WHS.
- There are other kinds of activities and uses inside CNP that would also appear to be lacking controls, such as: tourism, cattle grazing and farming. This is leading to the proliferation of construction projects, unjustified access roads, an unsustainable amount of visitors/tourists (Roraima), extensive slash and burn agricultural activity with no traditional cultural justification, and other impacts.

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Appendix 1

Natural and Social Aspects of Canaima National Park

The periodical *Acta Terramaris* (1993) published a technical report on the tepui formations, defining them as: "A peculiar kind of mountain, hill or massif, found in the Guiana Shield region, at times having the form of a butte or a mesa, consisting of sedimentary rocks (sandstone, quartzite) and/or igneous rocks, whose altitude ranges from a minimum of 800-1,000 m up to a maximum of 3,015 m above sea level. Furthermore, its sides and summits, subjected to a humid and rainy climate, present us with mid to high mountain ecosystems (meso and submicrothermal), which, from a biological point of view, clearly differentiate this kind of mountain from other tropical mountains, owing to their specific and unique (endemic) plant and animal communities." This definition of the tepui is based on two criteria, one being physiographic and the other ecological, which is why a tepui should be considered to be a kind of physiobiological unit, appearing in nature as a set of ecosystems (the Pantepui Province), an exclusive aspect of the Guiana Shield region.

Among the more striking tepui formations in Canaima National Park (CNP), taking into consideration their maximum altitudes (in meters above sea level), one finds: In the Los Testigos massif: Kamarkawarai-tepui (2,400 m), Tereke-yurén-tepui (1,900 m), Murisipán-tepui (2,350 m) and Aparamán-tepuy (2,100 m). In the Auyán Massif: Auyán-tepui (2,450 m), Cerro la Luna (1,650 m), Cerro el Sol (1,750 m) and Uaipán-tepui (1,950 m). In the Aprada Massif: Aprada-tepui (2,500 m) and Araopán-tepui (2,450 m). In the Chimantá Massif: Murey (Eruoda)-tepui (2,650 m), Tirepón-tepui (2,600 m), Apakará-tepui (2,450 m), Abakapá-tepui (2,400 m), Agparamán-tepui (2,400 m), Toronó-tepui (2,500 m), Chimantá-tepui (2,550 m), Churí-tepui (2,500 m), Akopán-tepui (2,200 m), Amurí-tepuy (2,200 m), Angasima-tepui (2,250 m) and Upuigma-tepui (2,100 m). In addition to Cerro Venado (1,320 m) and Kurún-tepui (1,100 m) (Huber 1995a).

Finally, it is noteworthy that CNP occupies a representative part of Venezuela's Guayana region, which is one of the areas in the northern part of South America that has the most endemic diversity with respect to flora. Of a total of 9,411 known species, 2,136 (22.7%) are endemic to that region. If we take into consideration the entire Guiana Shield, the number of restricted species reaches 3,763 species (40%). Likewise, there are 1,786 different known genus, of which 34 (1.9%) are endemic to Venezuela's Guayana region, and 118 (6.6%) are endemic to the entire Guiana Shield (Berry et al 1995). The fauna display a high diversity of species that have evolved mainly in the ecosystem of the mountainous forests, and there is a high degree of endemic diversity at the regional level (Huber 1995a)

Based on archeological findings, one can determine that the CNP area has been occupied since remote times by humans of the Carib group, who have left evidence of their culture in rock carvings and artifacts that date back to 5,000 and even 7,000 B.C. What is now Venezuela's Guayana Region was settled by four successive groups, of whom the Pemón have been the most recent, and they inhabit the southeast portion of the state of Bolívar and neighboring areas of Guyana and Brazil. While it is not possible to give an exact date for the initial settlements in the Pemón territory, one can say that

when the Spanish colonizers arrived (17th century) the Pemón people had already settled in what is now Canaima National Park.

The word "Pemón" means "people," and also "beings who think on their own," and it is the term used by this ethnic group to distinguish itself from other indigenous groups and from the "*criollos*" (Venezuelans of Hispanic cultural heritage). The Pemón dwell all along the Caroní River basin upstream from San Pedro de las Bocas, which includes the Karrao, Urimán, Tírika, Icabarú, and Kukenán Rivers and their tributaries (the Yuruaní, the Uairén and the Arabopo); they also live in the basin of the Karún River and its tributary, the Antabari River, and in the Paragua Valley, as well as on the shores of the Oris River and on the Paragua River, downstream from Uraima Falls. To the east they inhabit the upper part of the Kamarang and Venamo Rivers and the Cuyuní River Valley, near El Dorado (Thomas 1983).

The Pemón are divided into three subgroups that speak mutually intelligible dialects: The Arekuna, the Kamarakoto and the Taruepan. Although it is difficult to establish precise geographical boundaries for these groups, one can say that the Arekuna are found mostly in the eastern part of Pemón territory, while the Kamarakoto are in the Kamarata and Urimán areas (to the west), and the Taruepán are to the south of an east-west line drawn at the mouth of the Maurak River, a tributary of the Karuay River (Thomas 1983).

This indigenous culture, established in this region since remote times, is of authentic anthropological importance. Despite the fact that they have experienced important changes in their traditional lifestyle, they still maintain their cultural identity. According to the national census (INE 2001) the total Pemón indigenous group was estimated to be 23,300 individuals, making them, numerically, the third largest indigenous group in the country.

The area inhabited by the Pemón ethnic group consists primarily of two ecological zones: the savannah area, to the east of Canaima National Park, where most of their population dwells, and the rain forest area, to the west. The settlement pattern for the Pemón has gone through several changes during the past 50 years. In the past, the number of inhabitants at a Pemón settlement varied between 7 and 50 people and consisted of one or more nuclear families following a semi-nomadic pattern. Every communal housing site consisted of a separate dwelling group and each settlement had a maximum of six dwelling groups whose members were blood relatives, or were related otherwise.

Currently the pattern is that of a permanent settlement and the number of inhabitants in the communities varies between 100 and 1,000 people. These settlements are the result of influence by religious missions consisting of Capuchins (Catholic Christians) or Adventists (Protestant Christians), and by activities related to tourism and mining. For example, there is the case of the indigenous community known as "Las Malocas" on Canaima Lake, whose settlement resulted from the arrival of indigenous people coming from other neighboring communities, encouraged by the growth of tourist activity in this sector. Likewise, with the indigenous communities of Kamarata, Wonkén (Uonkén) and Kavanayén, where the Capuchin fathers founded religious missions from the 40's to the 60's during the 20th century; furthermore, the mission at Urimán was influenced from the very beginning by the mining activity.

Traditional subsistence for the Pemón was based primarily on migratory agriculture (*conucos* - small temporary cultivation plots), hunting, fishing and gathering. Later some communities began to partake in activities related to tourism and mining. The Pemón communities maintain important socioeconomic relations with the principal population centers in the region, which are, in their order of importance: Ciudad Bolívar, Puerto Ordaz, Santa Elena de Uairén, Kavanayén and La Paragua. Most of the goods and services required by the people living in the national park are purchased at these population centers. Today the communities living on the Brazilian side of the border have gained considerable importance.

