

GLOBE DATA DETECTIVE PUMA OF SÃO FIDELIS - RIO DE JANEIRO
Following the Footsteps of the Puma (Puma concolor) São Fidélis – RJ -
Monitoring the Atlantic Forest for the Conservation of the Species

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Abstract

This project proposes the use of technology associated with environmental monitoring and preservation of the puma (*Puma concolor*) in the municipality of São Fidélis, Rio de Janeiro. This species, also known as cougar, plays an essential role in ecological balance, but has been suffering from the reduction of its natural habitat, deforestation, and conflicts with human activities.

Through the use of Earth observation satellite images (CBERS-4A, Amazonia-1 and Sentinel) and the construction of a robotic puma prototype made with recyclable materials and simple circuits, the aim is to integrate science, technology and sustainability in the same educational project.

This data would allow the monitoring of changes in the species' natural habitat and could be used in awareness and environmental education actions with the school community. The proposal combines aerospace engineering, robotics and ecology, highlighting the role of technology in supporting biodiversity conservation and in the training of citizens committed to the planet.

Keywords: OBSAT, Satellites, Sustainability, Puma.

1. Introduction

The puma is a species widely distributed throughout Brazil, but its presence in São Fidélis – RJ has decreased drastically. The main causes are the advance of deforestation, the fragmentation of ecological corridors and the increased contact

with urbanized areas, resulting in conflicts, roadkill and loss of territory.

The identified problem is the lack of up-to-date local data on the species' habitat and the environmental changes that threaten its survival. This monitoring can contribute to the monitoring of forest areas, identification of wildfires, and analysis of vegetation cover, supporting the creation of preservation strategies.

Through data obtained by remote sensing, it will be possible to detect environmental variations and map critical areas for the local fauna. The information collected will be shared with the school community, promoting awareness of the importance of conservation and encouraging the active participation of students in scientific and environmental projects.

The puma (*Puma concolor*) is the second largest feline in the Americas and an important apex predator, fundamental to the balance of ecosystems. In the municipality of São Fidélis, Rio de Janeiro, the species' preference for large and continuous areas of Atlantic Forest conflicts with the growing pressure of urban expansion in the region. This scenario represents a significant threat of habitat fragmentation, which isolates puma populations and puts the conservation of the species at risk.

1.2. Justification

The threat of fragmentation of the Atlantic Forest and urban expansion in the São Fidélis region isolates puma populations, putting them at risk. Habitat conservation is crucial for the species' survival. This work is justified by the need to identify and protect essential forest remnants and ecological corridors, using low-cost and highly accessible tools.

1.3. Objective

The main objective of this work is to identify and map the areas of greatest habitat suitability for the puma (*Puma concolor*) in the municipality of São Fidélis, using

remote sensing data from the GLOBE Science Data Visualization platform. 2. Species Context and Study Area 2.1. The Puma (*Puma concolor*) in São Fidélis

The puma is a territorial species that needs large expanses of continuous forest to survive and move around. Its presence and population health are important indicators of the ecological quality of the region.

2.2. Characterization of São Fidélis

The municipality of São Fidélis is characterized by the presence of important remnants of the Atlantic Forest. However, the geographical and environmental landscape is marked by anthropogenic pressures (human interference), making the analysis of forest fragmentation a critical factor.

3. Habitat Mapping Methodology (GLOBE Data Detectives)

- GLOBE Science Data Visualization Platform: Use of field and satellite observation data available in the tool.
- Analysis Period: (Define the time window of the consulted data, last 5 years).

3.2. Environmental Parameters

The methodology focuses on identifying ideal habitat conditions (dense, continuous areas with water availability) based on the following GLOBE indicators:

- Land Cover: Used to map areas of dense and continuous forest, considered the primary habitat for the puma.
- Hydrosphere: Used to identify proximity to water bodies (rivers and streams), essential for prey fauna and the feline.
- Land Surface Temperature: Used to confirm areas of greater shade and lower temperature, which correlate with the quality of a conserved forest.

5. Conclusion and Recommendations

This work demonstrates the effectiveness of using GLOBE data to model the puma's habitat, confirming the critical areas for its conservation in São Fidélis. The low-cost methodology allows monitoring and identifying areas that require urgent intervention.

5.1. Recommendations

- Protection of Critical Areas: Recommend to environmental agencies the urgent protection of classified habitat areas.
- Conservation Programs: Suggest the creation of conservation programs for ecological corridors in the area, essential for gene flow and the survival of the puma.
- Continuous Monitoring: Emphasize the need for continuous monitoring to verify the stability and quality of the habitat over time.

Annex



Fonte: Autora - Onça-Parda de São Fidelis Reciclada

Link YOUTUBE

https://youtu.be/_sVfOkBG52U

Reference

BIPEs. *Kits OBSAT – eBook*. Disponível em: https://bipes.net.br/b/download.php?file=eBook_Kits_OBSAT_23_02_2022.pdf. Acesso em: **12 out. 2025**.

AGÊNCIA ESPACIAL BRASILEIRA (AEB). *Curso OBSAT / AEB Escola Virtual*. Disponível em: <https://aebescolavirtual.aeb.gov.br/course/view.php?id=6>. Acesso em: **12 out. 2025**.

INPE – Divisão de Gestão da Informação (DGI). *Catálogo DGI*. Disponível em: <http://www.dgi.inpe.br/catalogo/>. Acesso em: **12 out. 2025**.

INSTITUTO NACIONAL DE PESQUISAS ESPACIAIS (INPE). *Publicação Técnica – MTC-M21B*. Disponível em: <http://mtc-m21b.sid.inpe.br/col/sid.inpe.br/mtc-m21b/2016/03.25.23.54/doc/publicacao.pdf?metadataarepository=&mirror=iconet.com.br/banon/2007/01.10.09.37>. Acesso em: **12 out. 2025**.

G1. *Entenda como funcionam satélites que monitoram desmatamento na Amazônia*. G1 – Meio Ambiente, 18 out. 2022. Disponível em: <https://g1.globo.com/meio-ambiente/noticia/2022/10/18/entenda-como-funcionam-satelites-que-monitoram-desmatamento-na-amazonia.ghtml>. Acesso em: **12 out. 2025**.

LAB de Garagem. *Tirando fotos com Arduino Mega e OV7670 (chip AL422)*. Disponível em: <https://labdegargem.com/profiles/blogs/tirando-fotos-com-arduino-mega-e-ov7670-com-chip-al422>. Acesso em: **12 out. 2025**.

LoRaWAN. *Documentação Técnica – The Things Network*. Disponível em: <https://www.thethingsnetwork.org/docs/lorawan/>. Acesso em: **12 out. 2025**.