

Rapid Ecological Assessment

Contractors' Work Camp, St. Eustatius



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Background

EcoProfessionals was requested by the government of St. Eustatius (Directie Economie Natuur Infrastructuur) to perform a rapid ecological assessment of an area of land located on the property of GTI Statia on St Eustatius. A rapid ecological assessment assesses the flora and fauna inhabiting the area and the likely environmental impacts of a development in that area. EcoProfessionals, located on St Eustatius, is an independent foundation which provides ecological research and consultancy in all stages of project cycles in terrestrial areas, which includes rapid ecological assessments (REA). This REA covers the following aspects:

- Assesses ecological landscape values and vegetation
- Lists what is present on the property (protected/non-protected for plants and animals)
- Makes use of existing sources (vegetation and other maps)
- Suggests mitigation strategies by highlighting the consequences of the project on the landscape and species listed.

The primary aim of this assessment is to identify and evaluate whether the habitat is of conservation value, however species of note may also be included in the evaluation.

Purpose of Project

The contractors' work camp (hereafter 'Camp') is estimated to be 50 x 60 m (3,000 m²) and is located inside GTI Statia property on the western coast of St Eustatius at approximately 49 meters above sea level (17°29.206, 062°59.317; Figure 1). The government of St. Eustatius wishes to grant permission to temporarily develop the area, which is currently undeveloped. The Camp is proposed to be developed with primarily shipping containers, which will be removed following completion of a six-month road improvement project (Figure 1).

In order to develop the area, the current zoning plan does not need to be changed for the property. Nevertheless, a rapid ecological assessment is required. The Camp does not fall within the boundaries of any national parks and is therefore exempt from any associated rules and regulations related to this.

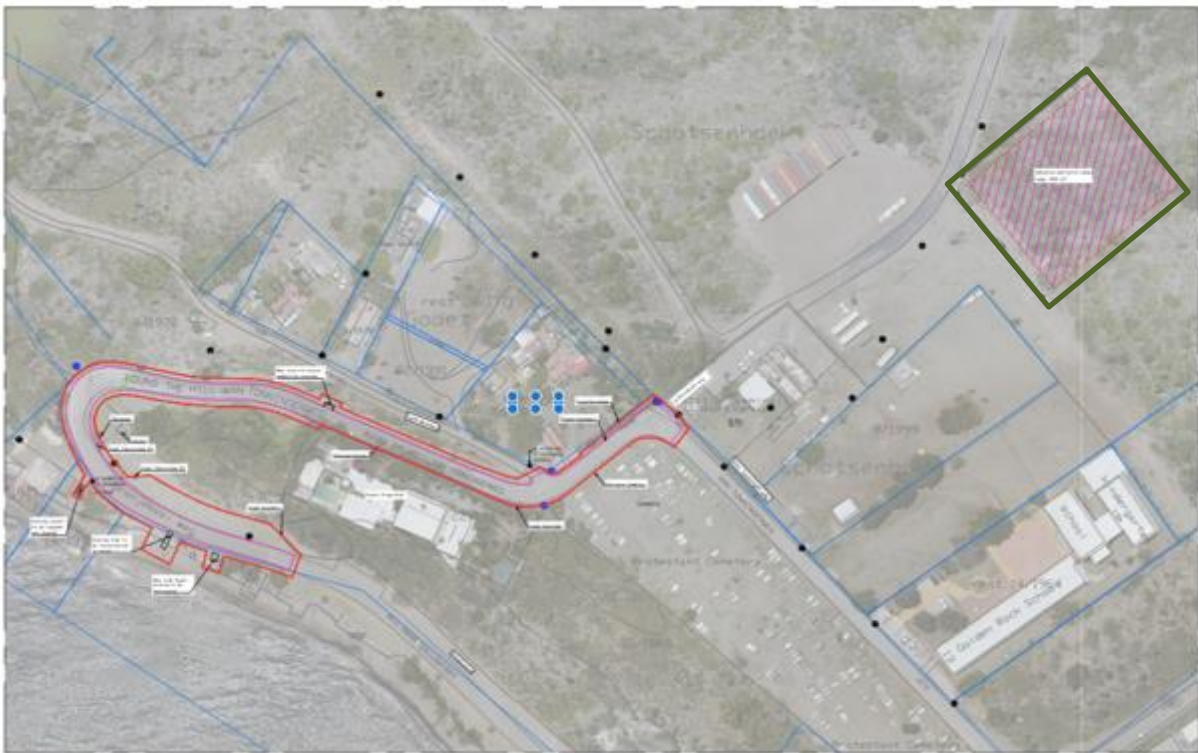


Figure 1. Map of St. Eustatius (top right) showing approximate location of the proposed contractors' work camp (red square). Bottom image: close-up of proposed development area (dark green square; top right) in association with the proposed road improvement project (red lines).

