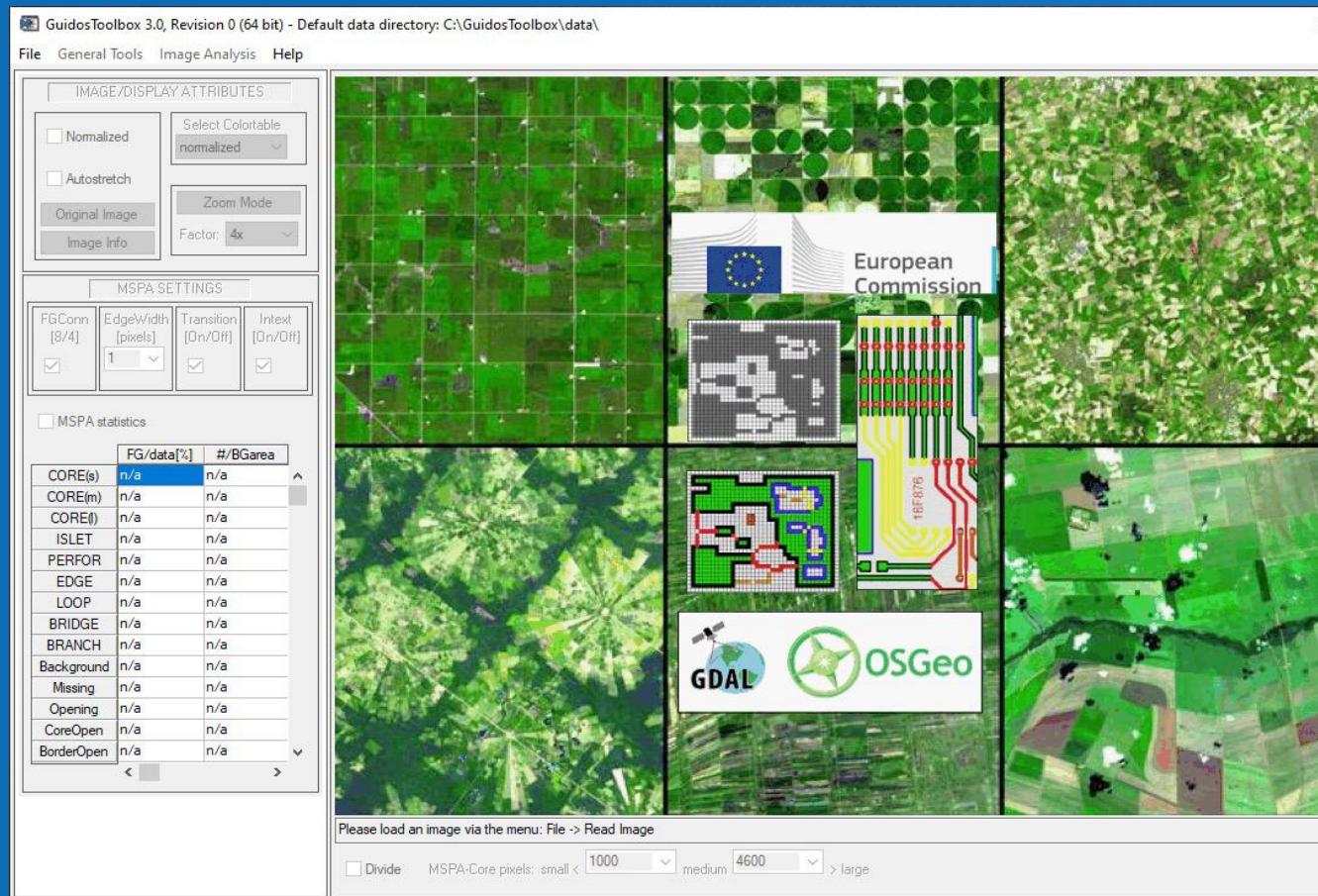




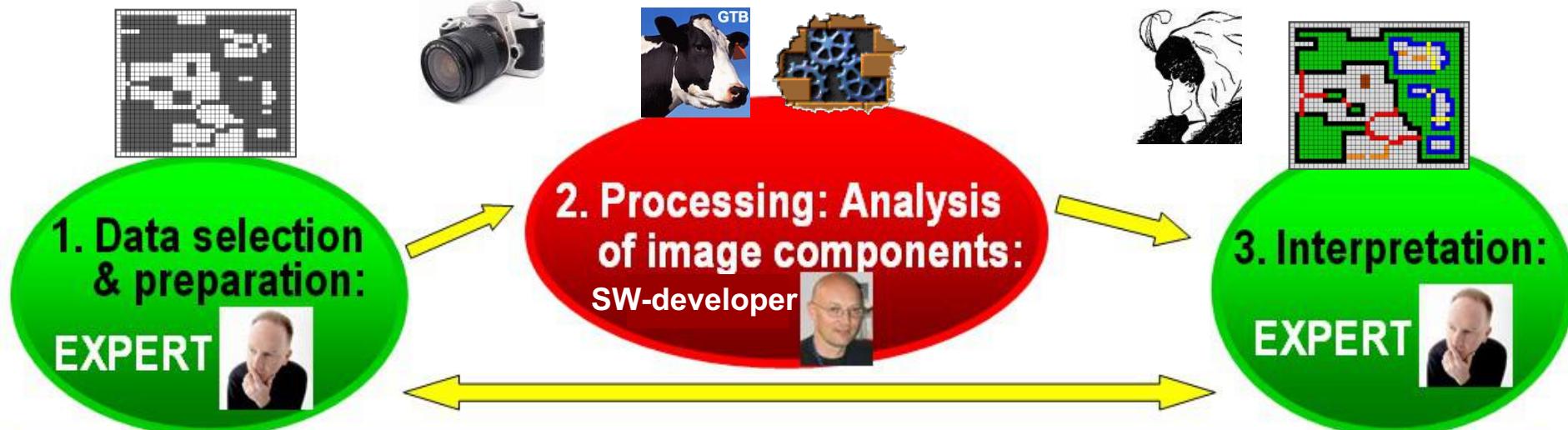
# GuidosToolbox: Feature Overview





# GuidosToolbox: Generic Geometric Image Object Analysis

Graphical User Interface for the Description of image Objects and their Shapes



**Aim: Toolbox for a generic description of spatial pattern**

- GuidosToolbox (GTB)<sup>1</sup>: interactive desktop application (macOS, Linux, MS-Windows)
- GuidosToolbox Workbench (GWB)<sup>2</sup>: command-line Linux server application
- Documentation<sup>1</sup>: detailed product sheets and extensive workshop material...

(1): <https://forest.jrc.ec.europa.eu/en/activities/lpa/gtb/>

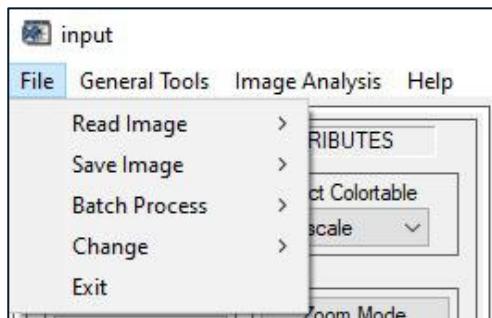
(2): <https://forest.jrc.ec.europa.eu/en/activities/lpa/gwb/>

# GTB menu: 4 thematically grouped containers

(GTB Manual: [https://ies-ows.jrc.ec.europa.eu/gtb/GTB/GuidosToolbox\\_Manual.pdf](https://ies-ows.jrc.ec.europa.eu/gtb/GTB/GuidosToolbox_Manual.pdf))

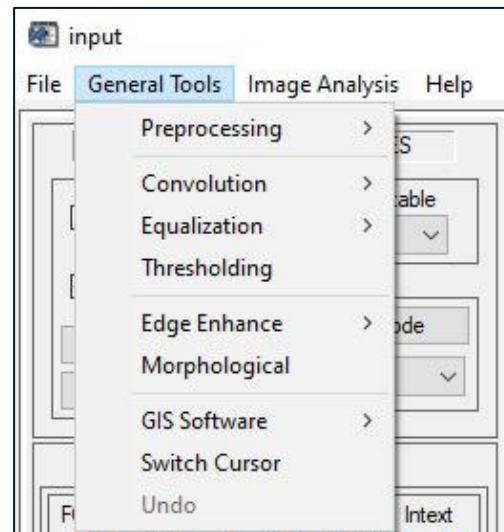
## File:

File management,  
Batch-processing,  
Change analysis...



