



# Expansion of invasive plant cover in the rural highlands of Galapagos

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## Introduction

Invasive plant species pose a major threat to biodiversity and ecosystem integrity in the Galapagos Islands.

While efforts to track and control these invasives have focused on protected areas, the rural highlands need more attention, since they harbor many endemic plant and animal species.

To close this knowledge gap, we produced updated high-resolution land cover maps (Fig 1) and carried out a land cover change analysis (2018-2024) across the rural highlands and adjacent buffer zones of Santa Cruz, San Cristobal, Isabela, and Floreana.

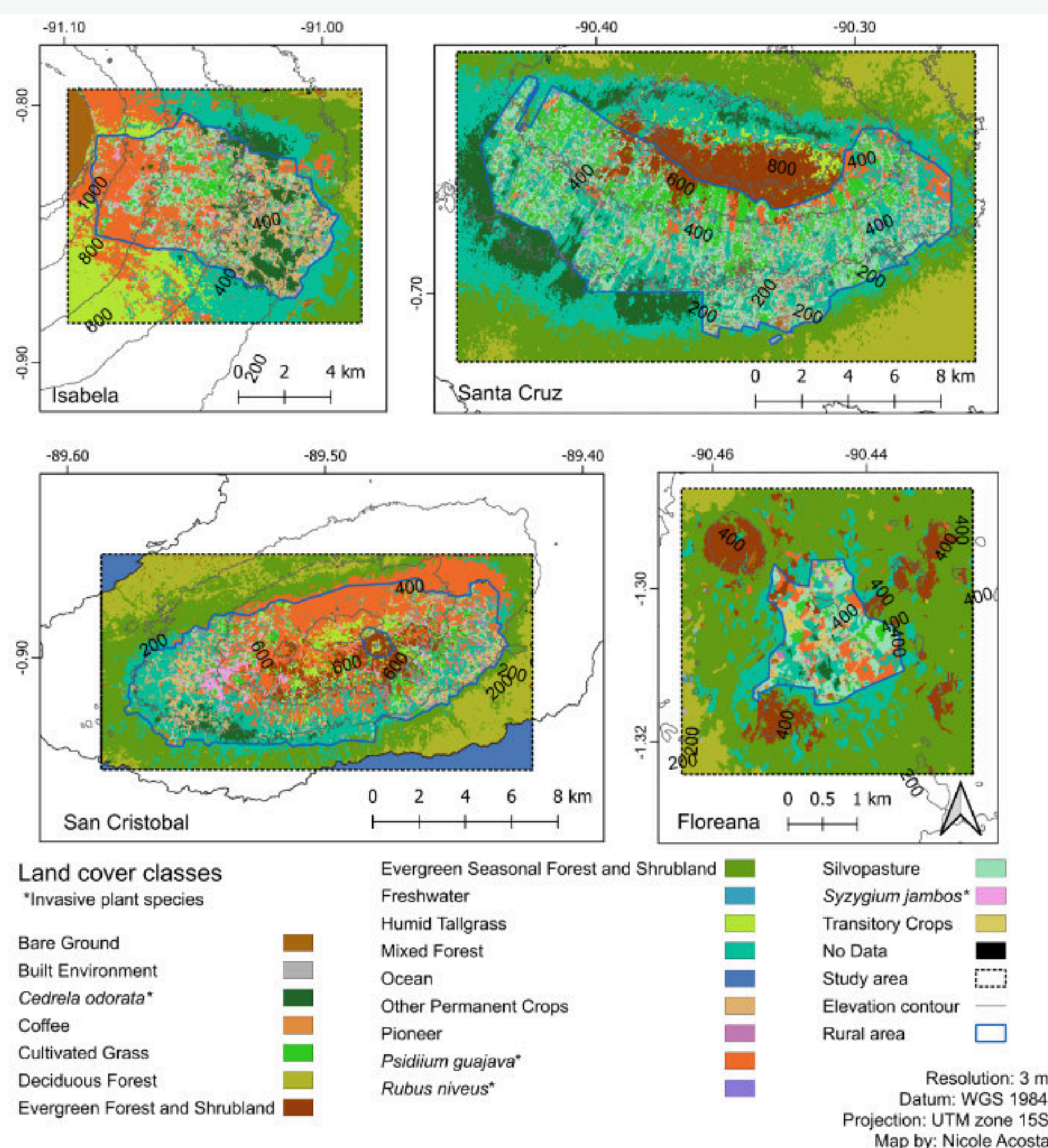


Fig 1. Updated land cover maps for the year 2024 of the rural highlands of the inhabited islands in Galapagos, and their associated buffer areas.