Survey Team

Team members for the fieldwork were Hannah Madden, M.Sc. and Adam Mitchell, B.Sc. (terrestrial ecologists). Fieldwork was conducted on 2 April 2020.

Policy and Legal Context

The main purpose of a rapid ecological assessment is to inform relevant stakeholders of the likely impacts of a proposal before a decision is made. By providing an opportunity to identify key issues early in the life of a proposal, potentially adverse impacts can be addressed before final approval decisions are made (Bisset, 1996).

This document provides an overview of potential environmental concerns only and should be used within a wider context which takes into account local laws regarding building guidelines and permitted actions. As stated in the St. Eustatius legislation handbook (2008) in the section Island legislation: *“It is forbidden to begin, continue, expand or amend environmentally harmful activities (indicated by General Island Resolution, along with exceptions **EUX2-Art.4**), or change any of the working methods involved, without a permit from the Executive Committee (to whom notification of changes should be given in advance **EUX2-Art.4**) – except for expansions or changes to an activity or work method that will have no effect or only positive effects on the environment.”*

Project Description

The purpose of the Camp is to provide a temporary administration facility for the workers of a road improvement project that will take place over approximately six months. The Camp will consist primarily of shipping containers placed on the site which will provide office housing for administration purposes. Running water will be connected from a nearby water source, and portable bathrooms will be installed. No permanent structures will be placed at the site. Following completion of the road project, the Camp will be dismantled and all temporary structures removed. Thereafter the site will be replanted with native vegetation in collaboration with ReforeStatia, a project run by STENAPA which aims to replant trees in deforested areas.

Site description

The topography of the Camp is located in the ‘cultuurvlakte’, a relatively flat area of land situated between the Quill and the northern hills. Altitude of the cultuurvlakte ranges from 10 m to about 80 m, averaging 40 m (Augustinus *et al.* 1985), and in coastal areas steep cliffs range from 20-45 m. The soil type in this area is categorized as ‘Statia sandy loam’. This area contains volcanic ash, fragment of molten or semi-molten rock, lapilli (rock fragments), and pumice (light-colored, frothy volcanic rock and ash-sized particles). Boldingh (1909) described the vegetation type as “croton vegetation” consisting of dry, shrubby flora. De Freitas *et al.* (2012) described the vegetation type as “disturbed, miscellaneous (former) agrarian use and or anthropogenic structures”. Historically and currently the site is grazed by free-roaming invasive herbivores; other previous disturbances include vegetation clearing (mechanical clearing and thinning) and agricultural use.

History of the Camp

St. Eustatius is comprised of three geomorphologic areas; first area is the north-western part of the island known as the Northern Hills which consists of an old volcanic landscape. Quill volcano located in the southern part of the island. The area in the plains between the northern and southern hills are known as the ‘cultuurvlakte’ or agricultural plains (Westerman and Kiel, 1961), where the Camp is located. Historical records indicate that a plantation was likely situated on the planned area of development (Figure 2).



Figure 2. Map of St. Eustatius showing where plantations were once located and the approximate location of the proposed Camp development (red square). Source from www.erfgoedstem.nl

Vegetation description of the Camp

Stoffers (1956) published a vegetation overview for St. Eustatius, in which 18 vegetation types were described. Since then several different vegetation descriptions have been produced by various researchers (e.g., de Freitas et al., 2012; van Anandel et al., 2016). For this report we used one of the latest vegetation maps by van Anandel et al. (2016; Figure 3). The camp is located in the marked-out area of the map (indicated with a red square) and is categorized as a miscellaneous, urban, disturbed area. The area is categorized as “miscellaneous” due to different types of present and historical agricultural activities which were conducted in the area such as the growing of crops and the grazing of roaming animals (e.g., cows, goats, sheep), the latter being the most common agricultural activity in the area. As a result of this,

most native vegetation was removed decades ago and large areas are now covered in shrubs, grass and invasive species such as *Corallita* (*Antigonon leptopus*) and Tan Tan (*Leucaena leucocephala*). The area is thus already considered disturbed.