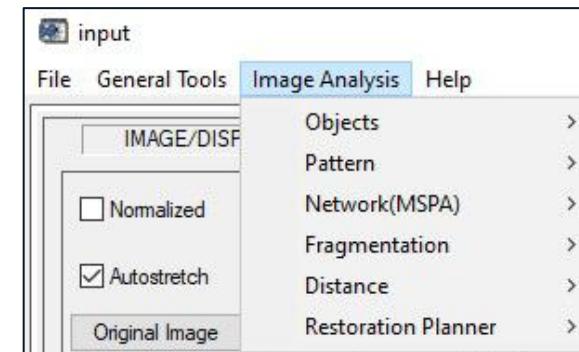
## General Tools:

Pre-processing,  
generic image filters,  
GIS software...



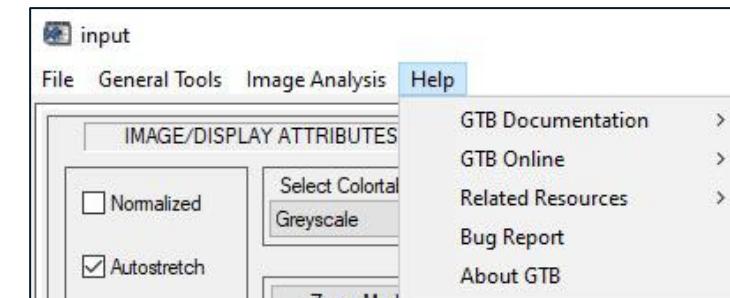
## Image Analysis:

Dedicated thematic  
image analysis tools...



## Help:

Program documentation,  
GTB product sheets, GTB  
workshop material, further  
resources ...



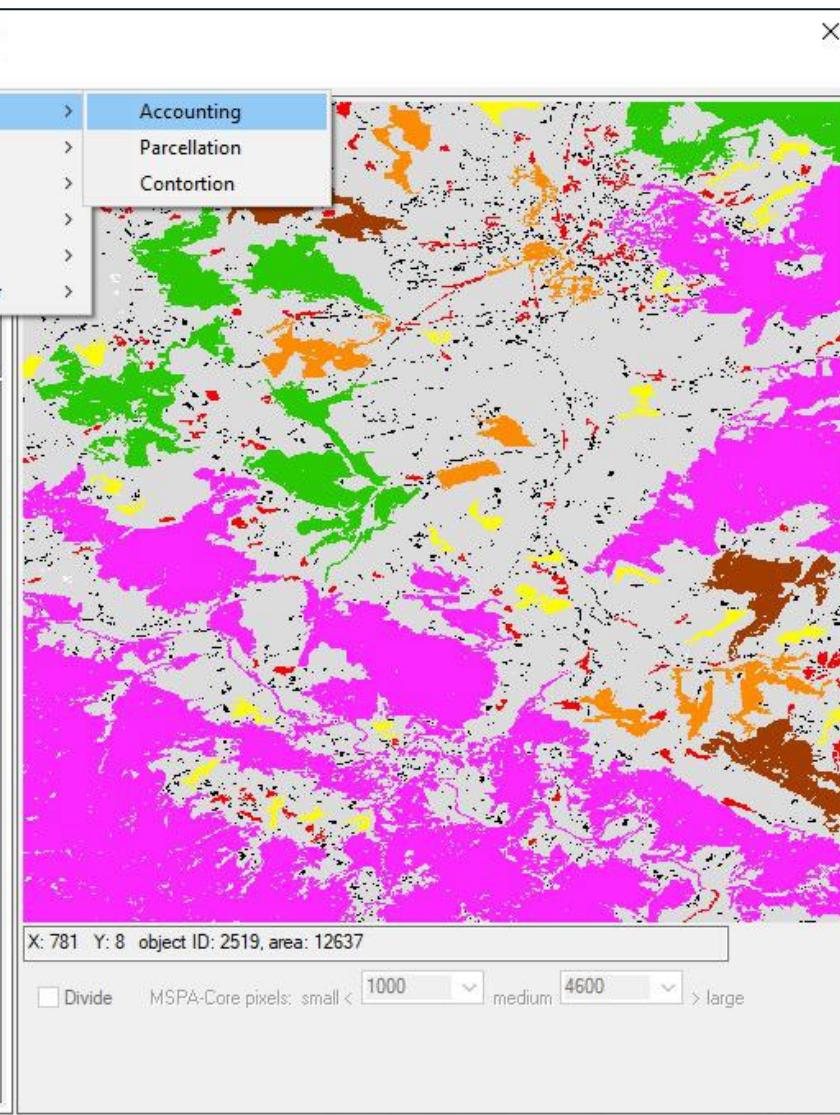
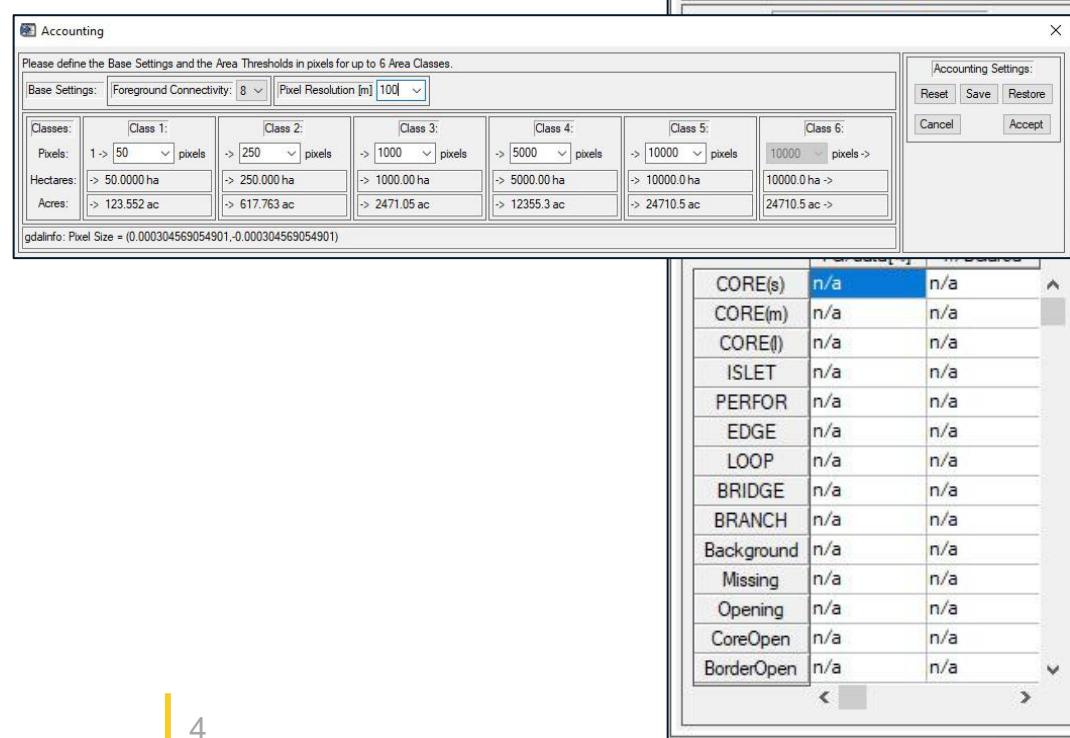
- **Input:** categorical raster maps, land cover, habitat & resistance maps, binary masks...
- **Output:** thematic feature maps and statistics, Google Earth image overlays, ...

