Brownsberg Nature Park
Situation Analysis 2012

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Cover picture Erlan Sleur, 2012

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This report accompanies standalone 1) digital aerial photographs and film footage of the mining activity in Brownsberg Nature Park and 2) the results of water quality tests from each study site, conducted by first year ADEK University environmental students. These data were produced March 2012 and are under the proprietorship of WWF Guianas. Request for these materials should be made to WWF Guianas, Paramaribo, Suriname South America.

The author takes full responsibility for any errors in translation and data interpretation.

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Executive Summary

This report provides an overview of current artisanal small-scale mining activity at three sites in the Brownsberg Nature Park, Suriname SA. The study sites include: Witi Creek, Irene Falls (Wakibasu Creek) and Jobokai Creek. Each site was chosen for its proximity to pedestrian tourist activity and/or historical data about: artisanal small-scale mining activity, water quality and projected forest degradation in the Brownsberg Nature Park. Discussed in this report are the results of focus groups and interviews conducted with members of the artisanal small-scale mining community and regional stakeholders.

From earlier research we know that artisanal small-scale mining activity in the Brownsberg Nature Park has increased since a series of 'Operation Clean Sweeps' began in the late 1990s to present. We also know that artisanal small-scale mining activity in the form of prospecting is slowly encroaching demarcated tourists' areas (Irene Falls and the Witi Creek swimming area). In addition, according to environmental projections mercury contamination, tributary diversion and retarded rates of natural regeneration pose a threat to the biological sustainment of the BNP. Moreover, artisanal small-scale mining and its associated activities will not decrease due to current socio-economic conditions.

Although miner's are empathetic about working in a nature park they believe there is no alternative for economic mobility. There is also underlying hostility towards organizations that seek to expel miners from the park, simply because it is a park. The concept of preserving a parcel of land for the benefit of tourists is perceived as insulting and a disregard for regional social issues. This is particularly the case because the revenues generated from tourism do not necessarily reach the local community in an obviously beneficial way. The general idea is that people in dire need of basic provisions and without the educational tools to access other avenues of incomes should not be denied the right to earn a living.

Unfortunately, past efforts by regional stakeholders to end artisanal small-scale mining activities in the park proved ineffective. To date Foundation for Nature Conservation Suriname management efforts have not been effective. In addition, inadequate park management and accountability prohibits consistent and transparent change.

List of Abbreviations

ASM	Artisanal Small-Scale Mining
ATV	All-Terrain Vehicles
BNP	Brownsberg Nature Park
CI	Conservation International
CSNR	Central Suriname Nature Reserve
GMD	Geology and Mining Department
GoS	Government of Suriname
IUCN	International Union for Conservation of Nature
OGS	Commission Regulation Gold Sector
STINASU	Foundation for Nature Conservation Suriname
WCPA	World Commission on Protected Areas
WWF	World Wildlife Fund

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1.0 Introduction

1.1 National Parks and the Natural Environment

Natural resource extraction occurs both legally and illegally in national parks worldwide. Illegal mineral mining and logging activity is rampant in the national parks of tropical regions throughout the world. This is largely due to inadequate management and enforcement in developing countries where national parks provide a source of timber, mineral and exotic flora and fauna procured for illegal sale and trade.

The Amazon Basin of South America, spanning several countries, is no exception to the effects of large scale commercial mining and illegal artisanal small-scale mining. Often both are accused of devastating eco-regions via deforestation (figure 1), contamination of waterways, habitat loss for rear and endemic wildlife species and negative impacts to local communities.

However, illegal artisanal small-scale gold mining (ASM) poses a threat to Amazon region national parks with high biodiversity, natural resource density, endemic species for scientific inquiry and an ecotourism industry. It is estimated that ASM has caused "5% forest cover loss and ablation of adjacent creek main stem" (Hammond et al. 2007: 667) in the Brownsberg Nature Park Suriname, South America. This number may increase with the current boom in gold prices, continued ASM activity and lack of ASM land reclamation procedures.

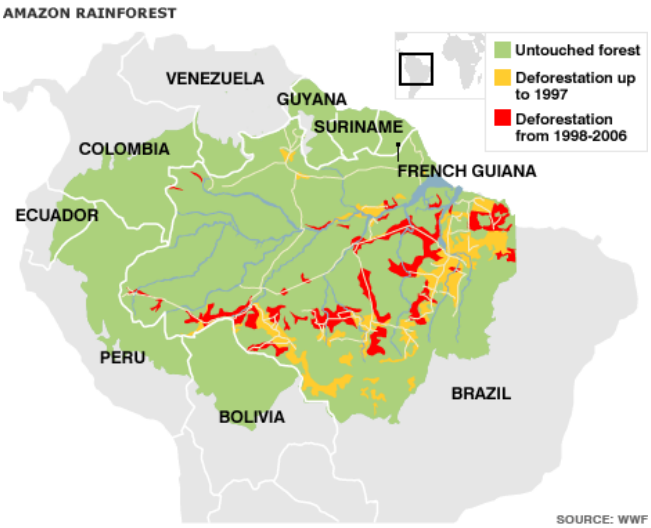

Figure 1. Amazon deforestation.

Without immediate and pointed intervention the current threat caused by ASM means the biodiversity of the Brownsberg Nature Park may experience irreversible damage.

1.2 Suriname's Natural Heritage

Suriname is home to at least 5018 species of vascular plants. In addition, there are some 1104 known species of amphibians, birds, mammals and reptiles according to figures from the World Conservation Monitoring Centre. Of these, 1.3% are endemic and 1.8% are threatened. The largest protected area is the Central Suriname Nature Reserve (CSNR); which is a UNESCO Natural World Heritage Site. This Reserve was designated on July 31, 1998 and is legally protected, under the country's Nature Protection Act of 1954. The reserve forms a corridor linking 3 former protected areas: Raleighvallen Nature Reserve (78,000ha), Eilerts de Haan Gebergte Nature Reserve (220,000ha) and Tafelberg (Table Mountain) Nature Reserve (140,000ha). These pre-existing reserves (that are now IUCN category II), were designated by State Resolution on April 22, 1966.

1.3 The Brownsberg Nature Park

The Brownsberg Nature Park (BNP) is located at 5º 01' N, 55º 34' W. It is located at the northwestern edge of the Brokopondo Hydropower Lake in the district of Brokopondo in eastern Suriname (figure 2). The BNP is a 130 kilometer drive from the capital city Paramaribo and is the most accessible of Suriname's protected areas representing rainforest diversity. The low cost and proximity means the park is frequented by Surinamese day tourists and international eco-tourists. In addition the BNP is a research hub for the Rainforest School for high school students and regional and international environmental and biological scientists alike.

Figure 2. Brownsberg Nature Park location.

The BNP is a part of a geological chain of forested plateaus with dynamic elevation levels that support the habitation of a variety of flora and faunal species (Norconk 2011).

Important Facts:

- ✓ **Conservation International's High-Biodiversity Wilderness Areas:** The BNP is located in the Amazonia Wilderness Area designated by Conservation International (CI). High-Biodiversity Wilderness Areas are defined by CI as areas that have "more than 70 percent of original vegetation have low human population densities and are among the last places where indigenous peoples can maintain traditional lifestyles" (Conservation International 2005, quoted in: Love et. al 2007). This area encompasses nine countries (Suriname, Guyana, French Guiana, Brazil, Venezuela, Colombia, Ecuador, Peru and Bolivia) and is the largest tropical forest on Earth, housing over 40,000 plant species alone, along with possibly 30,000 endemics throughout the Wilderness Area.