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Appendix 2

Systematic Web Search Regarding Mining Activity in Canaima National Park

- **Search engine:** Google
- **Number of key words:** 16
- **Number of key word combinations:** 27
- **Language:** English and Spanish
- **Results per search:** It depended on the word, but for all words at least the first 50 results were scrutinized
- **Strategy:** Two filters were used for selecting the information that was to become part of the results. The first filter limited scrutiny to only those links where the title contained at least one of the key words accompanied by a geographical location that would place it in Canaima National Park (CNP) or adjacent areas. The second filter consisted of deciding whether or not to take into account the search result, which required identification of an image, location or statement that gave evidence of mining activity inside CNP.
- **Products available in separate files:**
 - (a) Spreadsheet that summarizes the information obtained for each word.
 - (b) A Word document with the results for each word, wherein repetition of links was noted, given that every time they were found they were read over again and when a new item of interest was detected it was included.
 - (c) Files in PDF format that might be technical reports, scientific publications or web pages that have been converted because they contain valuable information that needs to be reviewed in depth.
 - (d) Images in JPG, PNG or PDF format, according to their availability for downloading. On the spreadsheet the sum total of images is greater than what was delivered, because each time the same image was seen more than once, but did not contain better information as to its author and location, it was entered again and later only the best one identified was kept.
 - (e) Videos in mp4 format downloaded from YouTube after conducting a search using the word combination "Canaima" + "Mining".
 - (f) Report that synthesizes the information from the different products.
 - Suggestions: Perhaps the search could be expanded to photos in Google Earth, Flickr, Instagram and Twitter.
- **In chronological order, the following is a summary of the results with textual information:**

A. Location of Illegal Mining in Canaima National Park: In Chronological Order.

Entries with No Date Indicated:

"Simón explained that at the mines, located in the environs of the Arekuna, Cocurital and Yuri Falls, in the southern part of Canaima, the miners work using all the necessary machinery, such as rafts, motorized pumps, hoses, barrels and other elements, which they hide in the woods or load onto vessels in order to proceed do their work at nightfall up until the predawn hours and then leave at sunrise." (<http://www.parquesnacionales.com.ve/index.php/parques-nacionales-63/canaima/118-mineria-ilegal-depreda-sector-occidental-del-parque-nacional-canaima>)

The Calcaño sector had been mined more than 50 years ago and some of its areas were reclaimed after operations had ceased. (<https://bluechannel24web.wordpress.com/2011/11/21/illegal-mining-in-venezuela-penetrates-the-canaima-national-park/>)

1994:

1. "Mining is one of the major activities in the lands adjacent to the park, and it is well known that the park itself has considerable mineral wealth. Although mining is currently prohibited, there have been sudden illegal 'booms', for example, in the Kamarata Valley in 1994." (<http://old.planeta.com/ecotravel/south/venezuela/canaima97.html>)

2007:

1. "Playa Blanca, Venezuela -- On the doorstep of the nation's most famous national park, Ruben González's small team of miners needed only a month to carve a yawning crater out of a savannah with axes and high-powered hoses. González is among 200,000 miners searching for diamonds and gold in mineral-rich Bolívar state. He operates a mining camp called Playa Blanca outside Canaima National Park." (<https://venezuelanalysis.com/analysis/2636>)

2009:

1. This item mentions that inside Canaima National Park "there are more than 300 mining crews controlled by *garimpeiros* from Brazil, Colombia and Dominican Republic". (<https://www.barinas.net.ve/noticias/mineria-ilegal-devasta-parque-nacional-canaima>).

2. "'In Canaima National Park, specifically on the Caroní River near San Salvador de Paúl in the area of La Bonita, Parupa, La Guacharaquita, San José, El Mono and Taraipa there are more than 300 mining crews undermining this important body of water,' Alejandro Lanz reported. (...) In Canaima National Park, as well as in the La Hojalata sector, the *garimpeiros* are extracting more than 600 kilos of gold monthly and this is commercialized in Brazil and Guyana without leaving any royalties for Venezuela." (<https://www.barinas.net.ve/noticias/mineria-ilegal-devasta-parque-nacional-canaima>) (Saved as a PDF as it contains captions to go with the photos, as well as information of interest.)

2010:

1. "Starting last year, approximately 40 mining crews consisting of Brazilians, Colombians and Guyanese are devastating Playa Linda and the Cucurital River, a tributary of the Caroní and located in the lower part of the Carrao River." Experts mentioned that 40% of the Caroní basin was being destroyed. One expert explained that several areas have been affected. Alejandro Lanz warned, "Another example is the Mono Guindao sector, near San Vicente de Paúl, where there are more than 30 mining crews undermining the shores of the Caroní and dumping sediments into the river, the principal body of water feeding into the Guri Dam."

(<http://www.noticiascandela.informe25.com/2010/03/la-cuenca-caroni-esta-destruida-en-un.html>).

2. "The Venezuelan Center for Ecological Research calculates that approximately 300 mining crews controlled by *garimpeiros* from Brazil's bordering states, Guyana and Colombia are illegally commercializing more than 600 kilos of gold monthly, and this is being transported in a clandestine way without leaving any earnings for Venezuela". (<http://www.guia.com.ve/noti/62225/la-mineria-ilegal-amenaza--la-biodiversidad-en-el-parque-nacional-canaima>).

2011:

1. "According to information we have received, on the western side of Canaima National Park illegal mining operations are taking place using hydraulic machinery," Alejandro Lanz stated". (<https://clicklegal.wordpress.com/2011/02/07/indigenas-denuncian-invasion-de-mineria-ilegal-en-los-rios-caroni-y-paragua/>)

2013:

1. The mining activity situation in Canaima is reviewed. Mention is made of a conflict in 2013 between the FANB and the Pemón people brought about by illegal mining in Canaima. (<http://archivo.derechos.org.ve/derecho-a-un-ambiente-sano/notiambienteve-mineria-en-canaima-olvidos-fraudes-y-mutismo>).

2014:

1. "André Izarra, Minister of the People's Power for Tourism, made use of the opportunity to denounce publically the depredation taking places in the entire park, perpetrated by groups bent on conducting exploitive mining activities along the Carrao and Caroní Rivers". (<http://www.mintur.gob.ve/mintur/blog/mineria-ilegal-en-canaima-destruye-patrimonio-natural-de-la-humanidad/> ; <http://archivo.globovision.com/canaima-esta-enferma-de-mineria-ilegal/>)

2. "There are reports that there are 6 mines along the Uroy Uaray River, which flows into the Kama, the main tourist attraction in Canaima National Park. Likewise, it is being reported that there are 20 machines on the Aponwao River, and in the lower area one can view the most impressive waterfall in Gran Sabana, after Angel Falls, near the Iworibo community midway between the turnoff on the main highway toward Kavanayén". (<http://www.diariocontraste.com/2014/11/denuncian-irregularidades-en-mineria-ilegal-y-trafico-de-combustible-en-parque-nacional-canaima/#>)

"I speak on behalf of sector 7, where I live, and there, I don't see any mining activity that is as wonderful as that they say it is. There, I see contaminated rivers where children can no longer bathe and where we can't drink the water. What I see there is: malaria, mercury contamination, prostitution and murders."

(<http://www.correodelcaroni.com/index.php/opinion/item/16890-mujeres-defienden-canaima-de-la-mineria>; <http://redulam.org/venezuela/lideresas-indigenas-denuncian-mineria-en-el-parque-nacional-canaima/>)

3. This is a report about mercury contamination, warning that there is mining activity in the country's "Areas Under Special Administrative Regulation," such as Canaima National Park, in the state of Bolívar, and in the Duida Marawaca, Yapacana, Parima Tapirapecó and La Neblina National Parks in the state of Amazonas, as well as in the Upper Orinoco-Casiquiare Biosphere Reserve.

(<http://revistamadretierra.com/2014/08/alta-contaminacion-por-mercurio-en-venezuela/>)

4. In her Twitter account, Valentina Quintero says that: "Mining activity has moved into La Gran Sabana. Mines at Aponwao, Kamá, Quebrada de Jaspe and Mirador del Oso. The Pemón are destroying Canaima NP".

5. "According to statements by José Simón, Captain General [Chieftain] of the Kamarata Canaima sector, who represents 18 indigenous communities, mining activity has intensified during the current year (2010) in the western sector of this natural reserve..."