## Results

We detected a net increase of approximately 6800 hectares (+43%) of invasive plant-dominated vegetation in the rural highlands (Fig 4).

Primarily driven by the expansion of "mixed forest" cover.

Despite the overall expansion, we observed localized contractions in the cover of these two species, likely caused by wood harvest, land-use change and canopy succession.

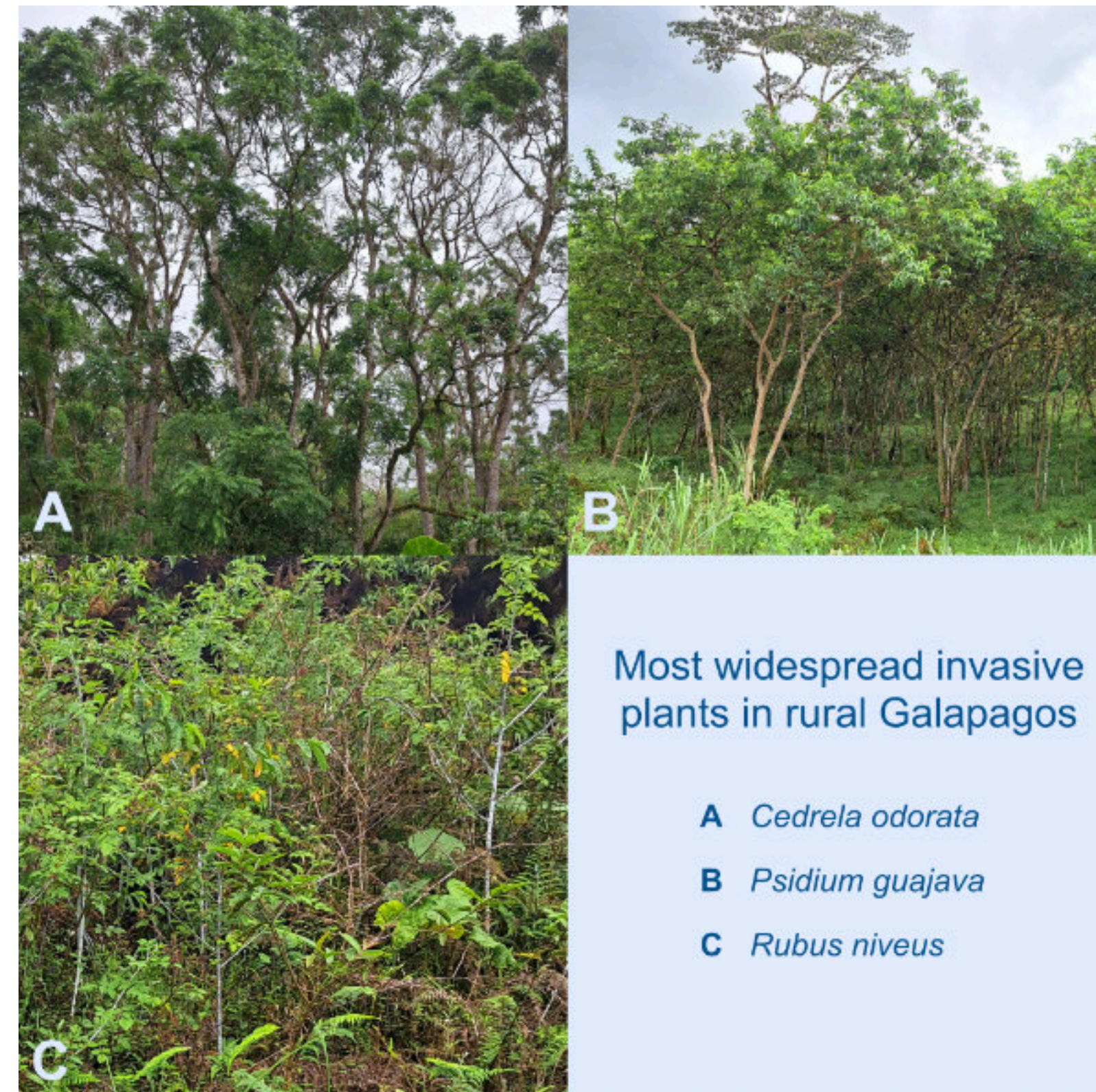


Fig 2. Most widespread invasive plant species in the rural highlands of Galapagos.

We detected a natural transition from homogeneous patches of the invasive *Psidium guajava* to more diverse compositions (Fig 3).



Fig 3. Example of the transition from a homogeneous *P. guajava* stand to a more diverse vegetation composition between 2011 and 2024 on Isabela island.