- ✓ **World Wildlife Fund's Global 200 Ecoregions**: According to World Wildlife Fund (WWF) all of Suriname is included within the Guianan moist forest "ecoregion." With regards to flora, WWF Guianas lists 4,500 plant species, including 300 varieties of orchids, 300 types of ferns and 800 tree species that have been inventoried in Suriname. Five hundred of these species are considered rare and 200 endemic to the Ecoregion. WWF Guianas also reports for Suriname: 185 mammal species, 668 bird species, 152 species of reptiles, 95 species of amphibians, 338 freshwater fish species, 452 marine fish species and 1,752 invertebrate species to date.

- ✓ **IUCN—The World Conservation Union (Red List -Critically Endangered, Endangered, and Vulnerable species)**: The IUCN has identified a total of 62 Vulnerable, Endangered and Critically Endangered species in Suriname. Forty of these species are terrestrial or freshwater; 22 are marine species. We do not know how many of these species are present in Brownsberg Nature Park. As compared to the Central Suriname Nature Reserve (1.6 mil. ha), which is

Suriname's principal protected area, BNP is very small (11,600 ha) and more impacted by human activity.

- ✓ **IUCN—World Commission on Protected Areas (WCPA):** 12.7% of Suriname is protected under IUCN categories I-V. The BNP falls under category II (National Park), V (Protected Landscapes and Seascapes) and VI (Protected Areas with Sustainable Use of Natural Resources). Each category is applicable to BNP and accommodates for monitored low impact visitation for recreation, education and sustainable livelihoods. These activities must be in step with conservation efforts that maintain the geographical integrity of the park. Currently the BNP's Rainforest School provides regional and international students as well as environmental researchers a platform for scientific study. In addition, the BNP tourist resort offers local community members a livelihood alternative.

- ✓ Researchers have asserted that no plant species is restricted to only the BNP. However, of Suriname's orchid species, 40 are endemic to the BNP's high plateau. The park also boasts approximately 200 tree species, a comparatively high number for the all the Guiana lowlands combined (Teunissen 2005). Furthermore, there are ~350 bird species at the BNP plateau, a high biodiversity not endemic in the surrounding lowlands (Teunissen 2005).

1.4 The Extension

The Brownsberg Nature Park is approximately 12,250 ha. The legal boundary of the Brownsberg Nature Park was established by the Foundation for Nature Conservation Suriname (STINASU) in 1970 in spite of a pre-existing bauxite concession (figure 3). At this time STINASU was given 8,400 ha for scientific and educational purposes.

The 1000 ha in the northwestern portion of the park experienced heavy gold mining activity as early as the 19th century. As recourse, to the damage done by historical mining and a gold rush in the mid-1990s, *allegedly* a 1000 ha area was reserved for artisanal small-scale mining (table 1). The decision was made after several failed attempts to expel miners from the BNP (see section 4.0 Interventions to Mitigate Problem for further discussions).

In 2002 4,850 ha of the southern boundary or extension was officially acquired by STINASU in exchange for the 1000ha allegedly allotted to the ASM community (see Appendix 1).

The area referred to as the buffer zone, is located along the western corridor of the BNP in line with the main road to Suriname River community, Atjoni. The buffer zone is demarcated for possible future extension of BNP though currently no efforts are being made to this end. To date the BNP in its entirety is under the management of STINASU.

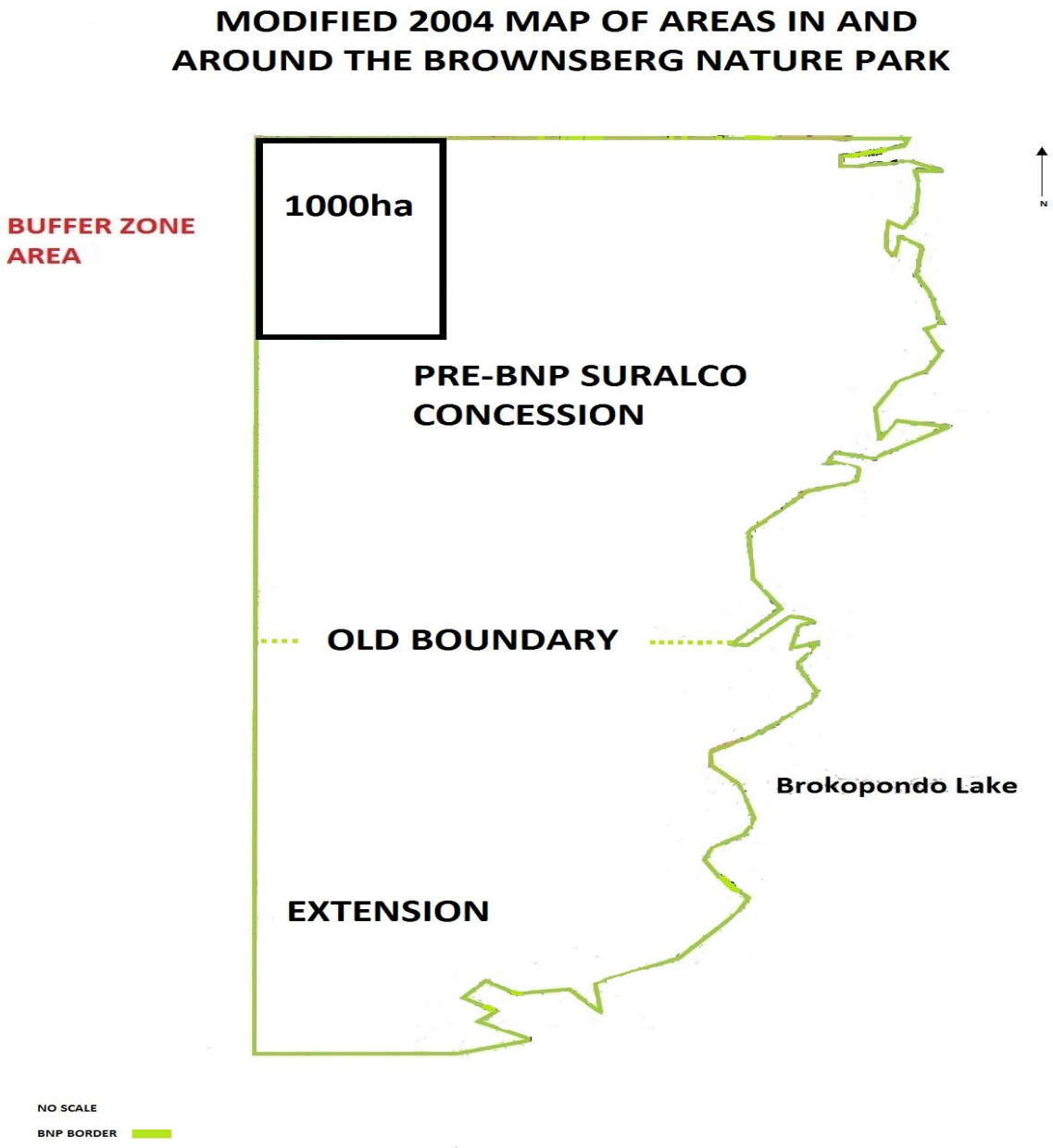

Figure 3. Modified 2004 map of historically contested areas within the BNP. Source Teunissen 2005.