(<http://www.parquesnacionales.com.ve/index.php/component/content/article?id=118:mineria-ilegal-depreda-sector-occidental-del-parque-nacional-canaima>)

6. "In May of 2014, the Office of the Comptroller General of the Republic conducted an inspection of the Campo Alegre indigenous community, located in the eastern sector of Canaima National Park: '...we found evidence of the practice of mining activity in the vicinity of the Kukenán River, conducted with the utilization of gasoline-powered pumping equipment and conveyor belts for purposes of extracting the gold (...) damages due to contamination to the principal source of water for the state of Bolívar and a portion of Venezuela's territory, as well as to the ecosystem of Canaima National Park.'" (<https://www.connectas.org/arco-minero-del-orinoco-crimen-corrupcion-y-cianuro/>)

7. In the 2015 Annual Report of the Office of the Comptroller General of the Republic there is a record of the results of the inspection conducted on 14 May 2014 at the Indigenous Community of Campo Alegre (coordinates N 04° 45' 80" and W 61° 12' 00"), residing in the eastern sector of Canaima National Park: '...we found evidence of the practice of mining activity in the vicinity of the Kukenán River, conducted with the utilization of gasoline-powered pumping equipment and conveyor belts for purposes of extracting gold (...)'" (<http://www.arcominerodelorinoco.com/capitulo-05/>)

2015:

1. "[A representative of the Pemón people] stated that this illegal activity has been going on for about ten years and emphasized that the indigenous community has filed complaints on a regional level, before the Office of the Governor of the State of Bolívar, and court jurisdictions, but has not received any responses."

(<http://www.elnuevoherald.com/noticias/mundo/america-latina/venezuela-es/article23011734.html>).

2. Warnings are expressed concerning the contamination of the waters of the Carrao River caused by illegal mining activities - starting at Campo Carrao and ending at the mouth of the Churún River. The same water they use and drink. "There are many

children who have been sickened with diarrhea and other stomach problems. It's the water that we're drinking, and that we use for bathing. The contamination also reaches Canaima Lake," explained Leonardo Martínez, Captain [Chieftain] of the Indigenous Community of Canaima. (<http://efectococuyo.com/efecto-cocuyo/lider-pemon-comunidad-en-canaima-esta-enferma-por-contaminacion-de-mineria-ilegal/>)

3. In an interview conducted in 2017, Valentina Quintero observes: "Two years ago we were in Canaima flying over the area in a light aircraft. We saw the mining activity, because, among other things, it operates under open skies. One can see craters alongside the Carrao River. When the miners begin to work the water turns into a turquoise blue, as the ground is very fragile. This destruction has no turning back." She mentioned that the landing strips intended for flying toward Angel Falls, today abandoned by the tourist trade, are now being used to serve mining operations: "There, at Campo Carrao, there is a landing strip that was not being used anymore and is now used only by the miners, and that is right in front of Angel Falls." (<http://notitotal.com/2017/09/15/valentina-quintero-padrino-lopez-miente-al-decir-no-mineria-canaima/>)

"This is a landing strip that is very near Angel Falls, on the shores of the Akanán River, just before it flows into the Carrao River". (http://www.el-nacional.com/noticias/viajes/mineros-extranjeros-destruyen-canaima_58036 ; <https://www.revistavenezolana.com/2017/09/valentina-quintero-pensamos-venezuela-destino-turistico-eliminar-arco-minero/>)

4. At a protest in 2015 the following observation was made: "The practice of illegal mining goes back more than six years, according to Martínez. 'The use of motorized pumps for extracting gold results in gasoline, mercury and methylmercury being spilled into the rivers. But that's not all. There are nearly 30 rafts floating on the Carrao River; each has six persons onboard who work as miners, and there they set up their camps. The amount of solid waste they generate is troublesome. In January of 2014 the last military occupation took place and several machines were destroyed, but they (the illegal miners) find a way to find more. They won't leave; on the contrary, they even come from Brazil and other countries," stated this authority figure from the community. (<http://efectococuyo.com/efecto-cocuyo/lider-pemon-comunidad-en-canaima-esta-enferma-por-contaminacion-de-mineria-ilegal/>)

Furthermore, it was mentioned that between January and April of 2015 at least nine alerts were issued by the Office of the Vice President of the Republic concerning the situation and the presence in the area of irregular actors who are bent on exploiting the reserves of gold, diamonds, coltan and other minerals of high value. In the reports prepared by the Vice President Jorge Arreaza's office, communities in the area are advising that these people are extracting, in an indiscriminate manner, gold and diamonds from the ground in the state of Bolívar, and that, reportedly, it is officers of the National Guard who are aiding and abetting the illegal activity. Added to this, in Sifontes Municipality, management at INPARQUES has been "less than transparent," and there are few forest rangers that can look after Canaima National Park. (<http://efectococuyo.com/efecto-cocuyo/lider-pemon-comunidad-en-canaima-esta-enferma-por-contaminacion-de-mineria-ilegal/> ; <https://es.panampost.com/thabata>

[molina/2015/06/09/gobierno-venezolano-tenia-informes-sobre-mineria-ilegal-en-guayana/](#) ; <http://elestimulo.com/blog/comunidad-pemona-mantiene-pie-lucha-no-abandona-protesta/> ; <http://revistamadretierra.com/2015/06/contra-la-destruccion-del-parque-nacional-canaima/> ; <http://www.panorama.com.ve/ciudad/Indigenas-mantienen-protesta-en-aeropuerto-de-Canaima-por-mineria-ilegal-20150603-0010.html> ; <http://www.laprensalar.com.ve/?p=405485> ; <http://elestimulo.com/blog/pemones-truncan-pista-de-canaima-ante-indolencia-por-mineria-ilegal/> ; <http://revistasic.gumilla.org/2015/pemones-cierran-pista-de-aterrizaje-en-canaima/> <http://www.radiofeyalegrianoticias.net/sitio/tag/canaima/> ; <http://www.radiofeyalegrianoticias.net/sitio/tag/canaima/>).

5. One person reports that the largest number of mining rafts is found in the Chimantá Massif, and that Pampatamerú has been destroyed. (<http://efectococuyo.com/efecto-cocuyo/pemones-reabren-aeropuerto-de-canaima-tras-llegar-a-acuerdo-con-el-gobierno/>).

6. "Toward the end of last year, on the waters of the Carrao River —inside Canaima National Park—there were nearly 9 rafts extracting gold from this tributary river. This year they tripled. More than 30 vessels, now converted into floating laboratories for processing the gold, are now plowing through the waters of this river".

"[The miner] justified himself by saying, 'You don't yet see the destruction on the Carrao River,' and he explained that the silt is taken out of the river with a hose. The silt ends up on a carpet that serves as a filter. They leave it there for 6 to 7 hours. On the following day they flush out the sand, for which they use an 18-liter bucket. "When the material is almost pure it's time to use the mercury. In the bucket, not in the river," he makes it clear. This man, who normally works as a tourist guide, says that they don't release the mercury into air either. "We use leaves to trap it. Mercury is very expensive, and that way we can use it over again. We do what we can to prevent waste.' He says that after this process is over they stay out of sight for 15 days before going back to the mining site". (<http://viajesboletin.com/index.php/categorias/venezuela/9318-el-desplome-del-turismo-empuja-a-canaima-a-la-mineria>)

7. "[The Minister for Indigenous Peoples] emphasized that despite statements by Defense Minister Padrino López, the fact remains that there are indigenous actors involved in the process of illegal mining operations. 'But we must issue an appeal to prevent anyone from being in the park conducting this activity,' the Minister for Indigenous Peoples warned. (<https://www.elcambur.com.ve/elcambur/poder/gobierno-realizara-recorridos-para-detectar-puntos-de-mineria-ilegal-en-canaima>)

8. In June of 2015, the governor denounced **that miners had returned to Canaima, and mentioned that more than 20 tons of gold were being commercialized by illegal means.** (<http://archivo.ntn24.com/noticia/gobernador-del-estado-bolivar-reconocio-que-mineros-ilegales-invadieron-nuevamente-el-parque-53821>)

9. This item mentions that 80,000 ha of forest have been lost in Canaima. Based on information from: Episode 5 of Discovery Max's "Clandestine Amazonas." Produced by: Arantza González-Boza. and Kiotto Garcia. With the participation of Jorge Benezra. (<http://efectococuyo.com/efecto-cocuyo/mineria-en-guayana-es-monitoreada-por-grupos-armados/>)