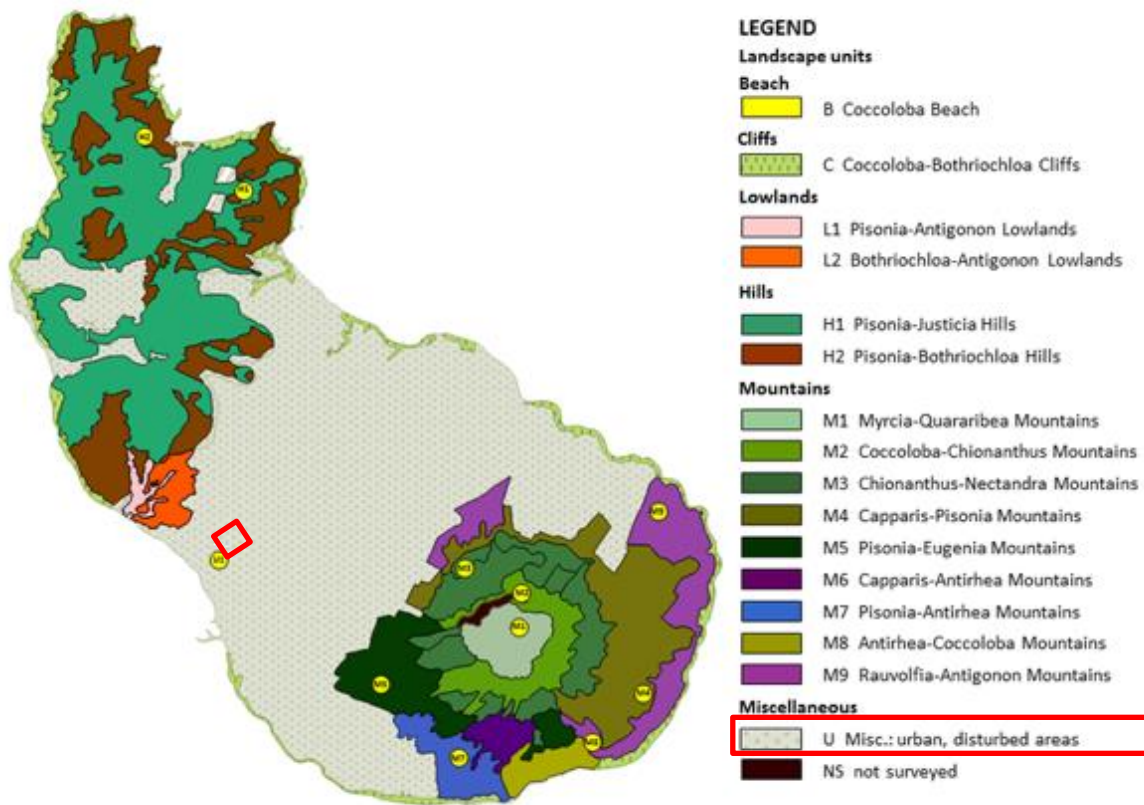


Figure 3. Vegetation map by van Andel et al. 2016 showing the approximate location of the proposed Camp development (red square). Based on de Freitas et al 2012.

Fieldwork and observations

On 2 April 2020, walking transects were conducted throughout the proposed development. Six transects were conducted over the area with approximately 10 meters distance between each transect (Figure 4) Whilst conducting the transects, two team members walked simultaneously, one recording and listing species of flora observed. The second person recorded fauna species through visual and aural observations. All animals seen or heard in the close proximity of the area were recorded. In addition to the listing and recording of species

of flora and fauna a rough estimation of vegetation cover was recorded in each transect to produce a general overview of the type of cover and height average of the vegetation present. In addition to walking the transects, Adam Mitchell marked out mature trees in the area that could be left in situ wherever possible.



Figure 4. Overview of transects walked in the proposed Camp development area.

Vegetation in the area consists of low and woody shrubs, small to medium sized trees, grass cover, and in some parts bare ground (Table 1).