## Conclusions

- **Invasive plant species are still expanding** in the rural highlands and associated buffer area.
- Increase of approximately **6800 hectares** (+43%) of invasive plant-dominated vegetation.
- **First detection of natural transition** of homogeneous *Psidium guajava* to more diverse compositions.

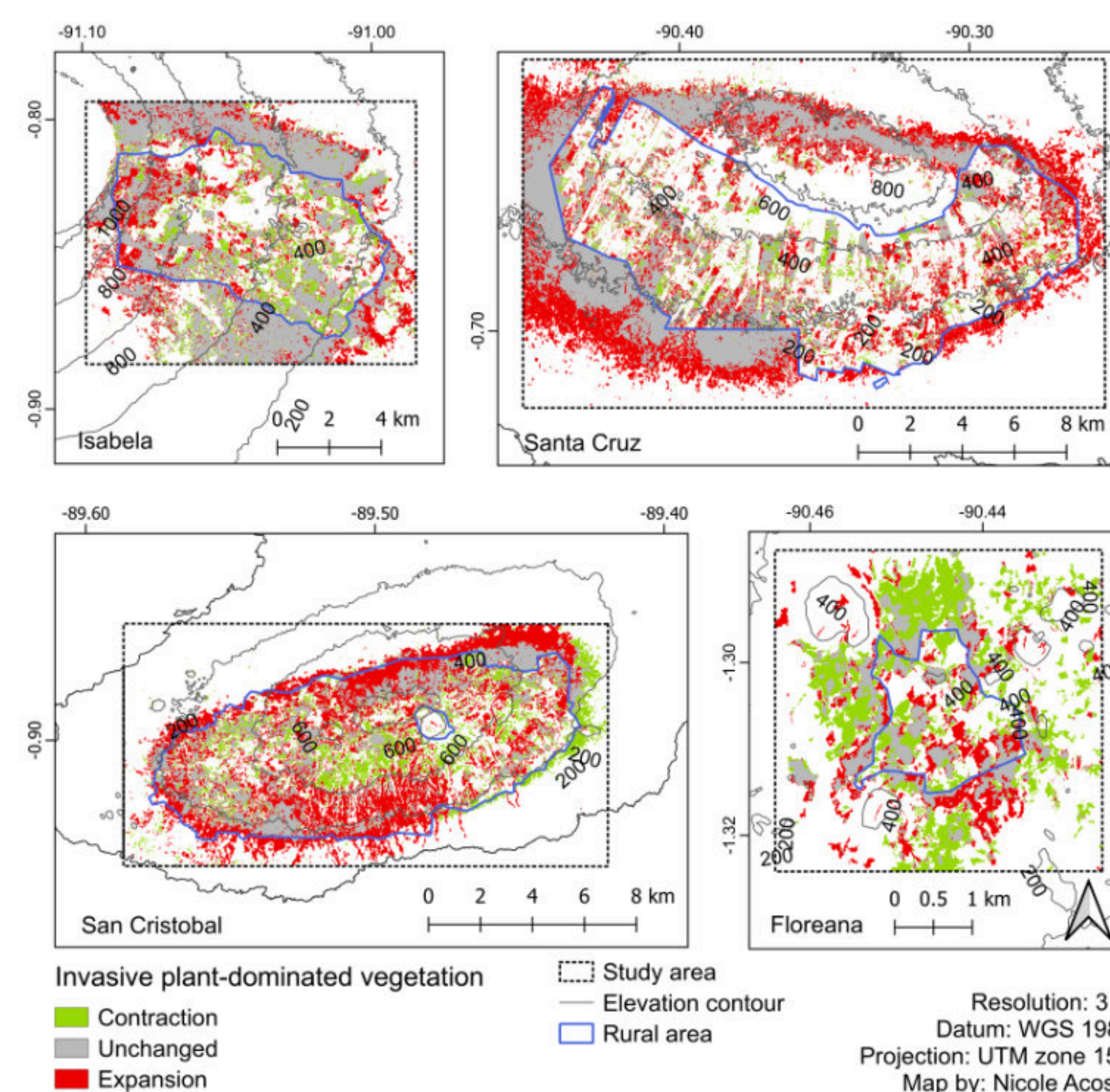


Fig 4. Change in cover of invasive plant-dominated vegetation (*C. odorata*, *P. guajava* and "mixed forest") in the rural highlands of Galapagos from 2018 to 2024.

## Methods

We replicated the object-oriented classification methodology described in Laso et al. (2019), in order to ensure comparability for subsequent land cover change analysis.