10. In 2015, Morelia Morillo comments in her blog: "Visitors said they were surprised by conditions at Poza Paují [a waterhole], which was absolutely covered with sand, and also by the murkiness of the Chaverú River, these being two of the principal water sources in the area. The travellers had to go in as far as El Cajón and La Gruta to find clean water. Nonetheless, at La Gruta they encountered a group of miners who had settled in with their machinery with the intention of beginning operations at the end of the tourist season. This situation also repeated itself in the upper part of the eastern sector of Canaima National Park: the majestic Kamá River was also dirty because a group of people persists in working on the Uroi Uarai River in the upper sector of the basin". (<http://fundacionmujeresdelagua.blogspot.com/2015/02/la-mineria-afectazonas-turisticas-de.html>)

2016:

1. "The community states that there is a presence of mines starting at Kamarata and ending at the mouth of the Churún River, in areas in the vicinity of Angel Falls. The mine at Campo Carrao stands out. It has also been reported that there are miners present at an hour and a half hiking distance from the foot of El Sapo Falls on this River. (Núñez, 2016, found at:

<http://www.ecopoliticavenezuela.org/georreferenciacion/59/>)

2. Campo Carrao: landing strip utilized in 2016 by foreign miners. Official denunciations of illegal mining activities on the Carrao and Caroní Rivers. (http://www.el-nacional.com/noticias/viajes/mineros-extranjeros-destruyen-canaima_58036)

2017:

1. There are reports that 97 rafts and dredges are spread along the middle Caroní River, starting at Las Babas Falls and ending at Parupa Falls, with equipment also present in the Arekuna and Las Bonitas sectors.

(<http://www.ecopoliticavenezuela.org/2018/01/18/mapa-de-conflictos-socio-ambientales-comunidades-indigenas-pemon-del-rio-carrao-afectados-por-la-mineria-ilegal-en-el-parque-nacional-canaima/>)

2. There are reports of corrupt practices at the Ciudad Bolívar airport that lend support to illegal mining in Canaima, given that fuel is being transferred through there, as well as gold. (<http://asocomerciosanfelix.com.ve/2017/06/desde-el-aeropuerto-de-ciudad-bolivar-se-alimenta-la-mineria-ilegal-en-pn-canaima/>)

B. Eviction of Miners from Canaima National Park: In Chronological Order

Entries with No Date Indicated:

"For more than 25 years it has been acknowledged that mercury pollution - which results from the use of mercury for separating gold from other material - poses a public health problem for the Guayana region. In 2003, the government began to implement plans aimed at ending illegal mining activity. Five initiatives have been developed since then: the Piar Plan in 2003, which later became known as Mission Piar in 2005; the Mining Reconversion Plan in 2016; the Caura Plan in 2010; and finally the Presidential Commission for the Comprehensive Development and Promotion of Mining Activity in

the Guayana Region, created in 2014." (<http://atodomomento.com/nacionales/planes-no-han-logrado-frenar-la-mineria-ilegal-en-guayana/>).

Operation Roraima: "The objective of this commission is to bring together the efforts of all national and regional public entities in order to generate policies and actions that will bring a solution to the problem of invasions and destruction of protected areas perpetrated by groups of Venezuelans and foreigners who conduct illegal mining, thus affecting the environment and generating social and health problems in the indigenous and rural communities and across broad areas of the states of Bolívar, Delta Amacuro and Amazonas." (<http://www.noticias24.com/venezuela/noticia/262603/padrino-lopez-ofrece-un-balance-del-operativo-roraima-en-el-estado-bolivar/>)

2009:

1. "The military Theater of Operations No. 5 dealt a hard blow to illegal miners that were cutting off the flow of the Caroní River where the river reaches San José. They had been conducting illegal mining activities inside Canaima National Park and dumping into the Caroní River the entire residue from thousands of tons of dirt they had previously excavated. Our congratulations to each and every one of the members of Theater of Operations No.5." (<http://www.diarioelprogreso.com/edi-270409/html/pag09-a.htm>)

2. "The first action to take place during this phase of Operation Roraima was to occupy an illegal camp located on the shores of Canaima Lagoon, which is fed by the Carrao River, and is part of Canaima National Park... At this point, in compliance with legal regulations currently in force, FABN troops confiscated and destroyed two rafts, 40 meters of high pressure hoses used for connecting the hydraulic equipment that destroys the ground below using strong jets of pressurized water, 20 meters of material used for trapping the gold particles suspended in the mud produced by the hydraulic equipment, one turbine and 20 barrels of gasoline."

(<https://diariolavoz.net/2015/02/09/fanb-destruyo-tres-campamentos-de-mineria-ilegal-en-sur-de-bolivar/>)

2010:

1. **The government announced that more than 20,000 illegal miners had been evicted from the basins of the Caura, Caroní and La Paragua Rivers in the state of Bolívar.** (<http://www.correodelorinoco.gob.ve/plan-caura-libero-mineria-ilegal-a-cuencas-rios-caura-caroni-y-paragua/>)

2. "Around 43 mining camps that were operating illegally in the municipalities of Gran Sabana and Angostura in the state of Bolívar have been dismantled by the Bolivarian Armed Force (FANB) during the 14 days following the launching of the Caura Plan by President Hugo Chávez".

"Also, 43 "high power" motors, 69 motorized pumps, 27 kilometers of hose, 55 electric generators, as well as earth-moving equipment were confiscated."

(<http://www.correodelorinoco.gob.ve/mas-40-campamentos-mineros-ilegales-destruidos-gran-sabana-y-angostura/>)

2014:

1. The Defense Minister stated: "On instructions from our Commander in Chief we have intervened along the Carrao River, which had been taken over by illegal mining operations, and which is used to hide weapons, fuel, and human trafficking. We have targeted the river decisively in order to liberate Canaima Park. It is now completely liberated. It was an impeccable operation. There were no fatalities or injuries. The FANB always works in adherence to respect for life and Human Rights."

(<http://www.panorama.com.ve/ciudad/Ministro-de-Defensa-Intervinimos-el-rio-Carrao-contra-la-mineria-ilegal-en-Bolivar-20141106-0019.html>;
<http://www.radiomundial.com.ve/article/operaci%C3%B3n-roraima-libera-completamente-el-r%C3%ADo-carrao-de-la-miner%C3%ADa-ilegal-audio>)

2. "We have targeted the Carrao River decisively during this first phase and we are going into a second phase that entails the liberation of all of Canaima National Park before the year is over. That is a goal we have set," the Defense Minister affirmed.
 (<https://www.aporrea.org/actualidad/n260315.html>)

3. "In Canaima, the FANB dismantled 220 illegal mining camps during 91 operations carried out as part of Operation Roraima..." (<http://www.csn.gob.ve/?q=node/342>).

4. "Vladimir Padrino López, Chief of the Operational Strategic Command of the FANB (CEOFANB), announced that the Bolivarian National Armed Force (FANB) has dismantled 220 illegal mining camps during 91 operations carried out as part of Operation Roraima, activated last April. He added that 870 persons were evicted from these mining camps, while always respecting the human rights of this group of Venezuelans. 'We have geo-referenced more than 100 mines that we are going to tackle decisively...' Elsewhere, he confirmed that almost 23,000 meters of high-pressure hose were being utilized for the illegal mining operations." (<http://www.2001.com.ve/en-la-calle/-220-campamentos-mineros-ilegales-han-desmantelado-en-canaima-.html>).

5. "Defense Minister Vladimir Padrino López announced that in an exercise called Operation Canaima 2014, the Armed Force dismantled a total of 269 illegal mining camps in Canaima National Park. 'We deactivated 27 motorized pumps and 2,400 meters of high-pressure hose. The bottom line is that 269 mining camps were deactivated, and from there (we evicted) all the organized crime that gathers around those camps, from which some 1,184 persons were evicted, and 35 were detained for smuggling fuel,' the Minister reported, while he was at El Sapo Falls in the state of Bolívar, and in contact with VTV [government television].