Vegetation category (%)	Bare ground	Grass	Corallita / cleared	Shrub <1m	Shrub >1m	Woody shrub <5m	Tree >5m
Transect 1	5	10	0	70	5	5	5
Transect 2	5	15	0	65	10	5	5
Transect 3	10	10	5	60	5	5	5
Transect 4	10	10	20	40	10	5	5
Transect 5	5	10	0	75	2	5	3
Transect 6	5	10	5	65	5	5	5

Table 1. Overview of vegetation and ground cover in each transect at the proposed Camp development (indicated in percentage for each area).

Based on the above, and considering there was little variation in vegetation categories between the transects, we averaged the data collected in all six transects to create an overall estimate for each category (Table 2). As can be seen in Table 2, vegetation in the area consists primarily of low shrubs, some grass cover, and few mature trees. Corallita does not dominate the area and is not considered a major threat to the vegetation. However, a number of Neem (*Azadirachta indica*) and Tan Tan (*Leucaena leucocephala*) trees were counted, which are considered highly invasive and should be removed (Raghu et al., 2005; Dos Santos and Kiwango, 2010).

Vegetation category	Average %
Bare ground	7
Grass	11
Corallita/cleared	5
Shrub <1m	63
Shrub >1m	6
Woody shrub <5m	5
Tree >5m	5

Table 2. Average vegetation and ground cover at the proposed Camp development based on all transects walked (indicated in percentage for each area).

The Camp area is heavily affected by free-roaming livestock, whose constant grazing reduces the resilience of natural vegetation and interferes with natural succession and saplings (see e.g., Melendez-Ackerman et al. 2008) by reducing plant biomass, which increases exposure to wind and sun. Three cows and numerous goats were observed during fieldwork.

Fauna observed during transects consisted mainly of various species of bird, two species of butterfly, and one species of dragonfly and spider (Figure 5; Table 3). We did not encounter any Lesser Antillean Iguana (*Iguana delicatissima*) or Red-bellied Racer (*Alsophis rufiventris*).



Figure 5 (clockwise from top left): Cloudless Sulphur (*Phoebis sennae*) butterfly, White-winged Dove (*Zenaida asiatica*), Black-whiskered Vireo (*Vireo altiloquus*), Spinybacked orb weaver spider (*Gasteracantha cancriformis*). Images from www.google.com

Flora species observed during transects consisted mainly of low to medium sized shrubs interspersed with the occasional mature tree (Figure 6; Table 4). We did not encounter any orchids or endemic plant species such as Statia Morning Glory (*Ipomoea sphenophylla*).



Figure 6 (clockwise from top left): Columnar cactus (*Piloseocereus royenii*), Wild Lantana (*Lantana involucrata*) Sugar apple (*Annona squamosa*), Fiddlewood (*Citharexylum spinosum*). Images from www.google.com

Description of Status and protection of species

Of all species occurring on St Eustatius, 51 appear on the IUCN Red List of threatened species as ‘critically endangered’ (CR), ‘endangered’ (EN) ‘vulnerable’ (VU), or ‘near threatened’ (NT). IUCN’s Red List is generally recognized as the most extensive and objective global approach to the evaluation of the protection status of plant and animal species. The goal of IUCN’s Red list is to identify species that require protection, both locally and internationally. Internationally protected species that occur in more than one country and are under threat globally are protected by international agreements such as CITES (Convention on International Trade in Endangered Species), the Convention on the Conservation of Migratory Species (CMS) and the regional protocol concerning Specially Protected Areas and Wildlife (SPA). The species named in these international agreements must be protected, usually according to specific measures, as stated in the corresponding convention. Tables 3 and 4 below contain a list of all the species recorded during the transects at Camp with their specific protection status based on the various conventions.

Species list of flora and fauna indicating status of species

Of approximately 20 species of flora observed at the Camp, only two species (*Piloseocereus royenii* and *Opuntia stricta*) are recorded on the CITES Annex list II (Table 3), which means different rules of trading of these species apply. None of the flora species recorded during transects are listed as endemic, endangered or threatened.