Activity Years	1970	2001	2002	2002 to present??
Park Boundaries (hectares) [1]	8,400 Acquired for scientific & educational pursuits	1000 Historical mining plot unofficially allotted to ASMs after several failed attempts at expulsion	4,850 **Southern extension added in exchange for 1000 ha**	12,250/ 13,250 (including the 1000ha)[2]
The Buffer Zone		The western corridor of the BNP along the main road to Atjoni demarcated for possible future extension		

Table 1. Legal assignment of BNP.

The currently defined borders of the Brownsberg Nature Park, seem to be of little consequence to ASM activities within the park.

[1] Source Teunissen 2005

[2] To date official documentation addressing the subtraction of the 1000ha is not available to WWF Guianas.

2.0 Statement of Problem

The biodiversity of the BNP faces a threat of deforestation due to small-scale gold mining (Love et al. 2007), logging and to a lesser extent hunting/poaching. The Brownsberg Nature Park is not a WWF Guianas priority landscape. Nevertheless, the area has been classified as important for conservation.

It was initially hypothesized that small-scale gold miners work on two locations within or near the Brownsberg Nature Park; Witi Creek and Irene Falls. Because there is discussion about the precise borders of the park, it is not clear to what extent the miners are actually entering the park boundaries.

2.1 Study Objectives

The objectives of the study were to determine the location and parameters of artisanal small-scale mining and associated activities in the Brownsberg Nature Park

a. Determine legal boundaries of Brownsberg Nature Park and the more recent extension
b. Determine location and parameters of artisanal small-scale mining and associated activities
c. Provide digital aerial photos (via flyover) of ASM location and associated activities[3]
d. Provide recommendations to enact an action plan for the ASM sector in and around BNP

2.1.1 Methodology

To meet the objectives the study implemented these methods: 1) a desk study and literature review of relevant reports and documents about the BNP; 2) A flyover of the Brownsberg Nature Park for digital aerial photos.[4] 3) open-ended interviews with relevant government officials and local stakeholders; 3) fact sheet fill-in, focus groups and open-ended interviews

[3] These data are standalone documents. Request should be made to WWF Guianas Branch, Paramaribo, Suriname.
[4] It was initially anticipated that the flyover be conducted before field work in order to illustrate more pointed ASM activity. The aerial photos were to be used as a base map to determine potential research sites in the BNP. However, due to rainy season weather conditions a more opportunistic approach was taken. Field work was conducted when the roads conditions allowed for safe and timely travel to the research site. In addition, the flyover was done when cloud coverage was not an issue. These two events changed the course of activities and fieldwork was instead conducted before the flyover.

with the ASM community; and 4) water quality tests[5] of creeks at ASM activity areas.

Fieldwork was conducted in February of 2012 at three study locations: Witi Creek, Irene Falls (this includes the Wakubasi Creek area) and Jobokai Creek. Both Witi Creek and Irene Falls are within the northern boundaries of Brownsberg Nature Park. Jobokai Creek is located in the BNP's southern region in the area of the contested boundary (figure 4).

[5] These data are standalone. For test results request should be made to WW-Guiana, Paramaribo, Suriname.

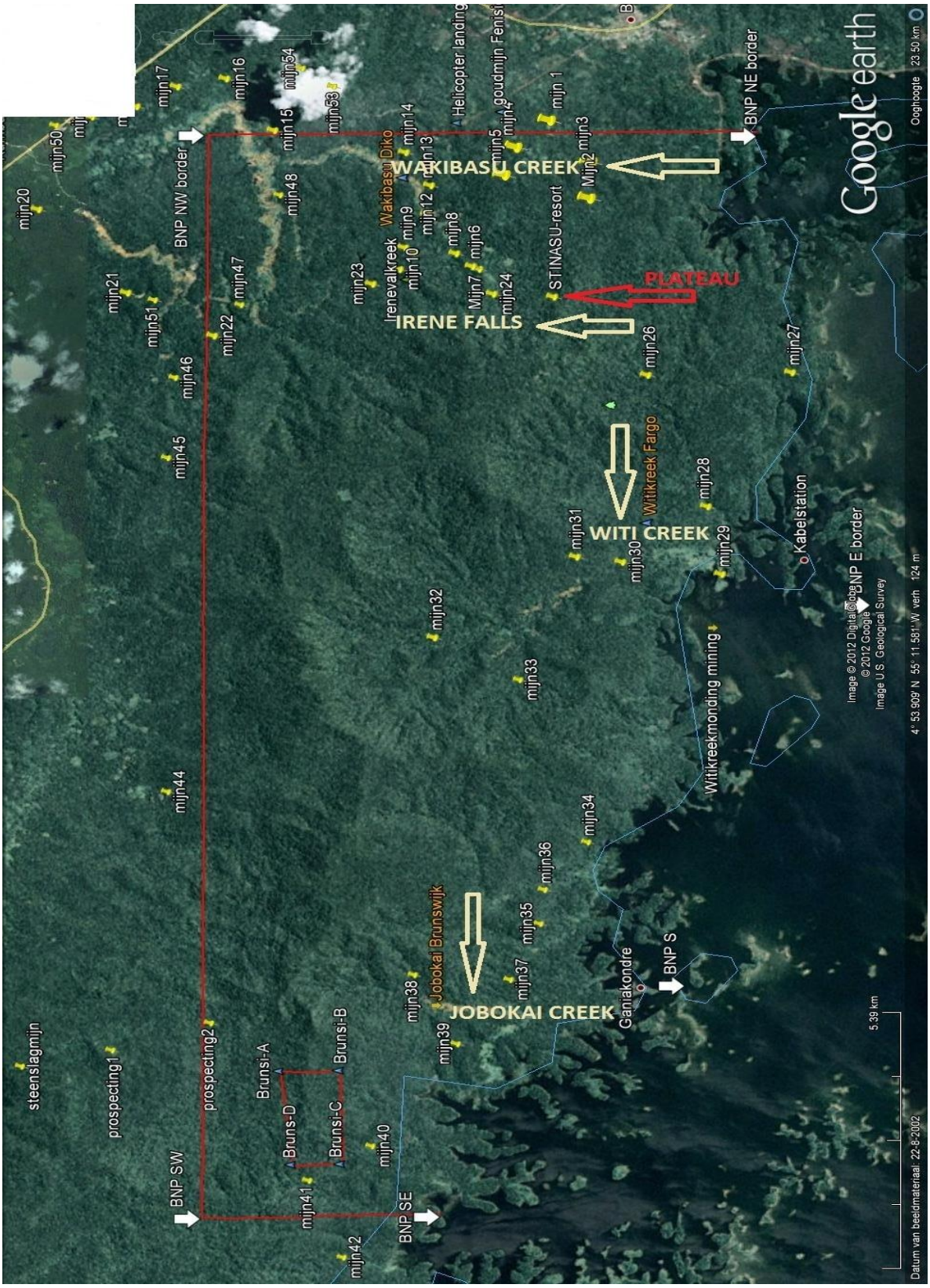

Figure 4. Study sites.

The sites were chosen for their comparability to historical data about mining activity and water quality in the BNP. In addition, Irene Falls and Witi Creek are in close proximity to the BNP's pedestrian and tourist activity area. While there is spotted reporting of mining activity at Brown and Komboe Creeks in the BNPs north western region, these sites were not visited during this field study.