(<http://www.analitica.com/actualidad/actualidad-nacional/desmantelan-269-campamentos-en-el-parque-nacional-canaima/> ;
<http://www.losreportesdelichi.com/site/desmantelan-campamentos-de-mineria-ilegal-en-el-parque-nacional-canaima/> ; <http://actualidadygente.com/noticias-venezuela-hoy/29731-desmantelan-campamentos-de-mineria-ilegal-en-canaima>)

"The battle has not been totally won. There are still groups operating in illegal mining operations, especially within Angostura Municipality (state of Bolívar)."

(<https://laradiodelsur.com.ve/2014/12/vladimir-padrino-parque-nacional-canaima-esta-libre-de-mineria-ilegal/>).

6. Venezuela's Attorney General Luisa Ortega reported in mid 2014 that the Public Ministry had sought precautionary measures for prohibiting the illegal practice of mining the state of Bolívar. (https://www.elconfidencial.com/ultima-hora-en-vivo/2015-06-04/gobierno-venezolano-atiende-a-indigenas-y-levanta-protesta-por-mineria-ilegal_597803/)

2015:

1. "In 2015, the FANB destroyed an illegal camp located on the shores of Canaima Lagoon, which is fed by the Carrao River, and is a part of Canaima National Park. During the operation, in keeping with legal standards then in force, they seized and destroyed two rafts, 40 meters of high-pressure hose used to connect the hydraulic equipment that is destructive to the lake bottom and surrounding terrain as a result of the strong water jets being utilized, 20 meters of material used for capturing the gold particles suspended in the mud produced by the hydraulic equipment, plus one turbine and 20 gasoline barrels." (<https://diariolavoz.net/2015/02/09/fanb-destruyo-tres-campamentos-de-mineria-ilegal-en-sur-de-bolivar/>)

2017:

1. This government announcement mentioned that part of the Boquete Plan, intended to eradicate illegal mining activity, includes the national park and that they are working together with the Pemón people, seeking economic alternatives. (<http://minci.gob.ve/2017/06/inhabilitan-campamentos-mineria-ilegal-pistas-clandestinas-frenar-contrabando-minerales-bolivar/>)

C. Agreements and Campaigns of Recovery and Restoration: In Chronological Order

2013:

In the Gran Sabana, an agreement was reached to promote "artisan" mining activity in indigenous territories under the supervision of indigenous captains general [chieftains]. (<https://rafaeluzcategui.wordpress.com/2014/07/21/mujeres-rechazan-mineria-en-la-gran-sabana/>)

2014:

"Gilberto Abati, former community captain [chieftain] at Kamarata and Víctor Abati, current captain general [chieftain] of Sector II that comprises Kamarata and Canaima, complain that, despite their denunciations about mining activity and the need to promote other sustainable economic activities, the State looks the other way. 'I myself delivered to Tourism Minister Andrés Izarra the socio-productive projects we have for the community. We also reported to him in May what was happening, and days later he came out talking about the mining issue with President Maduro. If they're aware of the situation about which we have complained to them, why then haven't they taken action against the mining activity so as to help us bring to fruition what we need in order to allow us to stock up on necessities,'" complained the captain general [chieftain]. (<http://correodelcaroni.com/index.php/politica/item/22039-el-estado-promueve-la-mineria-en-canaima>).

2015:

1. Reports on agreements between the Pemón community and the government, as part of the eradication of illegal mining in the national park.

(<http://www.radiomundial.com.ve/article/ejecutivo-y-comunidad-pem%C3%B3n-acuerdan-liberar-canaima-de-la-miner%C3%ADa-ilegal>).

2016:

1. The MINEA Minister announced, "We began a preservation process that contemplates an evaluation meant to determine the environmental impact and the measures of remediation and restoration according to the type of effect this is having in the Caroní River basin. We're taking the first steps to recover areas that have been affected by the illegal mining activity..." (<http://www.2001.com.ve/con-la-gente/141200/comenzo-programa-de-recuperacion-en-la-cuenca-del-rio-caroni.html>)

2. In November of 2016, chieftains of the Pemón people define norms for mining activity. The first measure was to suspend mining of alluvial deposits, which is being done using rafts in the river channels in the sectors of Urimán, Ikabarú, Wonkén, Santa Elena de Uairén and Kamarata in Gran Sabana municipality, the ancestral territory of the Pemón people, and locate mining areas that do not affect the Caroní River basin. In the second of those agreements that were reached it is explained that those spaces must be kept at a distance of between 500 and 1000 meters from the tributaries, and the Caroní River itself, and that mining work is to be allowed, provided it is done primarily by Pemón inhabitants, including mestizos, in other words, children having a Pemón father or mother, and who present a project for the recovery of the affected areas, and dedicate at least three days per month to restoration tasks.

(<http://fundacionmujeresdelagua.blogspot.com/2016/11/caciques-pemon-definieron-normas-para.html>)

2017:

1. The government announced the recovery of terrains, vegetation and ecosystems in areas of the lower Caroní River basin that had been degraded by illegal mining.

(<http://tecmin.com.ve/index.php/noticias/43-gobierno-revolucionario-iniciara-recuperacion-ambiental-en-zonas-afectadas-por-mineria-en-cuenca-del-bajo-caroni>)

2. In February of 2017, chieftains of the Pemón people agreed to suspend the mining of alluvial deposits, which is being done by way of rafts on the river channels, in the sectors of Urimán, Ikabarú, Wonkén, Santa Elena de Uairén, Kavanayén and Kamarata in Gran Sabana Municipality, the ancestral territory of the Pemón people and locate mining areas that do not affect the Caroní River basin.

(<http://plataformaindigena.org/caciques-pemon-definirien-normas-para-la-mineria-en-la-cuenca-del-rio-caroni/>)

D. Links to Photographs

- (1) <http://www.noticias24.com/venezuela/noticia/228230/vpl-se-detectaron-dos-campamentos-clandestinos-y-material-ilegal-en-el-rio-caroni/>
- (2) <http://www.mintur.gob.ve/mintur/blog/mineria-ilegal-en-canaima-destruye-patrimonio-natural-de-la-humanidad/> y <http://confirmado.com.ve/arco-minero-amenaza-el-parque-nacional-canaima/>

- (3) <http://www.diariorepublica.com/nacionales/vea-estas-dramaticas-imagenes-de-la-mineria-ilegal-en-canaima#>
- (4) <http://www.visionglobal.info/mineria-ilegal-es-es-una-realidad-que-no-se-puede-tapar-en-el-rio-carrao/>
- (5) <http://viajesboletin.com/index.php/categorias/venezuela/9318-el-desplome-del-turismo-empuja-a-canaima-a-la-mineria>
- (6) <https://maduradas.com/ecocidio-asi-tienen-al-parque-nacional-canaima-gracias-a-la-mineria-ilegal-fotos/> ; <https://storify.com/contrapuntovzla/tuits-de-valentina-quintero-denunciando-mineria-il> ; <https://www.elcambur.com.ve/elcambur/ciudadania-2/canaima-se-ensombrece-bajo-la-mineria-ilegal>. Photographs published on the Twitter accounts of Valentina Quintera and Maihen were not downloaded each-to-each because they were embedded and were of poor quality. A PDF of the entire page was generated.
- (7) <https://diariodecaracas.com/que-sucede/valentina-quintero-denuncia-explotacion-minera-ilegal-en-canaima-fotos>
- (8) <http://www.parquesnacionales.com.ve/index.php/parques-nacionales-63/canaima/118-mineria-ilegal-depreda-sector-occidental-del-parque-nacional-canaima>
- (9) <https://rawlins.photoshelter.com/image/10000yZQu0.G6neQ> Las fotos se descargaron en format PDF porque era la única forma que lo permitía.
- (10) <https://hiveminer.com/Tags/canaima,garimpeiros> Fotos de Kunfoto (Reportaje Fotográfico) Para la descarga directa solo disponibles en formato pequeño
- (11) <https://www.natura-medioambiental.com/testimonio-fotografico-mineria-ilegal-venezolana-hace-peligrar-la-amazonia/>. The photographs are apparently of Canaima. The report merely says national park.
- (12) <http://lalenguatv.com.ve/pemones-protestan-por-mineria-ilegal-en-rio-carrao/>
- (13) <http://geologiavenezolana.blogspot.com/2012/08/mineria-ilegal-en-venezuela.html>
- (14) <https://es.mongabay.com/2016/01/mineria-de-oro-en-venezuela-una-tormenta-perfecta-de-mineria-ilegal-deforestacion-y-mafias/>
- (15) <http://atodomomento.com/nacionales/mineria-parque-nacional-canaima/>
- (16) <https://venezuelaparaelmundo.com/valentina-quintero-y-otros-tuiteros-denuncian-ecocidio-en-el-parque-nacional-canaima/>
- (17) <https://www.elcorreodelorinoco.com/contaminacion-en-la-gran-sabana-arco-minero-del-orinoco/>
- (18) <https://concienciaesnoticias.com/2017/05/07/destruccion-asi-esta-quedando-la-gran-sabana-la-fiebre-del-oro-oficialista/>
- (19) <http://geologiavenezolana.blogspot.com/2012/08/mineria-ilegal-en-venezuela.html>
- (20) <http://www.elinformador.com.ve/2017/12/07/venezuela-vivir-en-peligro-por-denunciar-a-mafias-relacionadas-con-mineria-ilegal-en-el-sur-del-pais/>