# Accounting: size class mapping and statistics...

(Product sheet: <https://ies-ows.jrc.ec.europa.eu/gtb/GTB/psheets/GTB-Objects-Accounting.pdf>)

## 2) Resulting map and statistics

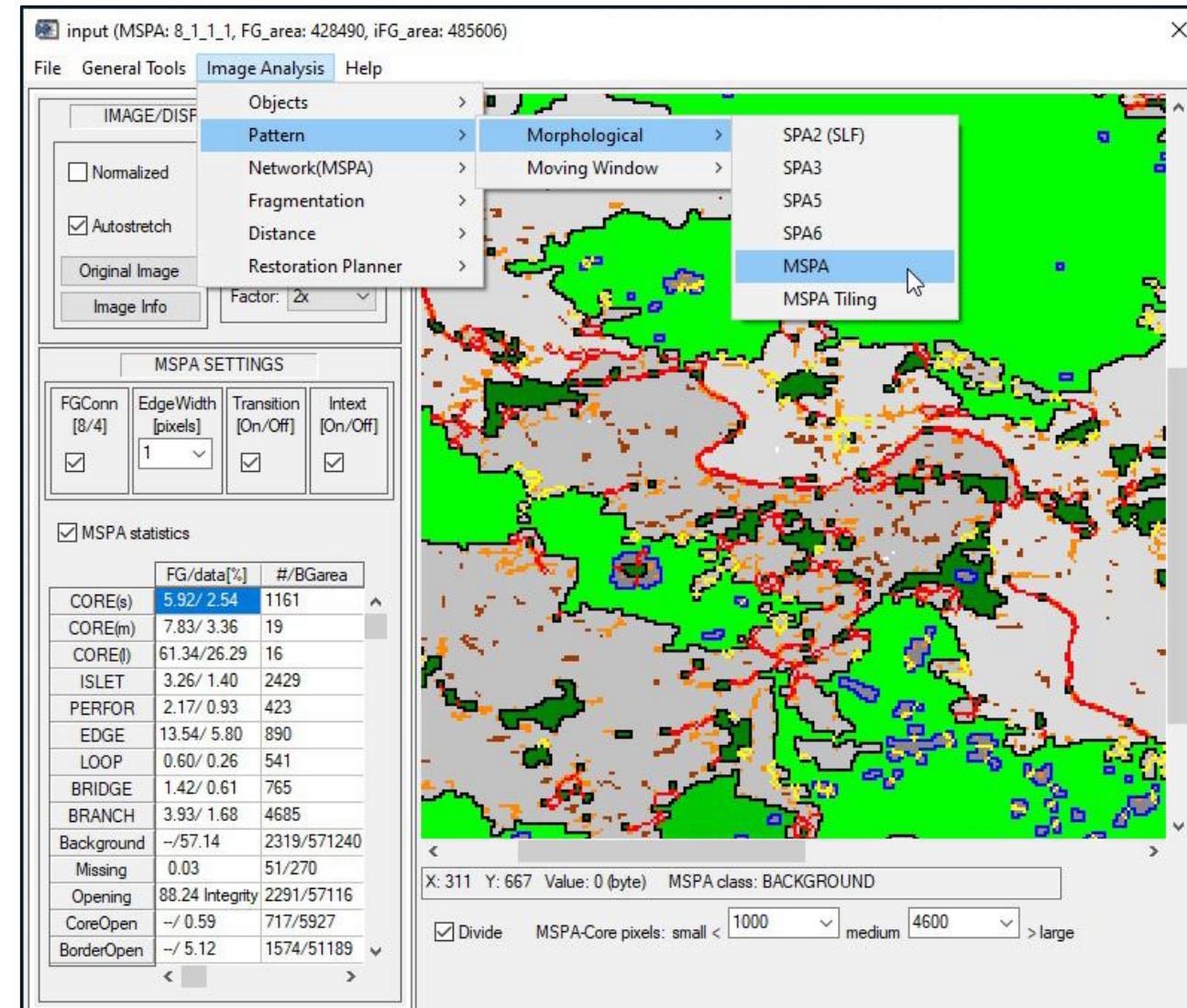
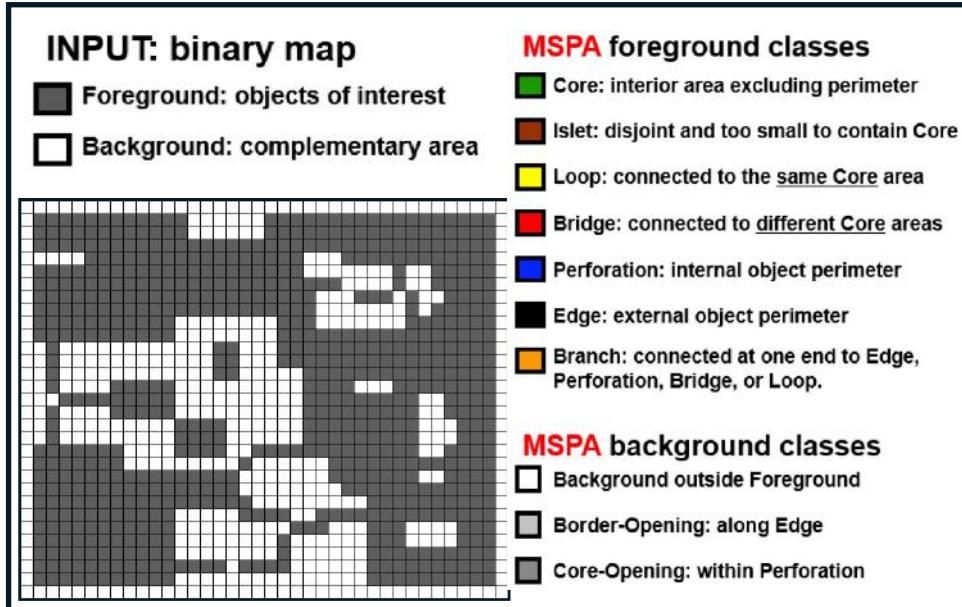
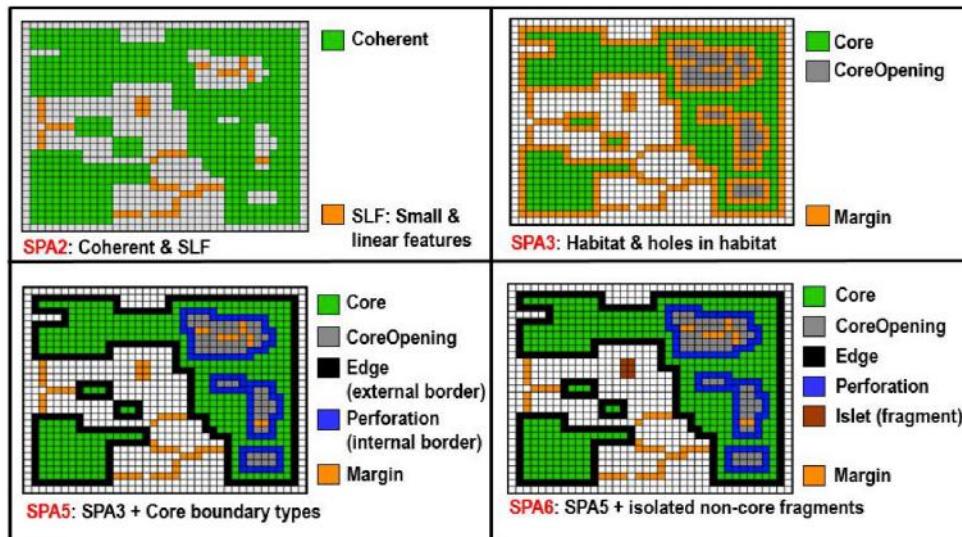
### 1) Define area size-classes