With the consultation of ADEK University National Zoological Collection of Suriname Center for Environmental Research Environmental Lab and four environmental science students[6], supplies were provided to collect water samples and conduct a grade I test of water ph/oxygen level, mineral/mercury concentration and turbidity/ density of solids. At three points at each study location the creek water was tested and two water samples were collected: upstream (~50 m from open mining pit); midstream (at free flowing point at the mining pit); and downstream (~50m from open mining pit) of creeks in relation to ASM activity. This process proved challenging as mining activity severely alters the terrain and direction of water flow from tributaries. As such water quality results presented in appendix 2 should be used as a basis for future in-depth research.[7] At each study site up\mid\downstream distance varied based on accessibility to an appropriate testing point in relation to the open mining pit.[8]

Water Test Sample Points	Witi Kreek	Irene Falls (Wakibasu Creek)	Jobokai Creek
Upstream	Tourist swim area	Tourist swim area at water fall	~50 -100 m
Midstream	Free flowing point at open mine pit	Free flowing point at open mine pit	Free flowing point at open mine pit
Downstream	Where creek meets Brokopondo Lake	Where Komboe Creek meets access road[9]	~50 -100 m

Open-ended interviews were conducted with Brownsweg stakeholder, Frits van Troon (manager of the Tonka Island tourist resort in the Brokopondo Lake), the BNP park manager and staff. In the same method interviews as well as focus groups were conducted with members of ASM community operating at Witi Creek, Irene Falls and Jobokai Creek.

[6] The participation of four first year students was a part of a capacity building exercise.
[7] Test was conducted with Bacharach mercury analyzer according to the Cold Vapor Atom Absorption Method.
[8] It can be expected that these locales will invariably change with increased mining activity.

[9] It was determined that the Irene Falls and Wakibasu Creek in addition to mining activity downstream from these points flow and concentrate into the Komboe Creek. Due to sample point accessibility, the downstream water quality test was taken at where Komboe creek meets the main road to Atjoni.

At each study location data was documented about 1) the basic characteristics and general geographic description of the mining site, 2) access to basic utilities, public facilities and services in the area, 3) social organization and cohesion and 4) awareness of BNP boundaries and regulations.

To better ascertain the legal boundary of the BNP relevant government officials were consulted via open-ended interviews. Also reviewed are legal documents pertaining to the lawful demarcation of the BNP and the ownership of gold mining concessions in the BNP. The documents are chronicled in the Appendix of this report.

When applicable, direct quotes are provided with a summary of the respondent's perspective. The information provided here was gathered primarily in a focus group[10] format and reflects a concise assessment of collective ASM activity per study site.

2.1.2 Study Limitations

Limitations to the study were weather and a short field rotation. Suriname's wet season—January through August—severely affects off-road transport and travel in the rainforest interior. In addition, wet conditions and the small-scale miner's use of all-terrain vehicles (ATVs) exacerbate the already poor off-road conditions in the BNP. The poor travel conditions coupled with the obscurity of the mining sites requires that more time be allotted to locate and better document the breadth of ASM activity.

To better determine the social background and conditions of non-Surinamese ASM members in the park, future assessments should include multilingual (Brazilian Portuguese and Spanish) researchers. This should better enable communication and data gathering with the variety of nationalities present at the mining sites, most notably Brazilian and Dominican.

[10] Given the work routine of miners and the breadth of activity at the mining site, focus group sessions proved more conducive to gathering information while miners worked or rested in groups.

3.0 Mining Activity in the Brownsberg Nature Park

Suriname's small population of approximately 492,829 lives mostly in the coastal zone. Minimally impacted tropical rain forest covers the remaining 80% of the country, and is referred to as "the interior". This forest houses and provides sustenance to forest peoples: Amerindians (est. 10,000 to 22,000 people) and Maroons (est. 45,000 people), who are tribal people of African descent (Kambel and MacKay 1999).

In Suriname, neither Indigenous peoples nor Maroons have legal rights to the lands they have inhabited and are using for centuries (White 2009). The various tribal groups do, however, claim customary rights to certain areas of land around their villages that are used for living; hunting and fishing; planting; and collecting building materials, tools and medicinal plants.

Unresolved conflicts over land rights threaten conservation efforts in BNP, like in Suriname as a whole. The Maroon community of Brownsweg, which is situated just north of the BNP, is a transmigration village. The inhabitants were moved to this place in the early 1960s, when their six original communities were flooded during the construction of the Brokopondo hydropower lake. The event caused the loss of their homes, goods, agricultural plots, familiar hunting and fishing grounds, burial sites and ancestral worship places. At the time, the communities were not consulted or properly compensated for their material and immaterial losses. Nor was there consultation about the creation of the park in 1970—an event that further prohibited access to ground provisions and use of traditional territory.

Suriname's 1975 independence from the Netherlands and a poor application of financial grants to the communities in the interior further exacerbated an already precarious social condition. "The 1975 change of power was a precursor to the financial and social instability that set the stage for civil war through the 1980s" (White 2009: 47). The civil war created an education, health and financial vacuum that left Maroons disenfranchised and without inroads to gainful employment (White 2009). In subsequent years disenfranchised Maroons began illegal mining as a means to earn a decent wage regardless of educational background and free from urban regulations.

3.1 Focus Group Discussions

Discussed in the following section are attributes of the ASM sector at: Witi Creek, Irene Falls (this area includes Wakibasu Creek) and Jobokai Creek. The discussion format presents 1) basic characteristics and general geographic description of the mining site, 2) access to basic utilities, public

facilities and services in the area, 3) social organization and cohesion and 4) awareness of BNP boundaries and regulations.

3.1.1 Witi Creek

Basic Characteristics and General Geographic Description

Witi Creek mining site is located at coordinates 04^0 55' 165N 55^0 09' 0489W and is ~5 kl from the Brownsberg plateau tourist area. The mining area can be accessed by walking the 4 kl hiking trail from the BNP tourist encampment at the plateau. There is an open access road that leads directly to the swim area, but it is a reported 5-7 hour walk in good road conditions. Exactly, where the access point is from the main BNP corridor is not clear. While Witi Creek is associated to the tourist swimming area located at the foot of the mountain trail, the ASM site extends an additional $1^{1/2}$ kl from the swimming location.[11]

The site is referred to as Witi Creek. There is however some concern about the real Witi Creek still existing due to the extensive tributary diversion for ASM activity water needs. Miners reported that the tributary commonly referred to as Witi Creek is really Kambaluman Creek, the true Witi Creek, as stated by miners, is only accessible via an access road from the open mining pit site and cannot be accessed by pedestrian/ tourist traffic. However, for ease of reference and historical commonality, the term Witi Creek refers to the mining activity area (figure 5).

Figure 5. Hydraulic mining at Witi Creek near Brokopondo Lake

[11] Miners stated that the wooden shelters at the swimming site were built by them, as this location is used frequently for evening baths.

It should be noted that due to time constraints and miner aversion to outsiders, the research team did not survey the entirety of Witi Creek mining area. The attributes discussed represent the mining population encountered at the site of the recorded coordinates— the area closest to the Brokopondo Lake.

As reported by miners, Witi Creek mine is ~1 hour walk south east of where the coordinates were taken. It is reported that this area bears more extensive infrastructure with additional excavators, at least two cabarets and a small bar/shop and a larger and more stable population of miners.

Access to Basic Utilities, Public Facilities and Services in the Area

Medical emergencies are dealt with in Brownsweg.

Social Organization and Cohesion

The miners reported working for one boss (both owner of 'concession' and machinery) located in Brownsweg.