- (21) <http://redulam.org/venezuela/la-mineria-en-tierras-ancestrales-2/>
- (22) <http://viajesboletin.com/index.php/categorias/venezuela/9318-el-desplome-del-turismo-empuja-a-canaima-a-la-mineria>
- (23) <https://www.barinas.net.ve/noticias/mineria-ilegal-devasta-parque-nacional-canaima>
- (24) <https://ejatlas.org/conflict/comunidades-indigenas-pemon-del-rio-carrao-afectados-por-la-mineria-ilegal-en-el-parque-nacional-canaima> PDF with datasheet compiled by Environmental Justice Atlas, in addition to 4 screenshots of the available satellite image
- (25) <http://www.panorama.com.ve/ciudad/Valentina-Quintero-compartio-dramaticas-imagenes-de-la-mineria-ilegal-en-Canaima-20150603-0011.html>
- (26) <http://tierradegracia.net/noticias-turismo/valentina-quintero-mineria-inocultable-miserable-canaima-888> Photographs on Tweets by Valentina Quintero.
- (27) <http://www.vitalis.net/actualidad-ambiental/mineria-ilegal-amenaza-patrimonio-natural-de-la-humanidad/>
- (28) <https://canaldenoticia.com/pemones-protestan-en-canaima-en-contradela-mineria-ilegal/> Photographs from Tweets about the protests on the airport runway.

E. Links to Interviews

- (1) <http://ondalaserestacion.com/valentina-quintero-la-gran-sabana-entre-esplendor-y-tragedia/> Valentina conversed with Mercedes Castro, a Pemón woman from the Kawi community at Non Pomoy Camp concerning the problem of mining activity in her community and Canaima National Park.
- (2) <http://www.radiomundial.com.ve/article/parque-nacional-canaima-es-territorio-libre-de-miner%C3%ADa-ilegal-audio> Official statistics concerning the elimination of mining in Canaima National Park in 2014.
- (3) <http://ondalaserestacion.com/ilegal-la-explotacion-minerales-parque-nacional-canaima/> " explicó el experto. Valentina Quintero conversed with Edgard Yerena, a lawyer and biologist, on *Valen de Viaje*, seeking to find out if there is some law that would force the State to preserve Canaima National Park's status as a World Heritage Site. "All mining activity inside a national park is illegal, no matter if it's Canaima or any other. But especially this one, because it has status as a natural World Heritage Site," explained the expert.

F. Links to Videos

- (1) <https://www.youtube.com/watch?v=IRXNA6TASD8>
- (2) <https://youtu.be/AXEd7XQsVKE>
- (3) <https://www.youtube.com/watch?v=IRXNA6TASD8>

- (4) <http://elestimulo.com/blog/comunidad-pemona-mantiene-pie-lucha-no-abandona-protesta/>
- (5) https://twitter.com/watcher_ven/status/920683445940031490
- (6) <https://videos.telesurtv.net/video/289011/mineria-ilegal-en-canaima-pone-en-alerta-al-gobierno-de-venezuela/>;
<http://archivo.globovision.com/pemones-se-reuniran-con-el-ejecutivo-tras-denuncias-de-mineria-ilegal/> Videos about the reopening of the runway at Canaima.
- (7) <http://www.laverdad.com/zulia/76316-indigenas-mantienen-protesta-por-mineria-ilegal-en-canaima.html>
- (8) <http://www.noticias24.com/venezuela/noticia/285531/pueblo-pemon-pide-el-apoyo-del-gobierno-para-erradicar-la-mineria-ilegal-en-canaima/> Video about the protest and detailed news item giving arguments for closing down the runway.
- (9) <https://elpitazo.com/ultimas-noticias/video-van-cinco-planes-fracasados-del-gobierno-contra-la-mineria-ilegal/> Video that presents evidence of the failure of the plans to eradicate illegal mining activity.

G. SubAppendices of Appendice 2, Downloadables and Zipped

In any of the following links you may download zipped files corresponding to findings of this Apenddix 2 systematic search