The workflow integrates remote sensing data from Sentinel-2 (10 m resolution), PlanetScope (3 m resolution), and UAV imagery (<2 cm per pixel). Each data source contributes distinct and complementary information to the classification and validation process (Fig 5).

We analyzed change in cover of the most widespread invasive plant species between 2018 and 2024. These species include *Cedrela odorata* and *Psidium guajava*.

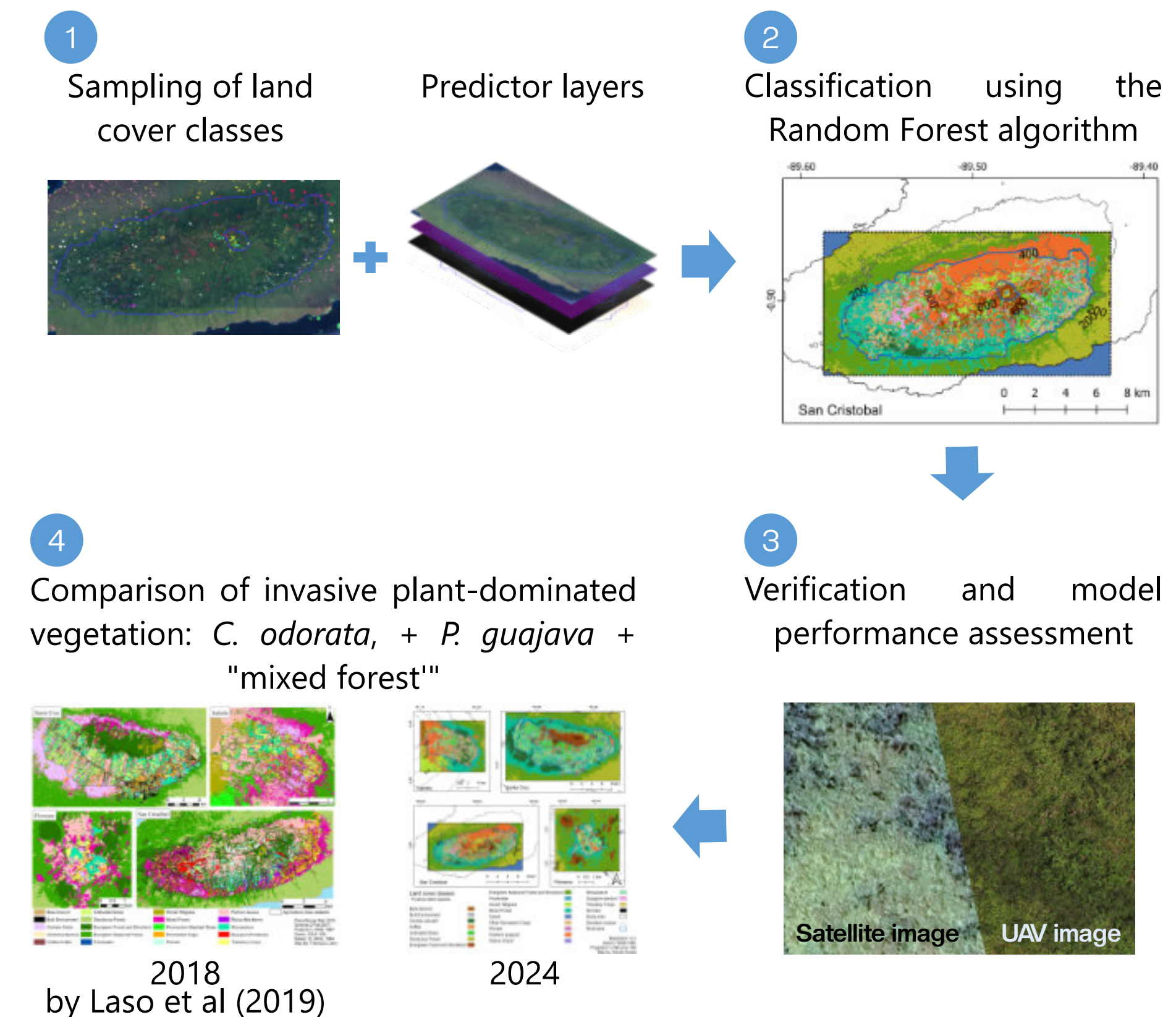


Fig 5. Overview of the study workflow for generating an updated land cover map and analyzing invasive plant-dominated vegetation change.

We also analyzed the cover change for "mixed forest", a land cover class composed of invasive (often *Cedrela odorata* and sometimes *Psidium guajava*) and native plants, forming patches of mixed vegetation that cannot be assigned to a single species.

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