Awareness of BNP Boundaries and Regulations "They want to make us poor"

Though Members of the ASM community at Witi Creek are aware they are working in the BNP they believe their mine boss holds a legal concession to the area and therefore they are within legal rights. Lost and /or curious tourists are often encountered along the creek leading from the swimming area.

Miners stated that with a lack of formal education few options are available outside the gold mining sector. They suggested the government should take more proactive measures to provide them with alternative sources of income instead of condemning them for exploiting what they believe is historically theirs.

3.1.2 Irene Falls and Wakibasu Creek

The Irene Falls (as it is commonly referred to) mine area is comprised of numerous dispersed ASM camps. Wakibasu Creek is the most northern dispersed camp and is roughly 3 kilometers from the main Irene Falls mining area.

For the sake of clarity Wakibasu Creek is discussed here as a separate locale, but it should be noted that it is part and parcel to the larger Irene Falls ASM

mining catchment. The Wakibasu Creek mining area connects via several roads between the two sites. Though there is high traffic between the two areas the roads are poorly maintained and are passable only with an ATV or 4wd vehicle.

Wakibasu Creek

Basic Characteristics and General Geographic Description

Wakibasu Creek is located at 4^0 59' 13.4" N 55^0 12' 02.6" W. Wakibasu Creek is generally associated with the larger ASM site of Irene Falls and can be accessed via the first right turn from the main BNP corridor after the BNP Rainforest School sign. From this point forward locating the direct access road to Wakibasu Creek requires a local guide with up-to-date knowledge of the routes. Though the access roads are open and clear of forest debris (notwithstanding poor off-road conditions), the nature of ASM mining means that the landscape changes with increased activities and new roads and paths are made frequently. This creates a maze of dirt roads to 'explore', but this process can negatively impact a time sensitive project if vehicles become immobile.

The Wakibasu Creek site is comprised of a cluster of 3 autonomous mining camps with individual bosses supervising ~5 people, all recent occupants of the last several months.

Access to Basic Utilities, Public Facilities and Services in the Area

Private generators provide electrical needs for each mine camp while rainwater, maintained in a Duro tank, is used for cooking and drinking purposes. There is no sanitary facility, instead habitants relieve themselves in the bush and medical emergencies are dealt with in nearby Brownsweg. Amenities like cabarets and small shops are available at the greater Irene Falls mining camp—~ 2 kilometers travel along one of the many connecting roads.

Social Organization and Cohesion "We each work for ourselves"

Though miners state that they work independently of each other there is still a degree of shared resources. Miners at Wakibasu reported pooling money for access road maintenance, but asserted that this was the limit and that each boss was the sole proprietor of their gold plot, and therefore the sole

benefactor of gold earnings. Miners stated they prefer working at Wakibasu Creek to avoid social issues with other bigger bosses at the Irene Falls site.

Awareness of BNP Boundaries and Regulations

Though miners are aware that they are working in a government regulated nature park, there was little to no understanding about which governmental organization maintains jurisdiction over the BNP. Or what they should or should not be doing in the BNP. Even though the Wakibasu Creek mine site is accessed from a clearly open road near the BNP's main entrance miners reported no interaction with stray tourists.

Irene Falls

Basic Characteristics and General Geographic Description

Irene falls is located at 4° 57' 40.8" N 55° 11' 34.3" W. In miner's parlance the entire area extending from the tourist waterfall to the extensive mining camps is referred to as Irene Falls. The mining site encompasses a large area and can be described as a miner's village with several quasi-independent mining camps functioning in a confined space. Though the site is reportedly more extensive than what was observed in the 2007 Operation Clean Sweep, a June 2011 estimated figure of ~25-30 camps still holds true (Per. Comm. M. Heemskerk 2011).

It consists of a reported 5 large mine bosses, each with a team of at least a dozen rotating workers under their guidance. In addition to large mine bosses there are individual miners that prospect for gold with metal detectors.

Though Maroons from nearby Brownsberg are the majority, there is a small percent of Brazilian miners that speak fluent Sranantongoe as well as Hindustanis from Paramaribo.

There are three functioning cabarets located at the camp entrance and the far ends of the mining area. Cabaret sex workers include Surinamese, Brazilian and Dominican women.

Access to Basic Utilities, Public Facilities and Services in the Area

Personal generators are a power source. Water is sourced from the ground, and chemically treated for cooking and consumption. Covered open pit

toilets are available for each mine outfit and are strategically placed along the periphery of the mine or in the bush.

Social Organization and Cohesion

Even with the close proximity to Brownsweg and Paramaribo the sedentary nature of the site is conducive to family life and older relatives and children frequent the camp for short weekends or several weeks visit.

Individual prospectors can rent large excavators and mining machinery from a large boss. Miners stated that bosses did not frequent the site, but instead appointed a foreman or point person to deal with day to day issues of equipment, provisions and general operational concerns.

Awareness of BNP Boundaries and Regulations *"There are prettier places in Suriname than Irene Falls"*

Several miners stated that they were aware they were working in a national park and are familiar with the role of WWF Guianas and STINASU. This however was not a deterrent. They stated that WWF Guianas and STINASU should care more about the state of the people living in the area with no livelihood options. Maintaining the park just for the benefit of outsiders seems counter to the responsibility government should have for its citizens. Miners realize tourist bring money into the country, but will not pay to see something that is spoiled. Their perspective is that "there are prettier places in Suriname than Irene Falls".

Even though there is awareness and pride for their country's natural heritage, socio-economic determinants outweigh any need to avoid potential gold rich areas. Nature preservation is viewed as a rich man's concern.

3.1.3 Jobokai Creek

Basic Characteristics and General Geographic Description

Jobokai Creek is located at 04^0 49' 11.8" N 55^0 10' 19.7" W. Generally speaking the area is referred to as Jobokai. The actual creek intersects with portions of the abandoned and currently in use mining area. Jobokai is a small mining camp that, according to members of its ASM sector, is not expected to increase in number of habitants, but will likely develop further provisions—cabaret and small shop—for current habitants.

The site is accessible via an $1^{1/2}$ hour (pending water conditions) boat ride from the Brownsweg boat ramp at the north edge of Brokopondo Lake to Jobokai at the western edge of the Lake. The tourist resort of Tonka Island—equidistant between Brownsweg and Jobokai—is the nearest fixed landmark. From the Jobokai boat landing where an informal 'guard' screens visitors, a 45 minute walk along a clear cut road leads to first a mining camp and then the main mining site.[12]

The current estimated number of persons at the Jobokai mining site is fifteen (8 Brazilians, 4 Maroons and I Hindustani operator). The researcher is not fluent in Brazilian Portuguese and therefore was unable to interview Brazilian miners at the location. Instead only Surinamese/Maroon miners were interviewed. In addition, this small group represents a shrinking number due to abandoned mines and meager gold deposits. Surinamese workers, however, reported being paid a monthly wage.

The site has been inhabited off and on for several years, though the number of miners has dwindled considerable.

Access to Basic Utilities, Public Facilities and Services in the Area

The camp is sustained by a small group of Brazilian miners and cooks, but is without a convenience shop or cabaret—though the Maroon miners anticipate providing both within the coming months. While a private generator provides for electrical needs, rainwater is preserved in a duro-tank for consumption and cooking.

Social Organization and Cohesion

According to the miners the area is 'owned' by 1 mining boss who provides food provisions, a preferred labor force of Brazilians and deals with functional issues. Miners stated that in the past years some prospecting took place further south from Jobaki, but operations have since stopped. Because there is no other mining operation within distance, this mine site is self-contained. Besides personal relationships between female cooks and the miners, there is no reported self-maintaining social organization.