Accounting size classes result using:				
input				
Base settings: 8-connectivity, pixel resolution: 100 [m]				
Conversion factor: pixel_to_hectare: 1.00000, pixel_to_acres: 2.47105				
Size class 1: [1, 50] pixels; color: black	# Objects	Areal[pixels]	% of all objects	% of total FGarea
2668	19953	93.6140	4.6565848	
Size class 2: [51, 250] pixels; color: red	# Objects	Areal[pixels]	% of all objects	% of total FGarea
129	13094	4.52632	3.0558473	
Size class 3: [251, 1000] pixels; color: yellow	# Objects	Areal[pixels]	% of all objects	% of total FGarea
30	13867	1.05263	3.2362482	
Size class 4: [1001, 5000] pixels; color: orange	# Objects	Areal[pixels]	% of all objects	% of total FGarea
13	30322	0.456140	7.0764779	
Size class 5: [5001, 10000] pixels; color: brown	# Objects	Areal[pixels]	% of all objects	% of total FGarea
3	21796	0.105263	5.0866998	
Size class 6: [10001->] pixels; color: green	# Objects	Areal[pixels]	% of all objects	% of total FGarea
7	329458	0.245614	76.888142	
Sum of all classes:				
# Objects	Areal[pixels]	% of all objects	% of total FGarea	
2850	428490	100.000	100.00000	
Median Patch Size: 5				
Average Patch Size: 150.347				
Standard Deviation: 4143.11				
Three largest object IDs and area[pixels]; color: pink				
These 3 objects overlay objects listed above				
1)	1	214811		
2)	901	33508		
3)	1662	26366		

# Pattern: from 2 up to 25 morphological feature classes...

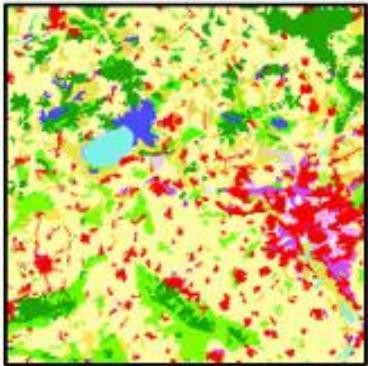
(Product sheet: <https://ies-ows.jrc.ec.europa.eu/gtb/GTB/psheets/GTB-Pattern-Morphology.pdf>)



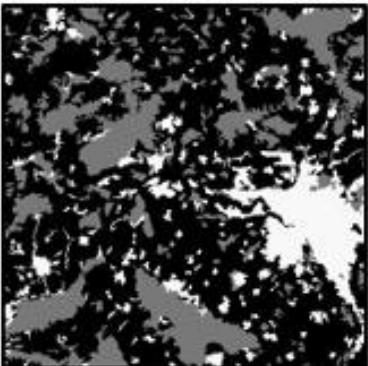
# Landscape Mosaic: heterogeneity and human impact...

(Product sheet: <https://ies-ows.jrc.ec.europa.eu/gtb/GTB/psheets/GTB-Pattern-LM.pdf>)