Flora	Common name	Scientific name	IUCN category	SPAW	CMS	CITES
Grass		Fam. Poaceae	Not assessed			
Vine	-	<i>Stigmaphyllon emarginatum</i>	Not assessed			
	Yellow death	<i>Cuscuta americana</i>	Not assessed			
Shrub	Money bush	<i>Senna bicapsularis</i>	Least Concern			
	Periwinkle	<i>Catharanthus roseus</i>	Not assessed			
	Pandou	<i>Jatropha gossypifolia</i>	Least Concern			
	Broom weed	<i>Melochia tomentosa</i>	Not assessed			
Woody shrub/tree	White root	<i>Rauvolfia viridis</i>	Not assessed			
	Wild Lantana	<i>Lantana involucrata</i>	Not assessed			
	Bahama nightshade	<i>Solanum bahamense</i>	Least Concern			
	Sugar apple	<i>Annona squamosa</i>	Least Concern			
	Neem	<i>Azadirachta indica</i>	Least Concern			
	Fiddlewood	<i>Citharexylum spinosum</i>	Least Concern			
	Strongbark	<i>Bourreria succulenta</i>	Not assessed			
	Mappoo	<i>Pisonia subcordata</i>	Not assessed			
	Guava	<i>Psidium guajava</i>	Least Concern			
	Acacia	<i>Vachellia sp.</i>	Least Concern			
	Tan Tan	<i>Leucaena leucocephala</i>	Not assessed			
Cactus	Prickly pear	<i>Opuntia stricta</i>	Least Concern			II
	Columnar cactus	<i>Piloseocereus royenii</i>	Not assessed			II

Table 3. All species of flora recorded at the Camp and their status according to the different annexes (based on the Caribbean Netherlands Nature Policy Plan 2012-2017).

Of the 14 fauna species recorded during fieldwork, only birds are recorded on the various lists, all of which are classified as Least Concern on IUCN's Red list (Table 4). The remaining species are not listed as endemic, endangered, vulnerable or threatened.

Fauna	Common name	Scientific name	IUCN category	SPAW	CMS	CITES
Bird	Bananaquit	<i>Coereba flaveola</i>	Least Concern			
	Black-faced Grassquit	<i>Tiaris bicolor</i>	Least Concern			
	Black-whiskered Vireo	<i>Vireo altiloquus</i>	Least Concern			
	Caribbean Elaenia	<i>Elaenia martinica</i>	Least Concern			
	Common Ground Dove	<i>Columbina passerina</i>	Least Concern			
	Eurasian Collared Dove	<i>Streptopelia decaocto</i>	Least Concern			
	Lesser Antillean Bullfinch	<i>Loxigilla noctis</i>	Least Concern			
	Red Junglefowl	<i>Gallus gallus</i>	Least Concern			
	White-winged Dove	<i>Zenaida asiatica</i>	Least Concern			
	Yellow Warbler	<i>Setophaga petechia</i>	Least Concern			
Insect	Dragonfly	<i>Brachymesia furcata</i>	Least Concern			
	Cloudless Sulfur	<i>Phoebis sennae</i>	Not assessed			
	Littler Sulfur	<i>Eurema lisa</i>	Not assessed			
Arachnid	Spinyback Orb Weaver	<i>Gasteracantha cancriformis</i>	Not assessed			

Table 4. All recorded species of fauna at Camp and their status according to the different annexes (based on the Caribbean Netherlands Nature Policy Plan 2012-2017).

Assessment of the Impacts on the Terrestrial environment

St Eustatius is located in the hurricane belt, and two major hurricanes (Irma and Maria; both CAT 5) passed to the north and south of the island respectively in September 2017. The Camp is located on the Caribbean (western) coast of the island and is thus less likely to be affected by catastrophic winds and weather conditions compared with the windward side of the island. Nevertheless, the result of inclement weather conditions and/or heavy rains during the construction phase may give rise to increased run-off from land. There is also a risk of damage to the various residential, office and school facilities nearby from construction debris, trash, and pollutants during bad weather. Although the Camp is temporary and no permanent foundations will be laid, measures should be taken to secure all temporary structures (containers, sheds, portaloos etc.) to reduce this damage/pollutant potential.

The Lesser Antillean iguana (*Iguana delicatissima*) is a critically endangered species protected under local legislation, and St. Eustatius is one of just a few islands that supports a remnant population. Although none were encountered during surveys on this site, surveys in other areas immediately surrounding the site have recorded iguanas. During the clearing phase, care should be taken not to kill iguanas if seen; they will typically move from the area if startled, but STENAPA has specialists who can capture and relocate them if required. The same applies to the Red-bellied Racer (*Alsophis rufiventris*), a species of snake that only occurs on St. Eustatius and Saba.