Awareness of BNP Boundaries and Regulations

[12] It should be noted that these conditions will invariable change with increased ASM activity.

Because of 'government issued' mine concessions, the Surinamese miners at Jobokai do believe they are working legitimately at the site. And reportedly have seen signed documentations attesting to this. Nevertheless, they report to not being aware of the exact boundaries of the BNP or the importance of its preservation. Miners reported no interaction with tourists.

Cross-Comparison of Mine Camp Attributes

	Witi Kreek[13]	**Irene Falls**	**Wakibasu Creek**	**Jobokai Creek**
Characteristics and Geographic Description	Cluster of mining camps; hiking trail access	Mining village; road access	Cluster of mining camps; road access	Single mining camp; road and boat access
Utilities, Facilities & Services	?? cabaret	3 cabarets (Brazilian and Dominican sex workers); treated ground water; covered open pit toilets	No cabaret; duro tanks; bush toilet	No cabaret; duro tanks; bush toilet
Social Organization	1 city based mine boss	5 city based mine bosses	3 individual bosses	1 city based mine boss
Awareness of BNP Boundaries & Regulations	Not aware; some tourist interaction	Aware; no tourist interaction	Not aware; no tourist interaction	Not aware; no tourist interaction
Estimated impact area (kl)	~7	~6 (densely concentrated camps)		~5

3.2 Conclusion

We know that ASM activity in the form of prospecting is slowly encroaching demarcated tourists' areas (Irene Falls and the Witi Creek Swimming area) which may increase interaction with eco-tourists. In addition, according to environmental projections mercury contamination, tributary diversion and retarded rates of natural regeneration pose a threat to the biological sustainment of the BNP. Moreover, ASM and its associated activities will not decrease due to current socio-economic conditions associated with miner's decision to inhabit the BNP.

[13] It should be noted the research team only visited a small portion of what is reported as the Witi Creek Mine site. It was reported that a more extensive large mining village with cabarets was not visited by the research team.

4.0 Interventions to Mitigate Problem

Since 1970 the Foundation for Nature Conservation Suriname has managed the BNP. STINASU's goals have always been that of scientific research, the preservation of nature and nature tourism (Teunissen 2005). During the civil war (1986-1991) the BNP tourist encampment was nearly completely destroyed. STINASU sought to restore the tourist encampment via their 1991 Management Plan. Complementary to this effort ever since the late 1990s WWF Guianas has sponsored several infrastructural and rehabilitation projects at the plateau's tourist encampment. In 2005 STINASU's original 1991 comprehensive Management Plan was rehabilitated to address the challenges of maintaining a facility viewed as a major tourist site and scientific research center (Teunissen 2005).

These efforts were in direct line with WWF Guianas' 'exit strategy' developed in consultation with STINASU. The goal of the strategy was to encourage self-support and management capacity, by 2007, of the BNP by STINASU. From 2007 to date there has been no donor relationship between WWF Guianas and STINASU related to the management of BNP.

Due to a lack of comprehensive management implementation there are now several dilapidated structures on site. Though tourist guest lodges were repaired and are currently in use, there remain several dispersed structures of questionable integrity.

The photos below (figure 6) are of WWF Guianas sponsored researcher lodges and structures located in the tourist encampment of the BNP. All are in a state of disrepair and/ or are unusable.

Figure 6. Before (left, 2005) and after (middle and right, 2012) photos of WWF Guianas sponsored and STINASU managed facilities at the BNP tourist encampment. Photos provided by WWF Guianas.

Following the overall rehabilitation program, in the last fifteen years STINASU has attempted to clear the BNP of illegal miners. Between 1997

and 2003 a strategy was implemented to confront the ASM activity in the park. Beginning in 1997, clean sweeps were implemented to clear the BNP of miners. The process consisted of expelling the miners and confiscating large machinery. These efforts were repeated in 1998, 1999, but proved ineffective at keeping the miners out of the park. In 1999 miners reportedly sued STINASU to return confiscated equipment. Given these conditions STINASU tried a more practical approach (figure 7).

In this time period, between 1997 to 2003, the GoS experimented with both legal and practical methods. In 2001 an attempt was made to work with the miners and not against them, under these conditions:

- miners were told to keep camps free of illegal weapons;
- the use of mercury was forbidden;
- hunting and poaching were deemed inappropriate activities;
- a donation was to be made to local community ;
- land reclamation was to be done; and
- new miners were to be turned away by current miners (Per. Comm. Harold Sylbing December 2011) .

These solutions proved to no avail and artisanal small-scale mining quickly resumed. Since then there have been several clean sweeps in the BNP. The most highly publicized Operation Clean Sweep took place on September 17th 2007. This clean sweep occurred when, in a questionable manner, the Geology and Mining Department issued two one year concessions to mine gold (see Appendix 3-4).

In 2010/2011, the association Stichting AHALA, which represents a group of small-scale gold miners from Brownsweg, initiated a dialogue with STINASU about the small-scale gold mining activities in the BNP. After a first meeting between the park management and Stichting AHALA, the park management had another meeting in the village of Brownsweg. The various parties involved agreed that Stichting AHALA would register the gold miners working in the park in order to be able to regulate their activities. Next, the park boundaries would be pointed out to the miners and registered miners would be able to mine up to this imaginary line. In exchange, the gold miners would help STINASU to maintain the road leading up to the tourist lodges in the park [14] (Per. Comm. M. Heemskerk 2011).

In the same vein the Commission Regulation Gold sector (OGS) has led clean sweeps and seeks to register miners and lecture on best practices. Current strides are being made by the OGS to institute a school at Snesi

[14] Note that in this instance, a government agency which is not authorized to grant mining concessions or lease parts of the national territory, is making a deal with unlicensed miners allowing them to work.

Kondre on the Marowijne River, Kwakugron in the Saramaka River Basin, Brownsweg and other targeted locations in the Suriname interior. The school will target the ASM community and provide oversight to ensure that artisanal small-scale mining is contained. To meet this end the school will consist of a facility to house participants and offer lectures and training about environmental stewardship and standards. In addition, ASM will be given the opportunity to register.

Figure 7. A STINASU issued warning sign at the entrance of the Brownsberg Nature Park that forbids hunting, logging and gold mining. Photo by Erlan Sleur February 2012.

Miners at Irene Falls attested to an October 2011 OGS lead effort to expel miners from the site. However, this was short lived as miners quickly repopulated the site within a month. BNP park rangers do receive regular warnings about scheduled clean sweeps and ASM expulsion from the park, but with little follow through.

5.0 Findings and Recommendations

5.1 Findings and Conclusions

The current high value of gold on international markets, few livelihood alternatives and a perception of the right to mine directly affect miner's decision to inhabit the Brownsberg Nature Park.

Although miner's were empathetic about working in a nature park they believe there is no alternative for economic mobility. There is also underlying hostility towards organizations that seek to expel miners from the park, simply because it is a park. The concept of preserving a parcel of land for the benefit of tourists is perceived as insulting and a disregard for regional social issues. This is particularly the case because the revenues generated from tourism do not necessarily reach the local community in an obviously beneficial way. The general idea is that people in dire need of basic provisions and without the educational tools to access other avenues of incomes should not be denied the right to earn a living.

