



NGC's REFORESTATION PROJECT ENHANCING BIODIVERSITY

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KEY TAKEAWAYS

Biodiversity is critical to combat climate change and sustain life on the planet.

Following its reforestation programme, NGC engaged The UWI to assess the impact of the programme on biodiversity at the project sites.

The UWI study revealed that there was a higher relative abundance of red brocket deer, ocelot, tayra, tamandua and red-tailed squirrel at the NGC reforestation sites.

WHAT IS BIODIVERSITY AND WHY IS IT IMPORTANT?

Biological Diversity – or Biodiversity – refers to the diversity within species, between species and of their interconnected ecosystems (World Economic Forum 2023). Biodiversity is critical to combat climate change and sustain life on the planet. The variety of plant and animal life contributes towards the world's food supply, raw materials for manufacturing, and employment of people. A healthy biodiversity leads to a healthier and more secure supply of food, materials and medicine, and more vibrant economies. Biodiversity is strongly correlated to climate change. For example, ecosystems such as rain forests, produce oxygen and help keep the planet cool. Loss of rain forests accelerates global warming. In turn, increased temperatures result in loss of biodiversity, leading to spiralling negative impacts on the planet.



NGC'S REFORESTATION PROJECT

Human activity over the past 50 years has resulted in the loss of 60 percent of vertebrate species and 50 percent of all plants (World Economic Forum 2020). However, humankind has the power to reverse these trends and prevent further loss of biodiversity. Recognising its role as a leader in the movement towards a low carbon future, NGC embarked on a study in 2022 to ascertain the impacts of the Company's signature 315 Reforestation Project on biodiversity.

NGC initiated the Reforestation Project in 2005 to replace forests that had been inevitably removed to make way for the Company's Cross Island Pipeline (CIP) and Beachfield Upstream Development (BUD) Projects.

NGC committed to the 'No Net Loss Principle' as part of its Corporate Social Responsibility programme, in alignment with the National Environmental Policy of Trinidad and Tobago. NGC worked in collaboration with the Ministry of Agriculture, Land and Fisheries Forestry Division and communities to replant 315 hectares of forest in the south-west and south-east forest conservancies in Trinidad.

FROM 2005 TO 2018,
100,000+ seedlings of 17 species of trees

WERE PLANTED AT THE MORNE L'ENFER FOREST RESERVE NEAR LA BREA AT ROUSILLAC AND GUAPO, THE VICTORIA-MAYARO FOREST RESERVE IN MORUGA, AS WELL AS MAYARO AND RIO CLARO.

**THERE WAS A HIGHER
RELATIVE ABUNDANCE
OF RED BROCKET DEER,
OCELOT, TAYRA, TAMANDUA
AND RED-TAILED SQUIRREL
AT THE NGC
REFORESTATION SITES.**



IMPACT ON BIODIVERSITY

In 2022, NGC engaged The University of the West Indies (The UWI) to conduct a study to determine the impact of the Reforestation Project on biodiversity. The UWI had previously conducted studies to estimate the amount of carbon dioxide sequestered by the project both above and below ground and was familiar with the reforested area. The main objective of the study was to determine how the reforestation programme had enhanced tree and mammal biodiversity in selected areas. The study was conducted at Grants Trace, Rousillac, and Guapo Parrylands, Morne L'Enfer, as sufficient data was available to conduct species richness calculations in these large areas.

Data outputs from the Rapid Botanical Survey (RBS) conducted by The UWI National Herbarium in collaboration with the Forestry Division and Oxford University in 2005, was compared with data recorded for Phase 1 of NGC's Reforestation Project in 2018. The RBS took place shortly before the

NGC replanting exercise commenced, and therefore provided a reliable reference point for comparison. A range of indices was employed to determine the impact on biodiversity including:

- **Species richness** - calculated using the Margalef Index (d), a measure of the total number of species (S) present for a given number of individual trees (N)
- **Equitability or evenness** - expressed as Pielou's Evenness Index (J'), a measure of how evenly the individual trees are distributed among the different species
- **Diversity** - measured using the Shannon-Wiener Diversity Index (H'), a measure of the proportion of the entire community made up of a particular species. The higher the value of H', the higher the diversity of species in the community.