Tropical dry forests are one of the most endangered habitats in the region; on St. Eustatius in particular they are heavily degraded by grazing, browsing, and soil compaction by feral mammals such as goats and cows (both of which were recorded on the site survey). By their nature, the native plant species found in these habitats are typically extremely slow-growing; the cactus *Pilosocereus royenii*, for example, only grows at a rate of approximately 5 cm per year.

Impact appraisal and ranking

Below is an overview of the presumed activities during the clearing/construction phases and the impacts of these on the area’s resource/environmental components:

Category	Ranking	Definition
Catastrophic	5	Transboundary and/or national scale impact.
Major	4	Regional to national scale
Moderate	3	Local to regional scale impact.
Minor	2	Local scale impact.
Negligible	1	Impact largely not discernable on a local scale being absorbed by natural environmental.
None	0	Impact absorbed by local natural environment with no discernible effects.
Positive	+	Activity has net positive and beneficial affect resulting in environmental improvement.

Table 5: Consequence ranking and definition of identified impacts.

Deforestation and bare grounds

Floral composition in the area comprises mainly woody shrubs, grass, and small trees, which is typical of the vegetation type described by de Freitas/van Andel et al. (2012; 2016).

Removal of this vegetation in its entirety would leave the area at risk of increased soil erosion, as well as open to invasive species. In addition, while the diversity of the flora species may be relatively low (ca. 20 species), this type of vegetation provides an important nesting/feeding habitat for many native fauna species, such as (migratory) birds, lizards and butterflies.

Likelihood of occurrence = 5 – certain to occur

Consequence = 1 – impact: negligible

Significance = 2 low

Carbon footprint during the construction phase

Cement production is responsible for around half of the construction industry's carbon dioxide output, both through the energy required to make it and the carbon dioxide given off as a by-product of the chemical reactions involved. Whether the contractors' area at the Camp will involve the use of concrete is unknown. Transportation of building materials also contributes to carbon dioxide emissions. Unfortunately, the limited alternative options to using cement on St. Eustatius means this may be an unavoidable component of the project.

Likelihood of occurrence = 5 – certain to occur

Consequence = 1 – impact: negligible

Significance = 2 low

Socio economic impacts

The area to be developed stands very close (<50 m) to the Golden Rock elementary school, and close (approx. 150 m) to the Gwendoline van Putten secondary school. Building contractors will bring their own vehicles, which will contribute to noise pollution, and clearing of the area is likely to produce a large amount of dust (see *Trucks and dust*, below). The school should be informed of the timings of the clearing, or ideally the clearing of land should be carried out when school is not in session (weekends or during school holidays).

The environmental impacts typically associated with traffic generated during construction projects include:

- Dust from vehicles traveling on un-surfaced roads, and across the site.
- Noise pollution.
- General damage to the soil surface and flora from off-road driving.

Likelihood of occurrence = 4 – very likely

Consequence = 2 – impact: minor

Significance = 2 low

Trucks and dust

Dust will be generated during clearing. Dust sources will be from the actual clearing of the area, transport of cleared material from the area, and movement of vehicles over the cleared work area within the construction zone while transporting containers and other materials. The occurrence and significance of the dust generation will depend upon meteorological and ground conditions at the time and location of activities. Under normal meteorological conditions, dust impacts will be limited to within several hundred meters of the construction area, however, there are two schools located within this area (see *Socioeconomic impacts*, above).

Dust generation can affect the ability of nearby vegetation to survive and maintain effective evapotranspiration, especially at agricultural areas.

Likelihood of occurrence = 4 – very likely

Consequence = 2 – impact: minor

Significance = 2 low

Waste disposal

The estimated daily domestic trash generated during construction is likely to be relatively low. It will be transported off-site to the recycling facility or general landfill for disposal. As this is a temporary camp, portable toilet units ('portaloos') should be used to eliminate the need to dig a septic tank and discharge waste into the environment.

Potential soil contamination may be associated with waste handling/disposal practices and potential spillage of e.g. gasoline/oil during the course of construction activities. However, proper waste management procedures could control and/or minimize such impacts.

