International Cartographic Association
Association Cartographique Internationale

# Mapping our Islands: Geospatial developments and applications for nature research and management

Erik Houtepen[a]

[a] *Head of the consultancy department, Caribbean Research and Management of Biodiversity (CARMABI), e.houtepen@carmabi.org*

**Keywords:** cartography, biodiversity, field work, Caribbean

Human landuse continues to impact our landscapes. To meet the needs of the future and achieve a sustainability society, we need to understand our ecosystems, our landscapes. Landscape ecology is the study of the arrangement of ecosystems in relationship to each other and aims to understand trends and changes of landscapes. Maps play a pivotal role in examining associations between landscape patterns, human landuse and ecological process across geographical scales. Islands are highly sensitive ecological environments, where humans have a significant impact. To visualize our relationship and impacts on nature and to understand changes, maps can help reveal these relationships and changes to be able to tell a story about them and inform decision making. Interdisciplinary research collaborations are necessary to further our understanding of nature, and, together with everyday evolving remote sensing techniques and methods, field observations prove key to this understanding. These are necessary to understand what is going on the ground in relationship with other environmental features and to see how aspects are changing. Field observations can be used as geospatial data that can and should be mapped.

What we value from nature is often reflected in what is decided to be put on maps. Looking at a series of the first maps of Curacao, old maps were made for maritime navigation, meaning the coasts, bays and harbours were most accurate and detailed. Eventually maps started to reveal key landscape features and elements relevant for terrestrial navigation such as settlements and roads. Starting in 1914, triangulating surveys were used to accurately map the entirety of Curaçao, resulting in very precise and to this day useful maps of the island (Werbata 1914).

Maps are of great importance to understand the complex and dynamic field of landscape ecology, as they can be used to organize spatial data, to visualize and calculate relationships between topographical features such as elevation, exposure, inclination and vegetation types. Cartographic techniques such as hill shading, is something visually simple and easily interpretable. Whereas contour maps of the same data maybe more difficult for a nonexpert to interpret. Once you put a hill shade on the map, one can quickly see different patterns and spatial relationships between elevation, exposure and hydrology and so visualize the direction of water flow. Clear connections can be made between vegetation cover, geology, and more landscape features.

While there is a lot of hype around new possibilities with accessible geospatial technologies, there is a lot of information we can already derive from existing aerial imagery over time. As far back as the 1950s, high resolution aerial imagery is available for the entire island of Curacao. These aerial images make it possible to visualize and understand human impacts on the landscape. Although these historical images don't have the resolution of current day satellites, they provide a historic view on landscapes way before the first satellites were launched.

Field data are imperative for checking the accuracy and understanding the phenomena being mapped. Ground truthing the insights obtained from aerial and satellite imagery. While aerial and satellite imagery techniques are great at quantifying for instance total vegetation cover, often important context can only be found on the ground and in the field. Quantifying herbs and grasses of the understory during fieldwork is as important for landscape ecology. It is important to get out from behind your computer. To answer questions like: What do I see and where am I? Why is this happening?

Finding and linking patterns of change over time, linking field observations with geospatial data is critical for landscape ecology. To find solutions to environmental sustainability challenges and make useful maps, collaborations are required. No one person or discipline has all of the expertise needed to build this understanding, to tell the story. We need to put our expertise and perspectives together. Examples of effective collaboration can be seen across the Caribbean. Effective examples of data sharing can be found in open data portals like the Dutch Caribbean Biodiversity Database (www.dcbd.nl),. These help use to share information and work together to understand and tell the story of landscape ecology on our islands in the Dutch Caribbean.

Abstracts of the International Cartographic Association, 11, 12, 2026
ICA Cartography and Sustainable Development Workshop, 26–28 January 2026, University of Aruba, Oranjestad, Aruba.
https://doi.org/10.5194/ica-abs-11-12-2026 

Maps can show rich explanations and stories about relationships between the landscape and biodiversity. Maps can also show change over time in the landscape. This is a pivotal component of landscape ecology and for achieving sustainability.

**References**

Beers, C.E., J. de Freitas & P. Ketner. 1997 Landscape ecological vegetation map of the island of Curaçao, Netherlands Antilles. Uitg. Natuurwet. Studiekring Carib. Gebied 138: 1-54.

Dutch Caribbean Biodiversity Database: https://www.dcbd.nl/

Fairbairn, D., Gartner, G., & Peterson, M. (2025). Engagement, communication and context: the success of the human-map nexus. International Journal of Cartography, 11(1), 42–62.

https://doi.org/10.1080/23729333.2023.2251751Pirasteh, S.; Mohamed-Ghouse, Z. S.; Chauhan, L.; Gartner, G.; Shirmohammadi, M.; Khonsari, N. Towards Responsible GeoAI Frameworks for Ethical Governance and Global Sustainability. Earth Systems, Resources, and Sustainability 2026, 1 (1), 18–31. https://doi.org/10.53941/esrs.2026.100002

Roth RE, G Gartner, G Baldrica-Franklin, A Cowart, L Houtman, A Kagawa, M Keskin, MJ Kraak, NT Nawshin, F Ortag, B Ricker, S Schlumpf, and Z Stachoň (Editors). 2025. Atlas of Sustainability. Vienna, Austria: The International Cartographic Association.

van der Krogt, P. (2006). The Werbata-Jonckheer maps: The first topographic maps of the Netherlands Antilles, 1911-1915