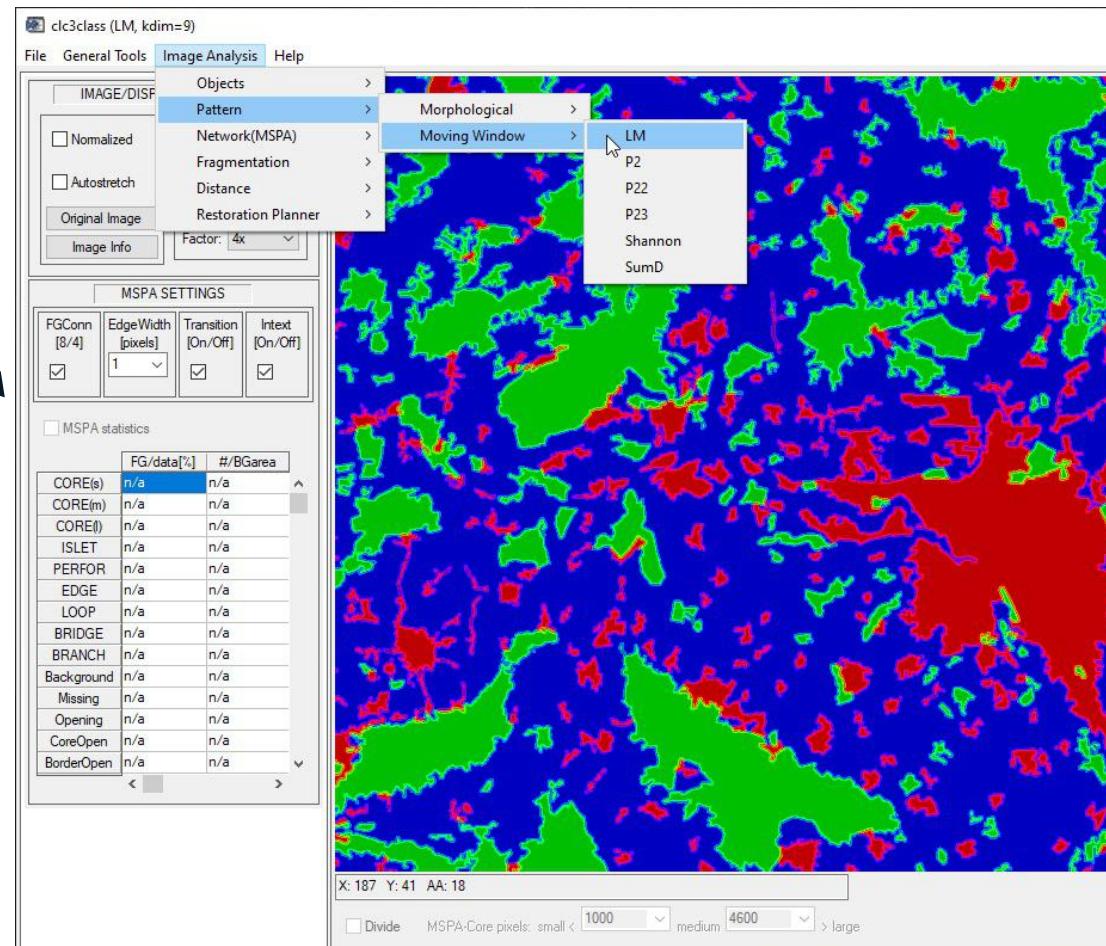
Land cover map



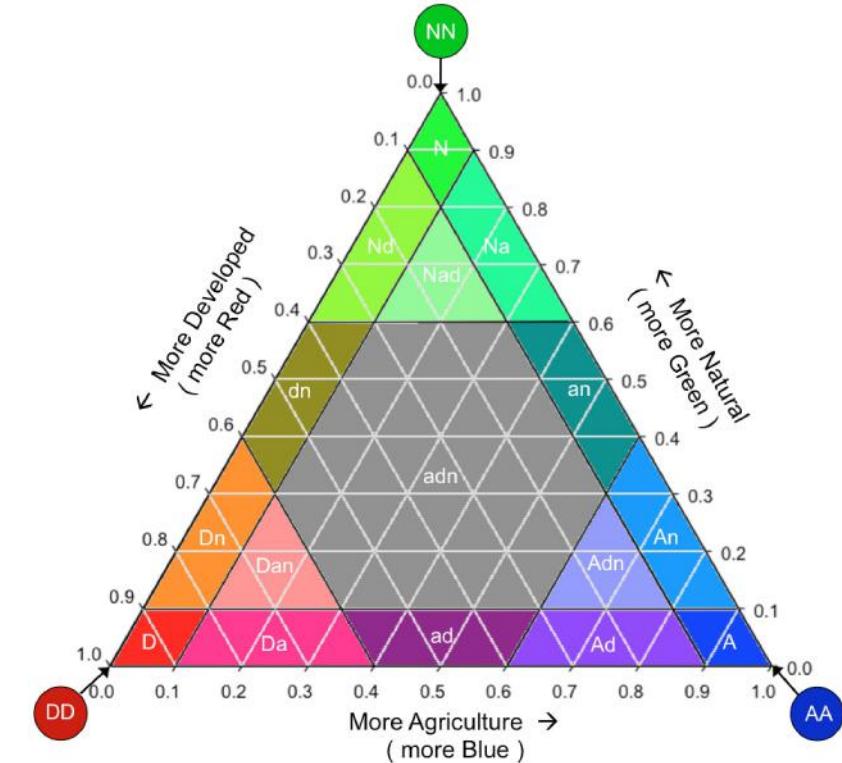
Agr./Nat./Developed



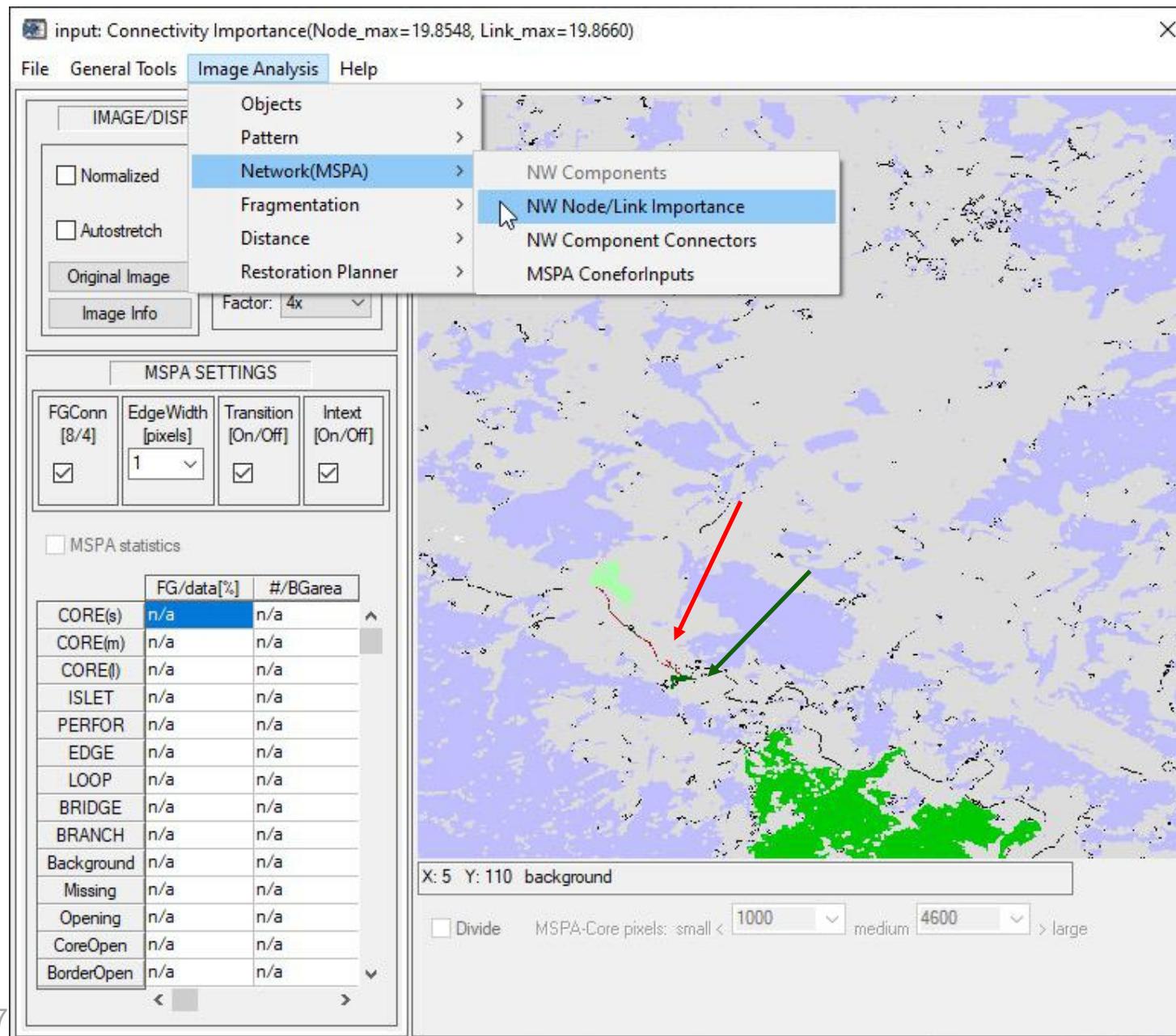
Heterogeneity in Agriculture/Natural/Developed  
(at user-selected observation scale)



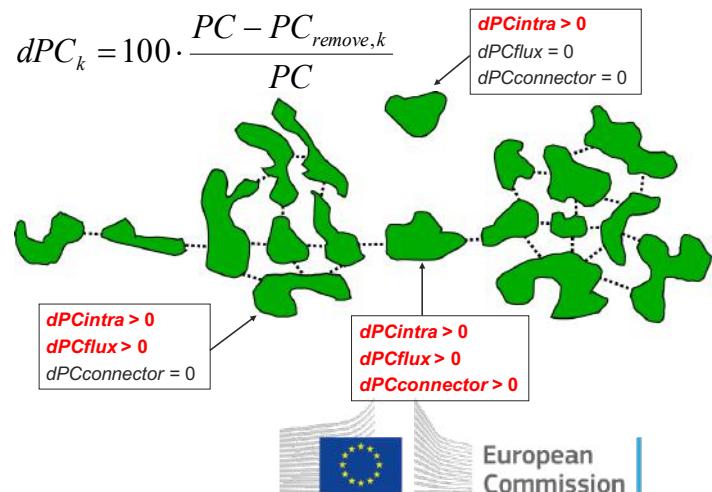
Measure land cover composition:



# Network: importance of connectors and habitat patches...



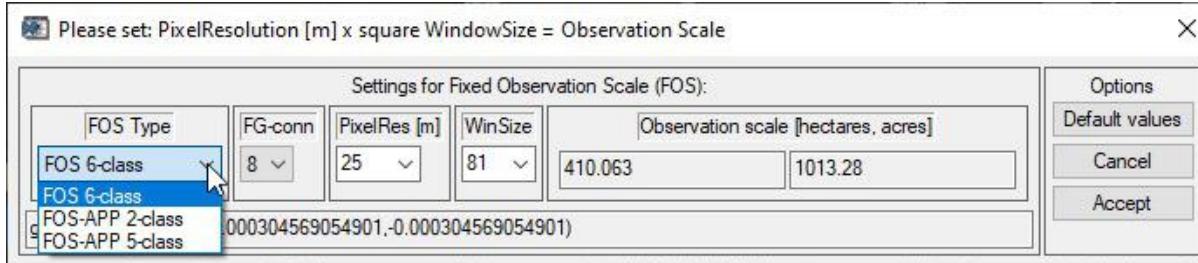
- Use MSPA to detect habitat patches and corridors
- Conversion to Nodes & Links
- Use graph theory to rank and locate the most important **corridors** and **habitats** in the current network (highest priority for protection/conservation)



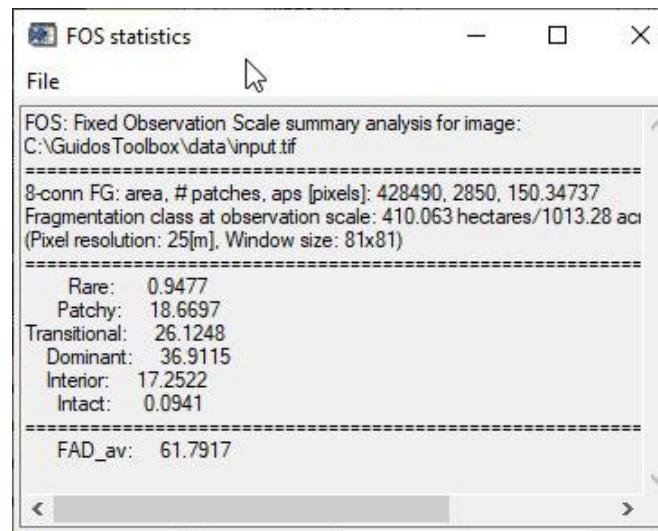
# Fragmentation: multiscale or custom analysis...