Clean, cleared topsoil should be kept and reused in the replanting process after the camp has fulfilled its purpose. Cleared vegetation could be banked as a windbreak for planting afterwards, however the presence of seeds from invasive plant species should be considered a potential threat.

Likelihood of occurrence = 4 – very likely

Consequence = 2 – impact: minor

Significance = 2 low

Recommendations and mitigation measures

The maximum project impacts will be during the construction phase, whereas the operational phase carries little of concern with respect to generating impacts. A majority of the impacts identified below are amenable to mitigation.

Run-offs

Preventing negative environmental impacts caused by run-off from land into the should be given high priority. Soils can be thought of as a living entity, usually comprising a layered habitat with thickness varying from place to place. Construction activities would result localized alteration of the soil profile, and soil compaction in the immediate vicinity, as a result of vehicle and construction equipment operations. Disturbed soil could be more susceptible to erosion.

Soil run-off during the construction phase could be mitigated by actions, which include but are not limited to: the scheduling of construction so that the exposure of bare soil is minimized as much as possible, installation of sediment control practices and silt fences before construction begins, and the diversion of water from slopes.

Climate, bare ground, time to avoid rainy season

The Camp is located at a low-lying altitude and is thus likely to receive less rainfall than the higher elevations of the Quill and Boven mountains. The dry season typically runs from January to April, with rainy season occurring during the second half of the year, which coincides with the hurricane season (Figure 7). To avoid potential loss of topsoil and prevent soil eroding into the waters below, it is not recommended to leave large areas of bare ground exposed during this time. In addition, most of the vegetation that exists in this area is native and serves a variety of ecological purposes. Removing this vegetation will increase the risk of run-off into the marine environment.

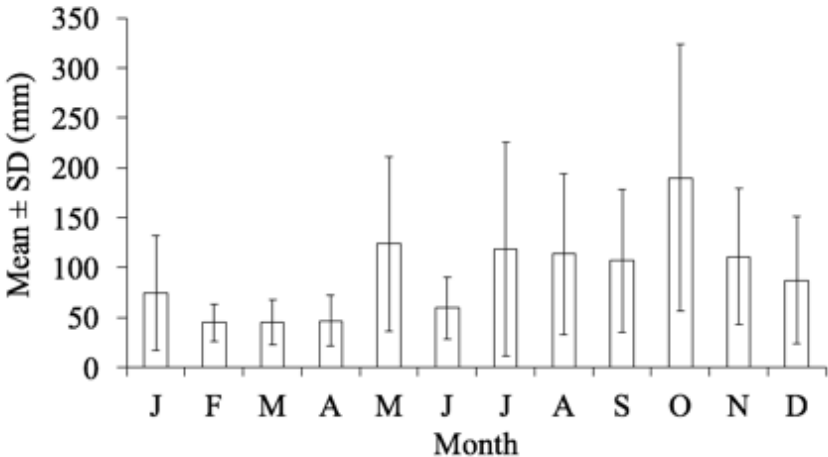


Figure 7: Average monthly rainfall on St. Eustatius (source: <http://seawf.com/rainhist.php>).

Small- to medium-sized trees provide shade, and their root systems help prevent soil erosion. Preserving this vegetation wherever possible will minimize erosion, maintain ecological functions, and minimize habitat loss to native fauna species. If removal of vegetation is absolutely necessary, one area at a time should be removed in order to minimize the risk of

erosion by exposing topsoil. Any topsoil removed should be saved and can be used in other locations where it may be needed.

Construction techniques that focus on protecting the environment and decreasing pollution help slow down the impact of global warming on the environment. Green building techniques help maintain a healthier society and surroundings. Conventional building methods and materials are associated with health problems. Chemical toxins from solvents, paints, composite timbers, and plastic together with biological pollutants like molds and dust mites cause problems like depression, headaches, asthma, palpitations, and serious fatigue syndrome. Green building techniques remove such problems, help strengthen the economy, and support local business.

Conservation of water is a crucial element of sustainable construction. Recycled or collected rainwater can be used for e.g. landscape irrigation. Investing in solar power presents a long-term cost-saving measure, reduces reliance on the grid, and would lessen the strain on local electricity provider STUCO.