IMAGES

https://drive.google.com/open?id=18dkvgr2cMKGWech9XVfn4X_b081kmRIQ

https://www.dropbox.com/s/hkp0a3rho4h4673/PDF_PPT_WORD.zip?dl=0

DOCUMENTS

https://drive.google.com/open?id=1EfOuxZARjbA07cPqhFbNV8pZ_pZPAjC3

https://www.dropbox.com/s/hkp0a3rho4h4673/PDF_PPT_WORD.zip?dl=0

VIDEOS

<https://www.dropbox.com/s/h77f5n4dkzxji37/Videos%20Anexo%202.zip?dl=0>

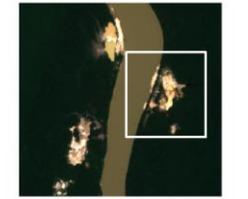
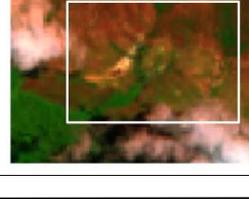
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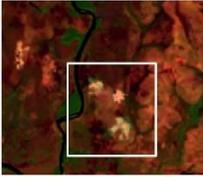
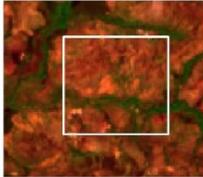
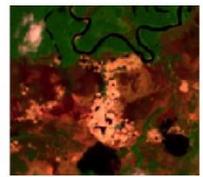
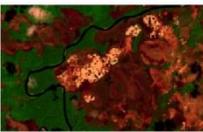
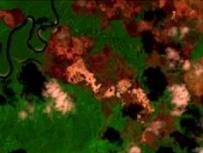
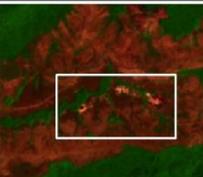
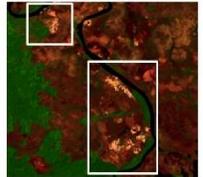
7526	<p>Currently, there is not one family living in the Kamarata Valley, inside CNP, that does not have a member working at the mines. In fact, the price of goods is being quoted in <i>gramas</i>, referring to "gold in terms of grams." There are very few indigenous people holding jobs related to the tourist industry. In fact, the flow of tourists has drastically decreased in just a few years. In Uruyén, there was a fire of suspicious origin at a tourist camp operated by indigenous people, the same one that had received support from the United Nations Development Plan (UNDP), and which was later purchased by the group from Aramerú, the same people that built a hotel on Canaima Lagoon. Of 30 Pemón students emerging from the area's school system, 3 leave to go to the cities and stay there, while the remaining 27 students end up working at the mines. Mining has become the only work available for survival in this isolated territory that has been subjected to the price structures determined by the readily available of gold, plus the hyperinflation that besets all of Venezuela. The closest point to the Kamarata Valley is Campo Carrao, and some of the people are now working at that mine. There is another mine that can be seen from the air that is located in the Devil's Canyon. Women and men living in the Kamarata community are concerned about the implications of this mining activity and its effects on the community, including the captain himself. There are now reports of illnesses the indigenous people had never suffered before. In clinics one now sees people afflicted with HIV, prolonged respiratory illnesses, and skin conditions brought about by contaminated water, among other things.</p> <p>In general, almost all of the Pemón captains dislike the mining activity, have been against it, and have denounced it in years past. However, during the past 2 years, they have given up the fight a bit because of the economy difficulties, due to the fall in tourist traffic resulting from the fact that airfares has become unaffordable. Today, many of the Pemón youth work as divers at the raft operations. What's more, toward the end of 2015, the first mining raft, one that was a very rudimentary, was brought to the community, and the man who was captain at the time was displeased, and so were other people. Nevertheless, for the moment, the situation has grown worse by the day, and there are members of the Pemón community who used to be teachers, but are now working at the mines.</p>
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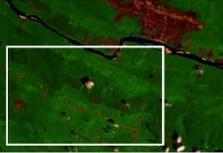
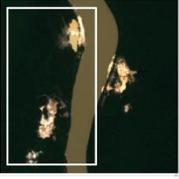
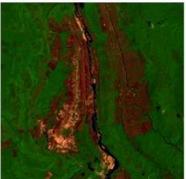
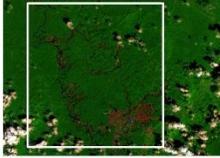
Appendix 4

Characterization of mining sites inside and outside the NPC

MEDIUM RESOLUTION SPATIAL IMAGE	HIGH RESOLUTION SPATIAL IMAGE	GEOGRAPHICAL LOCATION UTM Zone 20/WGS84		IDENTIFICATION BY NAME AND NO.	LINEAR DISTANCE TO CNP BOUNDARY (KM)
		X	Y		
		699338	544957	1. Campo Alegre	INSIDE CNP
		653679	531003	2. Acareden	INSIDE CNP
		631602	536552	3. Rio Amac Abajo	INSIDE CNP
		573747	525721	4. Rio Apremé	INSIDE CNP
		563849	538306	5. Rio Pirma	INSIDE CNP
		560777	555563	6. Rio Tirica	INSIDE CNP
		513377	606024	7. Boquini 1	INSIDE CNP

MEDIUM RESOLUTION SPATIAL IMAGE	HIGH RESOLUTION SPATIAL IMAGE	GEOGRAPHICAL LOCATION UTM Zone 20/WGS84		IDENTIFICATION BY NAME AND NO.	LINEAR DISTANCE TO CNP BOUNDARY (KM)
		X	Y		
		511884	616146	8. Guacharaca 1	INSIDE CNP
		511571	627692	9. Chicharrón 1	INSIDE CNP
		510506	638164	10. Asapati	INSIDE CNP
		509320	698658	11. Rio Karrao 1	INSIDE CNP
		574486	660259	12. Rio Karrao 2	INSIDE CNP
		584654	658934	13. Wadetey	INSIDE CNP
		578012	651302	14. Kuana	INSIDE CNP
		637198	605402	15. Mowak	INSIDE CNP

MEDIUM RESOLUTION SPATIAL IMAGE	HIGH RESOLUTION SPATIAL IMAGE	GEOGRAPHICAL LOCATION UTM Zone 20/WGS84		IDENTIFICATION BY NAME AND NO.	LINEAR DISTANCE TO CNP BOUNDARY (KM)
		X	Y		
		679873	543450	16. San Luis de Kukenan	0,2 km
		682391	541878	17. Río Mosquito	3,3 km
		675180	533859	18. Quebrada Salva La Patria	0 km
		665681	525366	19. Apoipo	0,07 km
		665294	522594	20. Río Surucun	1 km
		648336	519624	21. El Polaco y El Valle	11,5 km
		652451	527762	22. Yacimá	0 km
		640136	533640	23. Río Amac Arriba	2 km
		572090	526289	24. Río Apremé 2	0 km

MEDIUM RESOLUTION SPATIAL IMAGE	HIGH RESOLUTION SPATIAL IMAGE	GEOGRAPHICAL LOCATION UTM Zone 20/WGS84		IDENTIFICATION BY NAME AND NO.	LINEAR DISTANCE TO CNP BOUNDARY (KM)
		X	Y		
		565438	535311	25. Rio Pirma 2	0,03 km
		560310	573768	26. Pempa o Cusaribara	0 km
		525898	583912	27. Urimán	6 km
		511504	609709	28. Boquini 2	0,03 km
		510559	616386	29. Guacharaca 2	0 km
		511563	625013	30. Chicharrón 2	0 km
		512614	666696	31. San Salvador de Paul	0 km
		607371	685419	32. Cabecera Chicanan	2,5 km
		671933	685032	33. Las Claritas	1,8 km

Appendix 5

Mining Patterns in Canaima National Park

In the mining activity that is conducted in Canaima National Park (CNP), there are two patterns, which are described as follows:

a) Artisanal mining, as such, is defined by Article 82 of the Mining Law (1999) as "that which is characterized by personal and direct work in the exploitation of alluvial gold and diamonds, by means of manual, simple and portable equipment, using rudimentary extraction and processing techniques."

The manual equipment referred to consists of tools such as the *batea* (a cone-shaped vessel, generally made of wood, used in the manner of a gold pan), the *surucas* (screens used to sort out diamonds), the shovels, the *palín minero* (a short miner's shovel with a square point), as well as picks and sieves, among other things, which are used for extraction, and to sort out, by means of gravity, the material containing gold or diamonds. This kind mining is called "*batea* and *palín* mining."

When the process involves gold-bearing material there is a phase that consists of using mercury, commonly known as quicksilver, to form an amalgamation with the gold, and thus isolate the gold particles from the particles of other materials that settle in the *batea*. The mercury-gold amalgam is then heated, causing the mercury to evaporate leaving the gold behind. This last procedure is done in a rudimentary way that releases mercury fumes into the air that is breathed by the miners performing this task and by people who are close by, thus affecting their health.⁴⁰ This mercury is likewise released into the environment, thus contaminating different biotic components.

"The mercury condenses and finds its way into the vegetation and bodies of water, and because of its heavy nature, it does not stay suspended in the liquid column but settles out and becomes buried in the sediments. In the presence of oxygen, soluble compounds of Hg are formed, which are taken up by anaerobic bacteria that act to methylate the metal; that is to say, they transform it into organic mercury (CH₃ Hg⁺). This new compound is highly toxic, as it incorporates itself into the food chain and reaches people who ingest contaminated fish. If the exposure is prolonged enough the contamination becomes chronic, and irreversible once the central nervous system is affected. It can even cross the placental membrane and affect the fetus. (Bermúdez, 1997, 2003 y 2004)⁴¹.

This kind of mining activity is the most widespread and is practiced by the Pemón people, especially in the vicinity of their communities and on the shores of waterways. According to information provided by one of the specialists that was interviewed, the mines are generally located beyond a radius of approximately 20 km from the indigenous populated centers.

⁴⁰ Sergio Milano, *La cultura minera como base para el desarrollo de la pequeña minería* Nov.2017 < http://desarrollominero.gob.ve/wp-content/uploads/2018/04/Porunamineriaresponsable_ljornadastecnologicasdeloro_27042018.pdf > Consulta del 25.05.18.

⁴¹ Ibid.