(Product sheet: <https://ies-ows.jrc.ec.europa.eu/gtb/GTB/psheets/GTB-Fragmentation-FADFOS.pdf>)

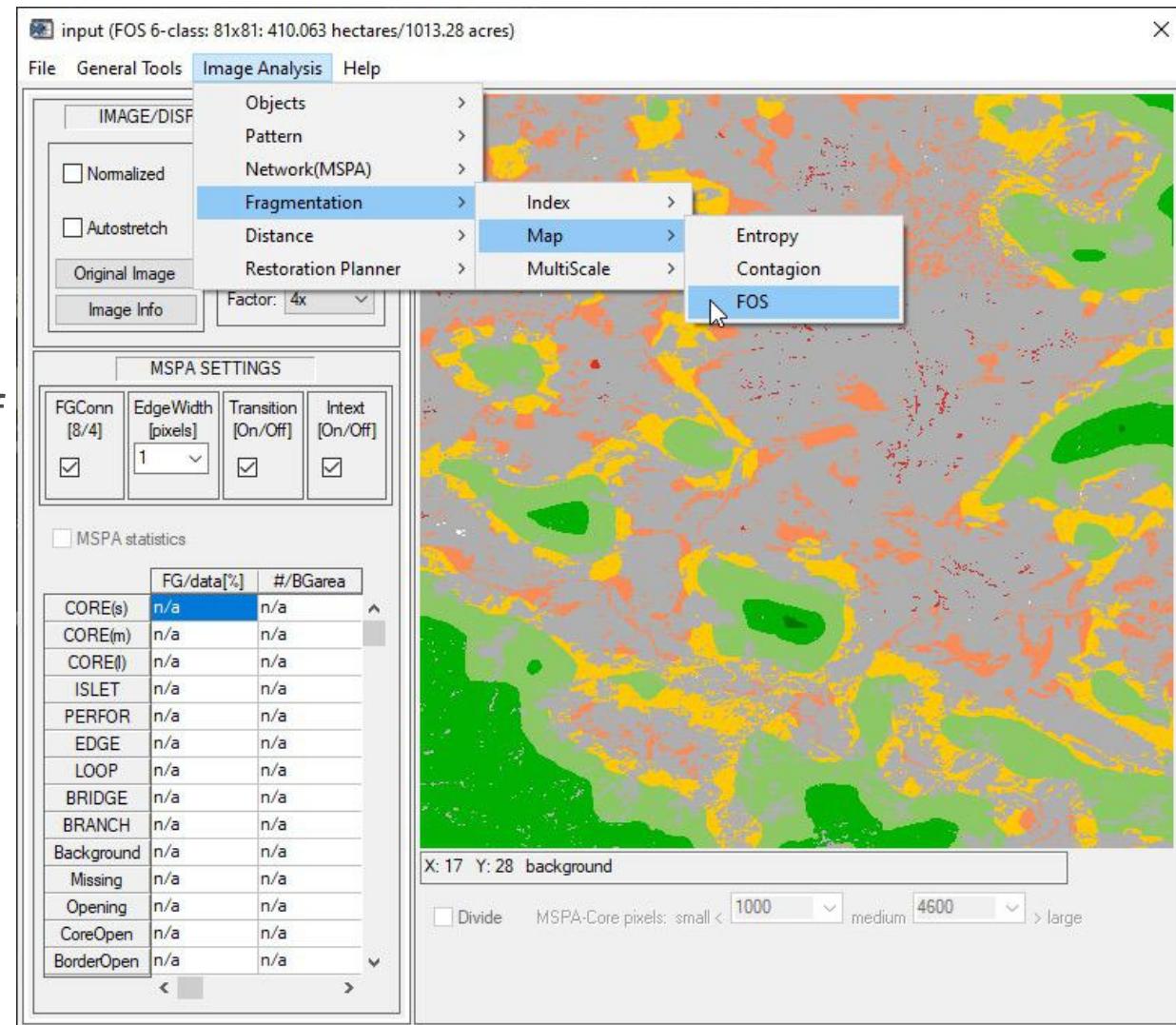
## 1) Set fragmentation-type, observation scale, etc.



## 2) Resulting map and statistics showing the degree of fragmentation in 2-6 classes and for various or custom observation scales.



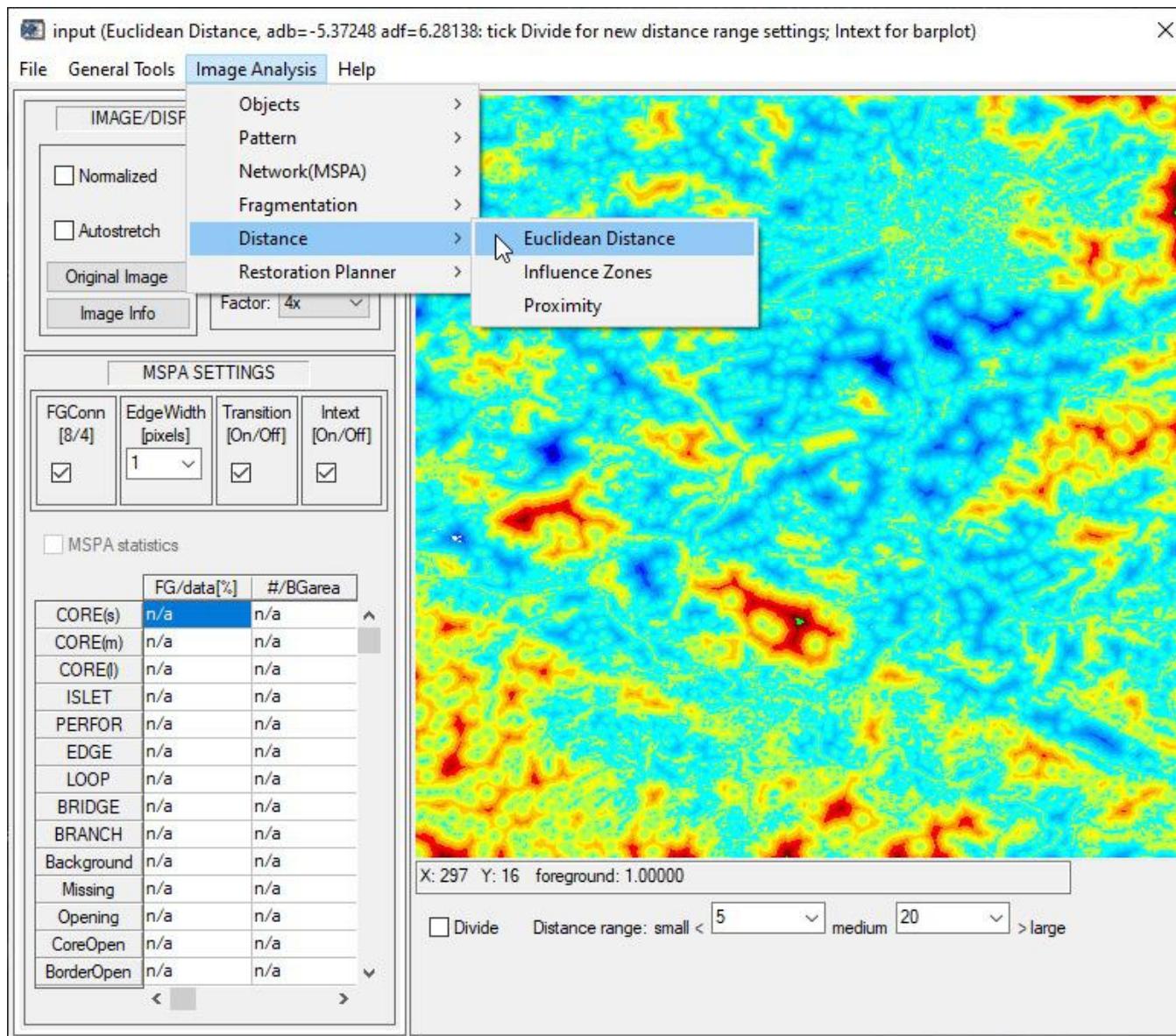
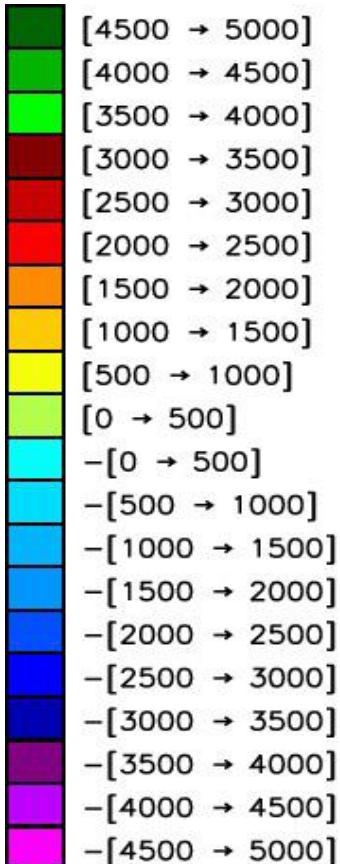
European Commission  
**Fragmentation:**  
Intact  
Interior  
Dominant  
Transitional  
Patchy  
Rare  
Background  
No data  
Specific BG  
Non-frag. BG  
<https://forest.jrc.ec.europa.eu/activities/lpa/gtb/>