Build as environmentally friendly as possible

Where relevant, construction companies that incorporate an environmental and ecofriendly choice of material and approach in the planning and construction phases should be considered. Environmentally friendly materials and sustainable solutions will benefit the project in the long term.

Construction work should be carried out during work hours that minimize noise and dust disturbance to local residents and nearby schools. Trucks carrying materials such as gravel or loose dirt should be covered in order to minimize contamination of the area around the site and nearby residences.

Recyclable items e.g., plastic, card, tires, glass should be taken to Statia Waste Solutions recycling plant. Plant materials can also be brought to the plant for conversion into chips. These chips could be used during the replanting phase. Non-recyclable materials should be covered and transported to the local landfill.

Mitigation measures

The predicted impacts and the effectiveness of the mitigation measures proposed should be monitored during both the construction phase and during the operational phase of the construction.

Construction phase mitigation

Larger trees absorb more CO₂ from the environment, provide significant habitats for animals and other plants, reduce heat-island effects, and play a major role in soil stabilization. Because of the nature of Caribbean dry forests, however, native trees in this habitat will take decades, and in some cases centuries to reach their maximum size. Therefore, when possible, larger native trees should not be uprooted during the clearing phase; because larger native trees in the area are relatively widely spaced, it should be possible to clear the area surrounding them without damaging them.

Many of the trees on the site are invasive Neem (*Azadirachta indica*) which should be removed where possible. Trees which should be kept were marked during the initial survey phase with red flagging tape. Live transplantation of large trees is prohibitively expensive and not a feasible option in this case.

Both species of cactus (*Piloseocereus royenii* and *Opuntia stricta*) recorded on the initial survey are listed on CITES Appendix II. Both are very slow-growing species, particularly *P. royenii*. *O. stricta*, has been severely impacted in the Lesser Antilles by the introduction of the invasive moth *Cactoblastis cactorum* and as such is decreasing on all islands. Where possible, these species should be left in situ. However, if this is not feasible, it may be possible to transplant these species, replant them elsewhere on the site, or replant them back on the site at a later date.

Topsoil removed from the area should be retained for post-construction mitigation; the biota of this soil (in particular the bacterial and fungal composition) is likely to be specific to dry Caribbean forest and should benefit the area during post-construction mitigation.

Post-construction (reforestation) phase

After the construction work has been concluded and the temporary structures removed, work should be undertaken to reforest the area.

If (temporary) fencing is installed around the area, ideally this should be retained in order to exclude roaming feral herbivores. If no fencing is used, a goat-proof fence should be erected. Chain-link fencing should not be used, as it has been recorded as a source of mortality for Lesser Antillean iguanas, which can become trapped in the diamond-shaped holes (A. Mitchell, pers. comm.).

Replanting can be carried out by the ReforeStatia project. The area should be replanted with an assemblage that includes native plants recorded in the initial survey (Fig. 10). A number of other species should also be planted which would otherwise be found in this habitat but which are likely to have been extirpated from the area; in particular saplings of gum (*Bursera simaruba*) and West Indian mahogany (*Swietenia mahogani*). Gum trees provide an excellent habitat and food source for native birds; mahoganies provide excellent habitat for native species and are themselves a CITES-listed species. Both are highly drought and hurricane resistant.

Some areas should be reserved for artificial nesting areas for Lesser Antillean iguanas. Historically, these iguanas are believed to have nested communally, as they still do on some other islands, such as Dominica (Knapp, 2016). However, very few of these communal sites now exist on St. Eustatius, one of which is at the nearby Kingswell resort. Providing some additional protected breeding areas for the iguanas in this area may aid in their recovery.

For approximately a year after the replanting phase, access should be granted to ReforeStatia as the trees will require regular watering to establish them during this period, the fencing will need to be checked for breaches, and invasive species will need to be removed.

Recommendations for mitigation

1. Retain large, native, marked trees (where possible)
2. Retain and replace removed topsoil.

3. Fence area with iguana-safe fencing.
4. Replant area.

Conclusion

Overall, the proposed Camp development is small (3,000 m²) and in its current state the area is of relatively low biological value. We did not encounter any endangered, endemic or threatened species; none of the flora or fauna species observed at the site are of conservation concern. Consequently, we are of the opinion that a temporary development will not result in significant biodiversity loss.

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