This mining activity is not new, but for many years it was restricted to a few sites and the indigenous people resorted to it only in special cases when, for example, they needed to obtain extra economic resources for taking a trip to Caracas or for expenses related to illnesses. Today, the extraction of gold and diamonds by the Pemón people has become generalized, and is explained by the country's economic situation, hyperinflation and scarcities, and mostly by the fact that tourism has practically disappeared from the region. The influx of tourists into CNP has drastically diminished, especially toward the western sector of Canaima (Canaima Lagoon, Kamarata, Kavac, Uruyén and others), a situation that has been exacerbated during the last two years, as a result of the decrease in commercial flights, the high cost of the airfares and, in the case of the Gran Sabana, fear for personal safety.

b) Semi-mechanized mining utilizes diesel-powered mechanized equipment for performing some of the tasks in the exploitation of gold or diamonds.⁴² As with artisanal mining, the deposits are alluvial. The degree to which mechanization is used is generally low, or scarce, with elemental equipment being used, and the activity is conducted under open skies on waterways and/or the bottom of waterways, meanders and the sides of anticlines that have been exposed by external effects and subjected to erosion and weathering.⁴³ It manifests itself in two modalities: one utilizes rafts equipped with hydraulic pumps, dredges called *chupadoras* and hoses used for the purpose of drawing up sediments from the riverbeds onto the rafts where the material is processed. Work is performed by divers who drill into the riverbed mechanically, or manually, where they believe there is gold-bearing or diamond-bearing material, in order to facilitate the suction process that draws the material onto the rafts; the second modality is on dry land and is based on using hydraulic monitors (water cannons). Motorized pumps that have been coupled to a hose then draw water from a nearby source and direct it toward the frontline of the job, and then a jet of water pressurized by a hydraulic pump is aimed at an embankment or at the ground to flush out the gold-bearing material. As the layers of raw material are removed, the washed material is suctioned off and transported to equipment that captures ("recovers") some of the finer gold particles or fragments.⁴⁴ But prior to the process of obtaining that mineral, the material, consisting of gold and mud, is propelled toward a wooden structure, known in English as a sluice, and locally referred to as a *tame*, which is aligned along an inclined plane, and along which the mud, the loose gold particles and the amalgams will slide down, and where a plastic carpet of sorts traps the heavier particles.⁴⁵

Both modalities are present in CNP, and even more so ever since the nation's Executive Branch started to promote its Orinoco Mining Arc policy, according to people that were interviewed as part of the research. These modalities are causing the most

⁴² Salvatore G. La Barbera, *Control de sedimentos en pequeña minería aurífera en Hoja de Lata, Municipio Sifontes, Estado Bolívar*. Trabajo especial de grado. Escuela de Ingeniería de Minas UCV < http://saber.ucv.ve/bitstream/123456789/677/1/Tesis_La_Barbera.pdf > Consulta del 09.05.18.

⁴³ Ídem.

⁴⁴ Luz Paredes (1994). *La actividad minera aurífera. Definición, identificación y manejo de yacimientos*. M.A.R.N.R., D.G.S.P.O.A. Caracas.

⁴⁵ Sergio Milano, *La cultura minera como base para el desarrollo de la pequeña minería* Nov.2017 < http://desarrollominero.gob.ve/wp-content/uploads/2018/04/Porunamineriaresponsable_ljornadatecnologicasdeloro_27042018.pdf > Consulta del 27.05.18

environmental damage to the protected area and its areas of influence. Mining activity on rafts, inside CNP (on the Carrao River and its tributaries, and on the Caroní), as well as along the Caroní and La Paragua Rivers, is causing sedimentation in the reservoir behind Guri Dam, thus shortening the life cycle of the turbines that are part of the hydroelectric system. Likewise, semi-mechanized mining diverts waterways, modifies the riparian topography, and produces a high volume of suspended solids, which has a negative impact on the benthonic and ichthyologic population, and on the food chain. As in the case of artisanal mining, it causes mercury contamination in bodies of water, living organisms and affected ecosystems, although to a much greater degree.

In general, semi-mechanized mining is conducted by partnerships or semi-organized groups that work in the same area.⁴⁶ In the case of CNP, this is demonstrated by the way in which the operators of different mining rafts help each other, for example, towing each other's rafts without any major interference from the authorities. Their illegal actions are carried out in connivance with the society in which the activity develops, given that today's socio-economic situation has compelled many indigenous persons to work at the mines, be hired as divers on the rafts, or has led miners (*Criollos* or of other nationalities) to forge partnerships with local or sectorial levels of the Pemón leadership. That situation had been undergoing some changes going back some years, given that before 2105 the indigenous captains were willing to denounce mining activities, without much negative reaction from the government authorities; however, now there is much resignation.

Those who execute this activity likewise have connections with economic sectors in the State of Bolívar, which allows for the required logistics to flow uninterrupted, specifically fuel and lubricants, necessary for the operation of motors and hydraulic pumps, as well as food and other supplies. Practically all of this is done by means of shipments by air, since CNP does not have access to regional road systems, except for National Highway 10 that goes through the Gran Sabana (eastern section of the park) and shipment by river would be unacceptable for them, since it would involve navigating upstream, which takes much longer. According to the documentation that was compiled, the light aircraft used for the logistics necessary for conducting mining activities in CNP originate at the Ciudad Bolívar airport and at landing strips at La Paragua and San Salvador de Paúl, where there are Army, National Guard, and/or Navy bases and detachments. One must also consider the fact that fuel, an indispensable supply necessary of the operation of mines, is under the exclusive control of the Bolivarian National Armed Force, an institution that rations out allotments. Furthermore, it is evident that surveillance of mining activities vis-à-vis the environment is not being duly conducted, given that the number of dredging rafts, whose presence on the rivers and whose footprints along the banks can be clearly seen from the air, has not ceased to increase. Also, the sudden rise in activity at some mines, such as Campo Carrao, near the Kamarata community and Angel Falls, is public and notorious. In the face of this, there is no other conclusion other than to state that this illegal activity exists in CNP as a result of participation by the military authorities.

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⁴⁶ Ibid.

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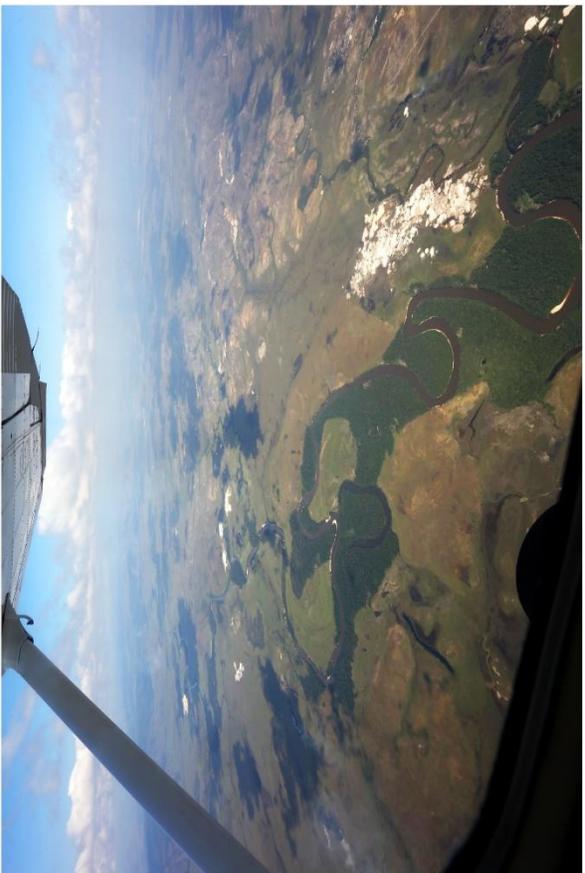
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Appendix 6 Recent views on mining in the National Park Canaima







Current Gold Mining Situation in Canaima National Park: A World Heritage Site in Venezuela. 2018.

Appendix 7
Other Significant Impacts on Canaima National Park, A World
Heritage Site: Tourism at Roraima, Roadways and Fires
For Sole Consideration by IUCN and UNESCO