Adopt-a-Pixel3Km

A 2025 case study of *Houston*

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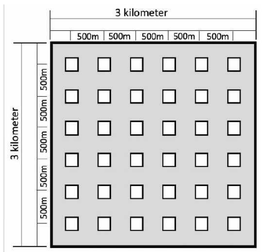
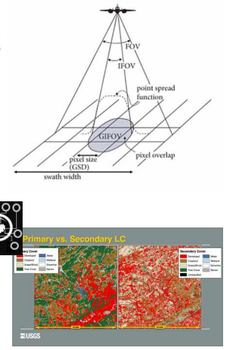
map

1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029

AaP3Km methods



remote Sensing ground to Satellite platforms



Sample an area on Earth

Discussion Summary

In this study, it was demonstrated that remote sensing data such as ESRI Land Cover, ESA WorldCover, and Dynamic World all have certain aspects of land cover that they over or under exaggerate, along with aspects that they consistently miss. For example, Dynamic World and ESRI Land Cover all massively underestimated tree cover data, while overestimating the portion of built up areas. Dynamic world, however, was better at capturing the presence of water in the grid, as while it portrayed certain parts of the bayou, ESRI Land Cover completely missed it and portrayed it as a built up area. ESA Worldcover was quite different from the other two, as it heavily over exaggerated tree cover while rarely portraying built up areas—It would only portray an area as built up if it was a large, empty area, such as a parking lot or large building. Like ESRI Land Cover, it completely missed the bayou, though it portrayed it as tree cover rather than a built-up area.

Conclusions | Recommendations

This project illustrated that while satellite and remote sensing data are accurate for large-scale averages and general environmental insights, they often fail to capture finer details and may over exaggerate certain aspects of land cover, leading to the conclusion that while remote sensing data is incredibly useful in making close estimates about information regarding land cover and similar features, real-time field observations are much more accurate on the small scale.

References

Nelson, Peder V., et al. “GLOBE Observer: A Case Study in Advancing Earth System Knowledge with AI-Powered Citizen Science.” *Citizen Science: Theory and Practice*, vol. 9, no. 1, 2024, https://doi.org/10.5334/cstp.747. Accessed 16 July 2025

Community Chronicles Background

Houston, especially in the suburbs surrounding the city, has had an increasing amount of construction and housing development within the past few decades, which has drastically lowered the number of grassy fields and open areas throughout the city.

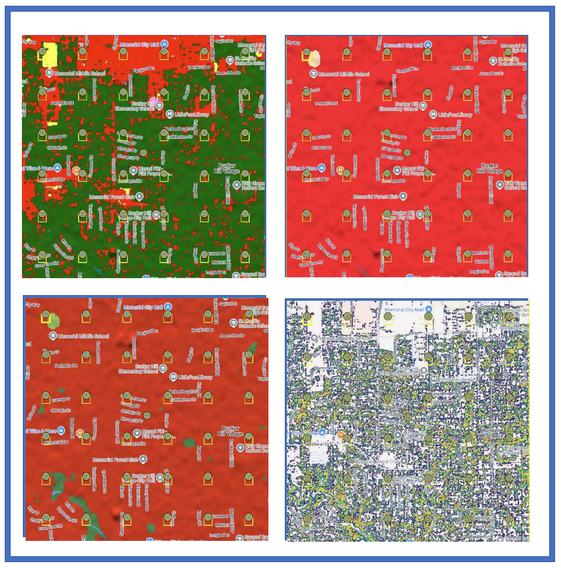
Descriptive statistics

of 37 points, 3 of them (the center, #29, and #30) were inaccessible and therefore data wasn’t retrievable. Of these 37 points, 32 of them were dominated by tree cover, with the remainder being almost entirely built-up areas. Though multiple points contained a decent amount of water, only point 12 contained a sizeable portion, up to 50% of the 100x100 meter point was water.

I wonder how well remote sensing data captures information when compared to on-site observations.

Result Summary

This study evaluated the accuracy of remote sensing datasets—including ESRI Land Cover, ESA WorldCover, and Dynamic World—against field observations, revealing significant discrepancies. While these datasets effectively capture broad land cover trends, each exhibited consistent limitations when compared to ground-level data. For example, both ESRI and Dynamic World substantially underestimated tree cover while overestimating built-up areas. In contrast, ESA WorldCover tended to overrepresent tree cover and often missed smaller built environments unless they were large and unobstructed. Dynamic World proved more reliable in identifying water bodies, such as sections of the bayou, which ESRI and ESA completely misclassified. These findings underscore that while remote sensing tools are invaluable for large-scale environmental monitoring, they may inaccurately represent finer land cover details. Consequently, for localized or high-resolution analyses, field observations remain critical to ensuring precision.



Platform	Landsat 5-9	WorldView-4	Sentinel-1/2			GLOBE Observer						Collect Earth Online
Primary Sample Unit	Landsat Time Series Graph	1m Tree Canopy Meta	World Cover 10m	Dynamic World 10m	ESRI 10m	Up	Down	west	south	east	north	high resolution image interpretation
0						N/A	N/A	N/A	N/A	N/A	N/A	
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30						N/A	N/A	N/A	N/A	N/A	N/A	
31							N		N			
32								N				
33							N			N/	N	
34								N			N	
35							N			N/		
36							N					