(1) Historic factors that created the condition for mining
   a. Creation of Brokopondo Hydropower Lake and forced migration from traditional Maroon territory, households, subsistence plots, hunting and fishing places and areas used for ritual practice
   b. STINASU acquisition of Brownsberg parcel without Maroon community consultation
   c. 1975 independence from the Netherlands
   d. 1980s civil war in the interior
   e. Clean sweeps with poor follow through

(2) Why does ASM occur in the BNP?
   a. Perception that BNP is traditional Maroon territory to do with as they please
   b. Limited options for employment
   c. Lack of inroads to the formal economy/ sector creates a disadvantage for youth already at risk due to limited education in interior communities
   d. Lack of outreach for alternative livelihood development
   e. Nearness to Brownsweg means basic subsistence and medical needs can be met with minimal travel time

Brownsberg Nature Park is very small and is interesting for its tourism and research potential. Moreover, due to its proximity to Paramaribo the park does offer an interesting location to undertake concrete actions to motivate miners to leave the BNP and reclaim damaged areas.

5.2 Recommendations

Recommendations to WWF Guianas based on the study findings:

1. A comprehensive and proactive **communication plan or educational outreach** complementary to and in partnership with Government of Suriname and/ or like-minded regional implementers

    - ***increase awareness about the value of the BNP for historical and traditional knowledge***. Miners perceive the BNP as historical Maroon property, but have little knowledge about what the BNP can teach them. Miners in other regions of Suriname have refused to mine in areas that are known ancestral settlements. An ***oral history account of Maroon traditional knowledge*** and the cultural relevance of biodiversity with local stakeholders may remedy this.

    - identify ***community of Brownsweg as a target site*** for educational outreach. Education should begin at the primary school level with the communities in closest proximity to the BNP.

    - *conduct educational* outreach via ***non-governmental organizations (NGOs)*** that target miners, i.e. ***Stichting AHALA,*** **about the uniqueness of the BNP to Suriname's eco-region.**

    - ***facilitate OGS*** which specifically targets the ASM community in a non-antagonistic manner. They may be a facilitator ***to discuss WWF Guiana's role in environmental stewardship***.

    - ***facilitate the use of an abandoned mine to be a positive educational illustration of deforestation with the potential for land reclamation.*** The water quality results, though alarming, are not condemning.

    - demonstrate the ***benefits of ecotourism*** to the BNP and associated communities. Miners believe tourism dollars do not help their communities.

2. **Diversify tourist walking trails and site seeing within the park**. Miners operate with abandon because they assume tourists are of little interactive consequence. Increased public presence may hamper ASM activities and send a subtle message about the importance of the BNP's preservation for local and international audience.

    - The Witi Creek site is directly along the Brokopondo Lake. Once miners are removed and with some reclamation measures, the site provides a scenic rest spot for hikers and boaters alike.

3. **Lobby international organizations,** with a focus on **environmental stewardship,** for educational outreach in Maroon communities

4. If there were a **series of signs demarcating the BNP boundary** with correct contact information an attempt may be made by miners to ask the permission of the proper authorities to work in the BNP.

5. In order to chart a productive way forward it would be in WWF Guianas best interest to determine the permanence and probability of ASM impact via a **steering committee**.

    - The steering committee can function as a monitoring and communication tool for deforestation, land degradation, water quality, effects on threatened species of fauna and flora and socio-cultural intermediaries to help redirect ASM activities.

    - WWF Guianas may want to collaborate with likeminded organizations with an invested interest and the research skill set to carry out scientific field monitoring. These may include, but are not excluded to: Conservation International and National Zoological Collection of Suriname/ Center for Environmental Research Environmental Lab.

Appendices

Appendix 1.

Department of Natural Resources
Bureau No. 5140/01
No. D 866

THE MINISTER OF NATURAL RESOURCES

READ:

- *the application of Nature Conservation Suriname (STINASU) dd. 16 May 2001;*
- *the opinions of:*
- *the district commissioner of Brokopondo dd. 21 March 2002 no. 51/02;*
- *the head of the Ground Inspection Service dd. 13 May 2002 G.I. No.3128/01*
- *the Wnd. Director of Transport, Communication and Tourism dd. 21 March 2002 MH/TS/216.*

Re-read the license decision of 14 March 1970 No. D 401.

Having regard to the "Decreed Issued Domain under" (S.B. 1982 no. 11).

[?] the Dir. of Natural Resources

HAS DECIDED:

I. *At the disposal of the Minister of Natural Resources for the purposes of the Nature Conservation Suriname the expansion of the Brownsberg Nature Park, the land parcel approximately 4,850 lies in the district of Brokopondo west of - and bordering the Prof. Dr. W.J. van Blommensteinmeer and specified presented a figurative map of surveyor in Suriname, Ing. Eugene E. Peroti dd.25 April 2001 [?] the figure in red.*

II. *Copy of the decision to send to the Director of Natural Resources, the District Commissioner of Brokopondo, the head of the Ground Inspection Service, the Director of Transport, Communication and Tourism and the Director of Nature Conservation Suriname.*

Paramaribo, 14 June 2002.
The Minister aforementioned,
Getd. Mr. F.R. Demon.
For [eensluidend]copy,
The Underdirector Domaniale Zaken

[Signature]

(Dr. D. van exel.)

Appendix 2.

Water Quality Lab Test Results

ANTON DE KOM UNIVERSITEIT VAN SURINAME

Nationale Zoölogische Collectie van Suriname (NZCS)/
Centrum voor Milieu Onderzoek (CMO)

Universiteitscomplex, Leysweg 9, Postbus 9212, Paramaribo, SURINAME,
Tel. (597) 494756 of 465558 tst. 339/340, fax (597) 494756,
e-mail nzcs@uvs.edu, website: nzcs.uvs.edu

Paramaribo, 28 maart 2012

RESULTAAT ANALYSE

Aanvraag nr: ML07

Aanvrager: Mevr. S. Carilho
Studierichting Milieu wetenschappen, FTeW
AdeKUS

Aluminium bepaling

Locatie	Datum sampling	Datum analyse	[Al] (mg/L)	
Irene vallen (upstream = stromend water)	10/02/2012	22/02/2012	0.01	0.03
Irene vallen (downstream = stromend water)	10/02/2012	22/02/2012	0.30	0.30
Djobokai kreek (upstream = stromend water)	12/02/2012	22/02/2012	0.02	0.03
Djobokai kreek (downstream = stromend water)	12/02/2012	22/02/2012	1.25	1.25
Witikreek (upstream = stromend water)	13/02/2012	22/02/2012	0.09	0.12
Witikreek (downstream = stromend water)	13/02/2012	23/02/2012	51.00	62.00
Waki Basu (mining site, naast een dal = stromend water	18/02/2012	23/02/2012	2.20	3.00
Irene vallen kreek (upstream = stilstaand water)	18/02/2012	23/02/2012	13.20	12.40
Irene vallen kreek (downstream = stromend water)	18/02/2012	23/02/2012	1.10	0.80
Kumbu km 12 (stromend water)	18/02/2012	23/02/2012	2.00	2.40

IJzer bepaling

Locatie	Datum sampling	Datum analyse	[Fe] (mg/L)	
Irene vallen (upstream = stromend water)	10/02/2012	22/02/2012	0.09	0.11
Irene vallen (downstream = stromend water)	10/02/2012	22/02/2012	1.11	1.07
Djobokai kreek (upstream = stromend water)	12/02/2012	22/02/2012	0.21	0.26
Djobokai kreek (downstream = stromend water)	12/02/2012	22/02/2012	7.68	7.68
Witikreek (upstream = stromend water)	13/02/2012	22/02/2012	0.56	0.60
Witikreek (downstream = stromend water)	13/02/2012	23/02/2012	318.00	350.00
Waki Basu (mining site, naast een dal = stromend water	18/02/2012	23/02/2012	14.80	17.80
Irene vallen kreek (upstream = stilstaand water)	18/02/2012	23/02/2012	38.60	35.20
Irene vallen kreek (downstream = stromend water)	18/02/2012	23/02/2012	7.00	7.40
Kumbu km 12 (stromend water)	18/02/2012	23/02/2012	13.00	11.60