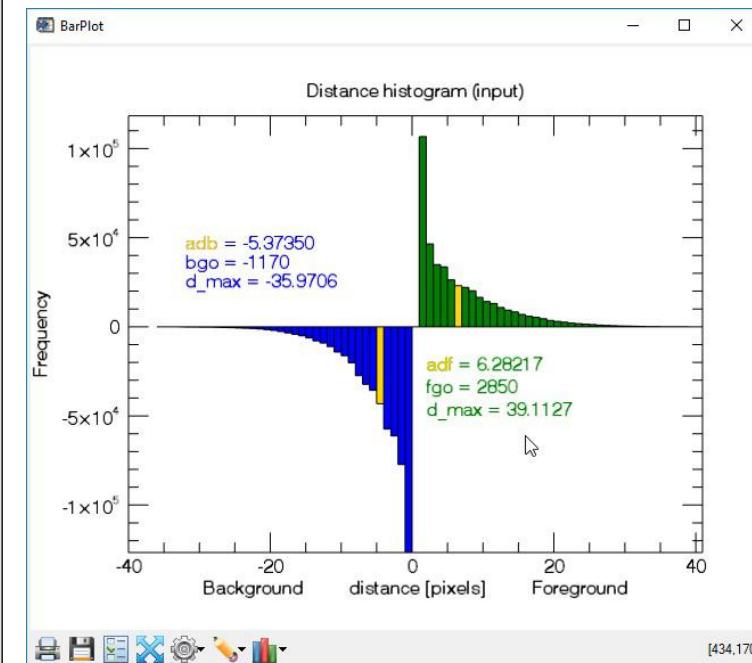
# Distance: spatial arrangement and compactness...

(Product sheet: <https://ies-ows.jrc.ec.europa.eu/gtb/GTB/psheets/GTB-Distance-Euclidean.pdf>)

Distance [m]



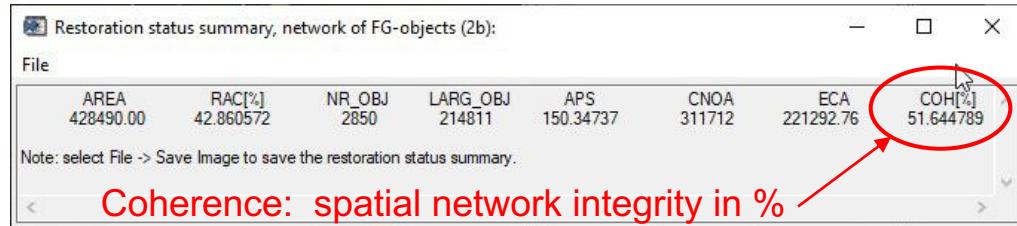
- Locate compact habitat
- Distance to habitat boundary
- Hypsometric curve summary



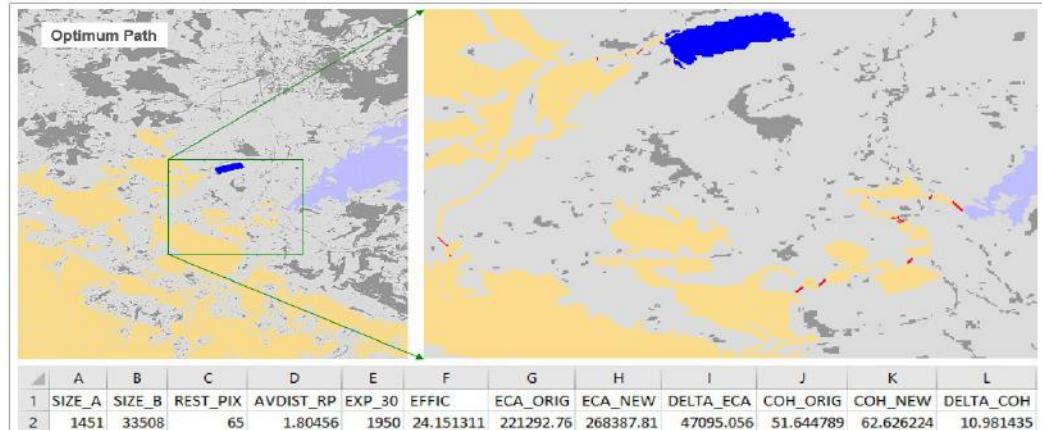
# Restoration Planner: quantify network integrity; evaluate, simulate or locate most efficient restoration scenarios...

(Product sheet: <https://ies-ows.jrc.ec.europa.eu/gtb/GTB/psheets/GTB-RestorationPlanner.pdf>)

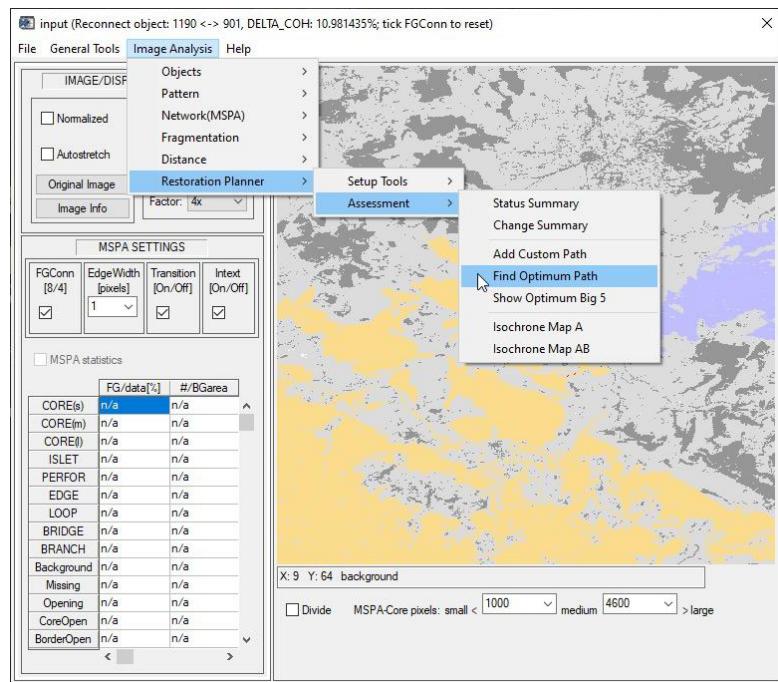
## 1) Network status summary.