The results showed that there was an increase in all indices following NGC's reforestation programme, providing emphatic evidence that the programme enhanced biodiversity.

The impact of the reforestation initiative on eight species of wild terrestrial mammals was also assessed: red brocket deer, ocelot, tayra, nine-banded armadillo, common opossum, southern tamandua, red-rumped agouti, and red-tailed squirrel. This was achieved through the deployment of 10 Reconyx HC 600 Hyperfire camera traps. The cameras were set to capture three images every time they were triggered with no delays between captures. Over a period of 50 days, a total of 2,761 photos were taken in the Morne L'Enfer Forest Reserve near La Brea at Rousillac and Guapo, Parrylands.

While there was no baseline data on the relative abundance (number of camera captures per 100 trap days) for the study sites, the survey results could be compared to similar survey sites in the Trinity Hills and Central Range of Trinidad. The comparison revealed that there was a higher relative abundance of red brocket deer, ocelot, tayra, tamandua and red-tailed squirrel in the NGC reforestation sites.



Table 1 – Comparison of Indices

	Results of 2005 – 2008 Survey by The UWI National Herbarium, Forestry Division and Oxford University									
	Results of 2018 Report on Phase 1 of NGC Reforestation Project									

Sample	S		N		d		J'		H'	
	2005	2018	2005	2018	2005	2018	2005	2018	2005	2018
Guapo 1	118	129	138	146	23.78	25.68	0.9924	0.9945	4.735	4.836
Guapo 2	113	117	139	142	22.70	23.41	0.9937	0.9937	4.698	4.733
Rousillac 1	62	69	138	84	14.03	15.35	0.9925	0.9927	4.096	4.203
Rousillac 2	135	144	158	165	26.46	28.00	0.9941	0.9950	4.877	4.945

Where S = total number of species present

N = number of individuals

d = Margalef index of species richness

J' = Pielou evenness index (i.e., how evenly the trees are distributed among the different species)

H' = Shannon-Wiener diversity index

SPECIES OF TREES PLANTED DURING NGC'S REFORESTATION PROJECT:

Acurel (*Trichilia smithii*), Apamate (*Tabebuia rosea*), Argalie (*Clusia rosea*), Black heart, (*Clathrotropis brachypetala*), Cedar (*Cedrela odorata*), Crappo (*Carapa guianensis*), Mahoe (*Sterculia caribaea*), Mahogany (*Swietenia macrophylla*), Pois doux (*Inga laurina*), Wild camphor (*Tarchonanthus camphoratus*), Wild chataigne (*Pachira insignis*), Bois d'orme (*Guazuma ulmifolia*), Hogplum (*Spondias mombin* L.), Roble (*Platymiscium trinitatis*), Cypre (*Cordia alliodora*), Yellow Olivier (*Buchenavia capitata*), Balata (*Manilkara bidentata*), Cajuca (*Virola surinamensis*), Locust (*Hymenaea courbaril*), Galba (*Calophyllum lucidum*), Pommerac (*Syzygium malaccense*), Chennet (*Melicoccus bijugatus*), Mango (*Mangifera indica*) and Poui (*Tabebuia* sp.)

CONCLUSION

The evidence from the study shows emphatically that the NGC Reforestation Project that commenced in 2005 and concluded in 2022 has enhanced both plant and mammal biodiversity. The exercise yielded additional benefits as well, with the observation that deer appear to be switching from diurnal to nocturnal patterns. Also encouraging is the comparatively high number of ocelot recorded, given the animal's status as an environmentally sensitive species in Trinidad and Tobago.

Though the Reforestation Project began as a provision of

the Company's Certificate of Environmental Clearance for its pipeline projects, the initiative evolved over the years to become part of NGC's CSR practice and sustainability culture. Having completed all phases of the project, NGC formally handed over the replanted forests into the care of the Forestry Division on 21 March 2023. However, NGC's commitment to environmental preservation does not end here. We continue to explore opportunities to partner with stakeholders and communities through The NGC Group's Green Agenda to contribute towards environmental entrepreneurship, carbon reduction and further enhanced biodiversity. ■

References:

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