Kwik bepaling

Locatie	Datum sampling	Datum analyse	[Hg] (µg/L)	
Irene vallen (upstream = stromend water)	10/02/2012	26/03/2012	0.03	0.03
Irene vallen (downstream = stromend water)	10/02/2012	26/03/2012	0.03	0.03
Djobokai kreek (upstream = stromend water)	12/02/2012	26/03/2012	0.03	0.03
Djobokai kreek (downstream = stromend water)	12/02/2012	26/03/2012	0.06	0.06
Witikreek (upstream = stromend water)	13/02/2012	26/03/2012	0.09	0.09
Witikreek (downstream = stromend water)	13/02/2012	26/03/2012	1.14	1.20
Waki Basu (mining site, naast een dal = stromend water	18/02/2012	26/03/2012	0.20	0.17
Irene vallen kreek (upstream = stilstaand water)	18/02/2012	26/03/2012	0.20	0.20
Irene vallen kreek (downstream = stromend water)	18/02/2012	26/03/2012	0.17	0.14
Kumbu km 12 (stromend water)	18/02/2012	26/03/2012	0.17	0.20
Water in Diamond Blue petfles	13/02/2012	26/03/2012	0.00	0.00

Opmerkingen:

1) Water van Witi kreek downstream was heel erg troebel.
2) Water in Diamond Blue petfles is niet volgens de opgegeven richtlijnen verzameld.

Met vriendelijke groeten,

Mej. G.Landburg MSc.
Fungerend Hoofd Milieu-Laboratorium NZCS/CMO

Appendix 3.

Head Nature Management
Mr. B. Drakenstein

Subject: Mining rights in
Brownsberg Nature Park

Paramaribo, 27 September 2007

Dear Sir,

Referring to the above subject we ask your attention for the following:

according to the mining rights of the Geological Mining Service data file, there are currently no valid mining rights on gold and construction materials published in the Brownsberg nature park In the past, there were two (2) mining rights issued to Mr o. Thutnim and Mr a. pawiriredjo. This mining rights were as follows:

***Pawiroredjo, Achmad**, GMDno 758/96, for a period of three years. Exploration of gold. Published 21/05/1996*
there is no application for renewal submitted, no reports, and no surface rights paid, making this mining right expire.

Thurnim, Oscar
GMD no. 502/96, issued 11/09/1996, for a period of three years, exploration of gold. This right is extended under the GMD number 445/99
for a period of two years. This mining right is also expired now.
Afterwards Stinasu announced an expansion of the Brownsberg nature park, of which we never have received an expansion card with valid coordinates.

*The undersigned also wants to stress that the two (2) mining rights of Thurnim and p. Pawiroredjo were **issued** before STINASU has begun with the expansion of the Brownsberg Nature Park.*

The undersigned hereby request to you to hand over an expansion card of the Brownsberg area to the G.M.D as soon as possible, so that this area can be processed with its geographical coordinates in our map as well as data file.,

, The Acting Head of the
Geological Mining service
Mrs P.W. Simons, m. SC.

CC: Minister of N.H. Dr. G.A. Russia

Appendix 4.

Ministry of Natural Resources

No. G.M.D.: ***837/07***

Subject: Granting of the right to small-scale mine to: Ronnie Brunswijk

THE MINISTRY OF NATURAL RESOURCES

By the following the application of ***Ronnie Brunswijk date 26th September 2007***

Acting

Having regard to the opinion of the Head of the Geological Mine Construction Service on 22 October, 2007.

After hearing the District Commissioner of Brokopondo

Having regard to:

1. *The decree mining laying down general rules on the detection and mining and quarrying*
2. *The state decision of 11 May 1989*
3. *Agreement relating to the law 25th of January 1958 (G.B. No. 4) and on the law of 3rd August 1977 No. 8821 (Statute book No. 45)*

Has decided:

I. *To: Ronnie Brunswijk*
[?] to the Captain Chris Silosweg 10, at Marowijne for the time of 2 (TWO) YEARS THE RIGHT TO SMALL SCALE MINE TO THE EXPLORATION OF GOLD to grant in or on a plot of land likely to remain larger than 200 hectares, situated in the district of Brokopondo and identified on the figurative map of the land surveyor Frits Sanrawi M.Sc. d.d. 24th of September 2007 and enclosed by the following geographical coordinates: see rear of the sheet

II. *Determine, that this right to small-scale mine, in addition to the conditions laid down in this decree cited determine under be named, granted under the following conditions*

a. *The construction work must be made in respect of the right of 3rd party and to dispute concerning the matter in accordance with the rules by/ or because of the state to give;*
b. *That within 3 (THREE) MONTHS after the date of its decision a start should be made in mine construction work;*
c. *For the start on the fieldwork, the head of Geological Mine Construction Service officially in the possession of an implementation program of work with related outline of the work as that during the first months of the fieldwork finished will be;*
d. *The holder of this, MINE CONSTRUCTION RIGHT is compulsory, periodically and, on the 3rd (THREE) MONTH to report in writing to the head of the Geological Mine Construction Service , of all to or through the work data and results;*
e. *The head of the Geological Mine Construction Service and the designated by him staff during normal work hours have access to the field of activity in order to ensure that the MINE CONSTRUCTION RIGHT, in general, and in this, ? urban planning restrictions condition in fore in particular properly respected;*
f. *The extension of the RIGHT TO SMALL-SCALE MINE will only be possible as long as the holder [?] meets the requirements of points b, c, d, and e prescribed terms and conditions and these have been properly complied with, for the assessment of The Ministry of Natural Resources.*

III. *The Special Attention to the person concerned to the fact that:*

a. *The holder of the rights of small scale mine [gram gold per quarter] will produce and already won the fold obliged to offer for sale to the CENTRAL BANK OF SURINAME:*

   To offer, after the stamp taxes due and transfer costs, respectively a sum of 35SRD to 1SRD levels as mortgage [?] premises paid up.

IV. *Copy of the decision to transmit to the court of auditors of Suriname, The District Commissioner Of Brokopondo, The Head Of The Service Of Areas, The Head Of The Office For Water, Power Works, The Inspector Of Customs And Excise, The Head Of*

Geological Mine Construction Service, The Head Of The Service Of Areas, as well as registered to the person concerned.

Paramaribo, 23 October 2007

After Hearing the, the Minister of Natural Resources

Dr. G.A. Rusland
For a true copy the acting Head of the Geological Mine Construction Service

[SEAL] signed by P.W. Simons M.Sc.

Geographic Coordinates:
A. 4°49'5.62" NB 55o13'13.8" WL
B. 4°49'5.62" 55°12'41"
C. 4o48'0" 55o12'41"
D. 4o48'0" 55o13'13.8"

111.e.

The mine construction rights cannot be exercised in the [?] by the government to designate economic zone where communities of tribal citizens reside in economic activities in particular forestry, small mining camps, fishing and hunting companies [?] companies can unless it thoroughly or expressly authorized.

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