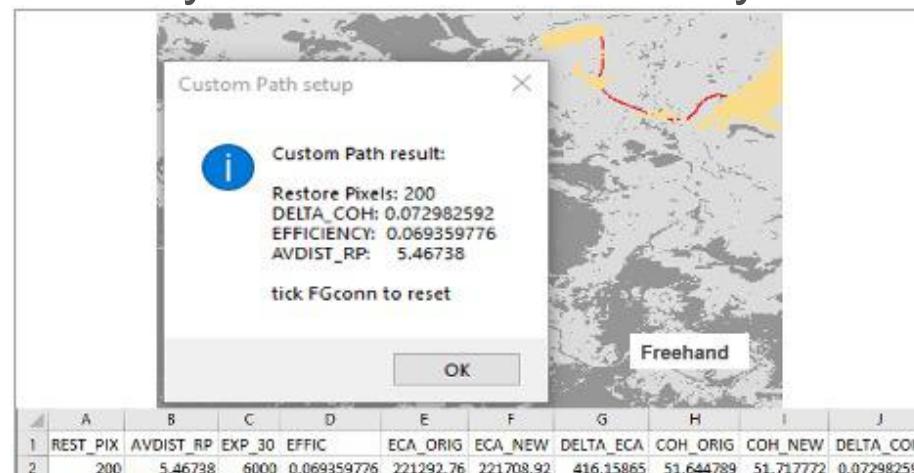
Locate optimum path between **start** and **target** habitat



## 2) Setup & evaluate restoration scenarios.



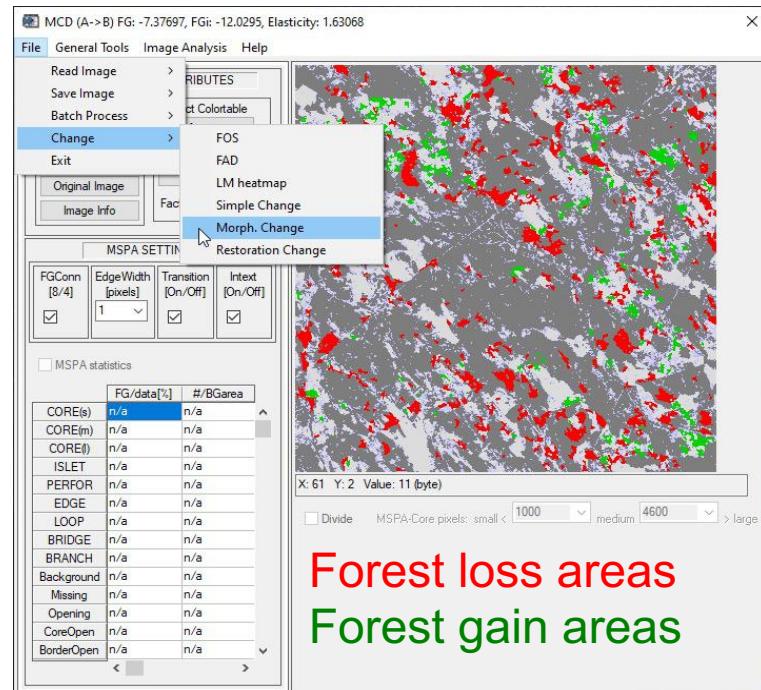
Interactively draw and evaluate any custom restoration scenario



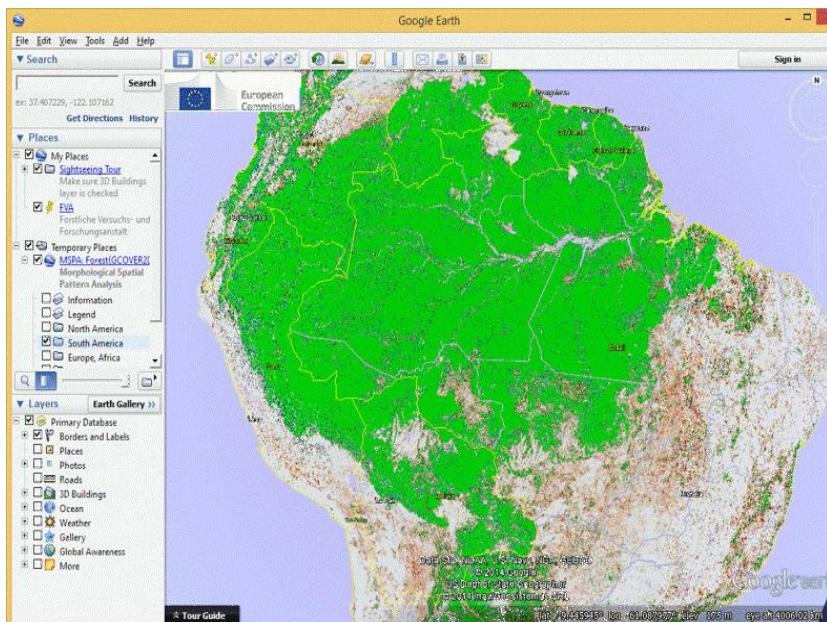
# Change analysis, contortion, batch-processing, ...

(more details in the GTB Manual: [https://ies-ows.jrc.ec.europa.eu/gtb/GTB/GuidosToolbox\\_Manual.pdf](https://ies-ows.jrc.ec.europa.eu/gtb/GTB/GuidosToolbox_Manual.pdf))

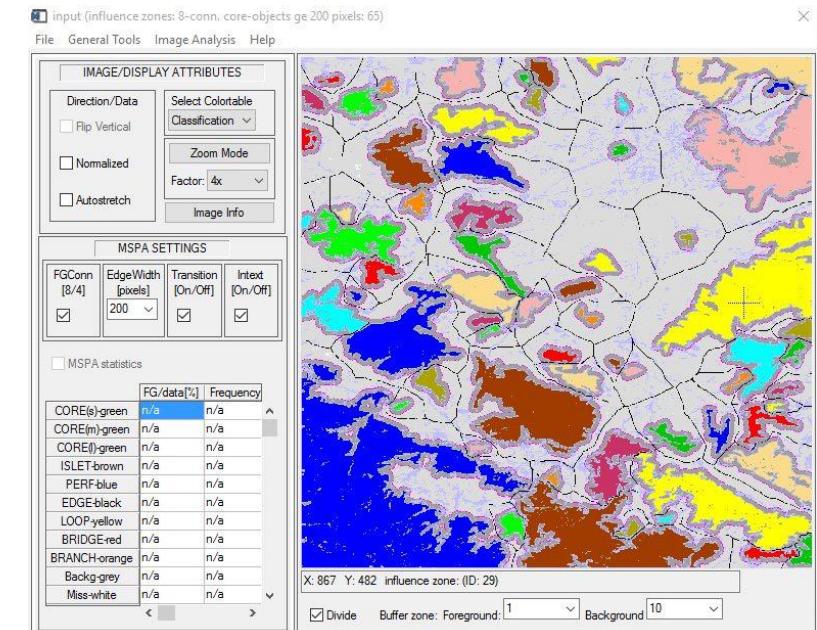
## Morphological change detection



## Export as Google Earth overlay: MSPA in Rondônia, Brazil



## Pest risk: influence zones...



## The GTB Product Sheets:



<https://forest.jrc.ec.europa.eu/en/activities/lpa/gtb/>  
<https://forest.jrc.ec.europa.eu/en/activities/lpa/gwb/>  
**GuidosToolbox workshops:** <https://forest.jrc.ec.europa.eu/en/activities/lpa/gtb-workshops/>  
Contact: [peter.vogt@ec.europa.eu](mailto:peter.vogt@ec.europa.eu)

**GuidosToolbox fully portable directory:  
copy to & work from external drive!**



**Customers:**

# Thank you



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