



**An  
Phríomh-Oifig  
Staidrimh**

Central  
Statistics  
Office

*Workshop on Earth Observations for SEEA  
compliant Natural Capital Accounting*

22<sup>nd</sup> May 2024

# Earth Observation for Ecosystem Accounting in Ireland

Sylvie Clappe

*CSO Ecosystem Accounts Division*



Introduction

EO for Irish ecosystem accounts

Limitations and perspectives





Introduction

EO for Irish ecosystem accounts

Limitations and perspectives



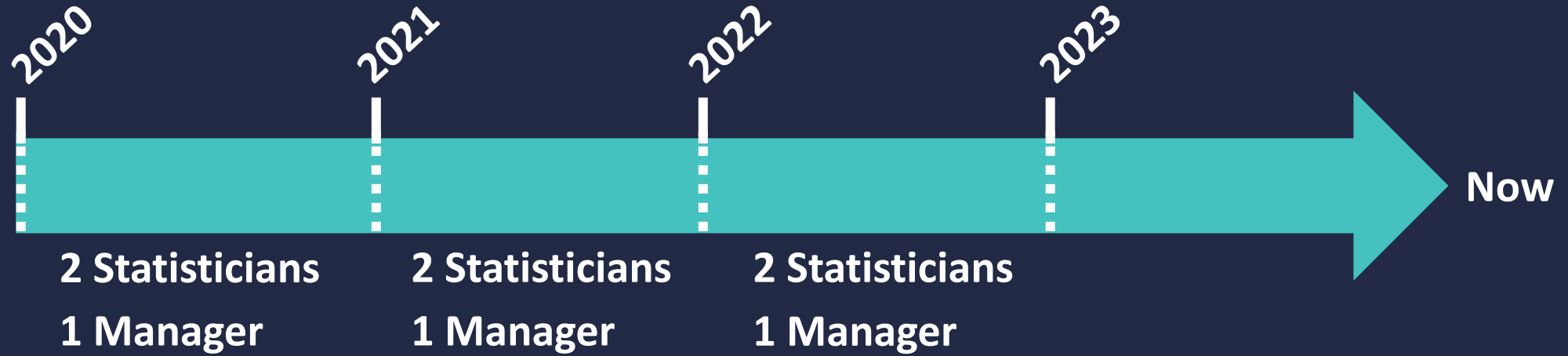


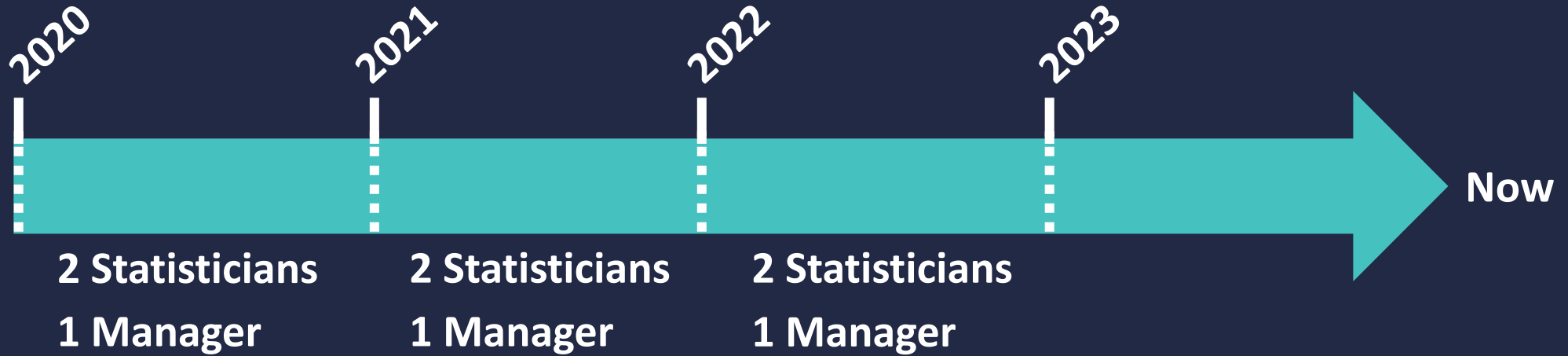
Introduction

EO for Irish ecosystem accounts

Limitations and perspectives

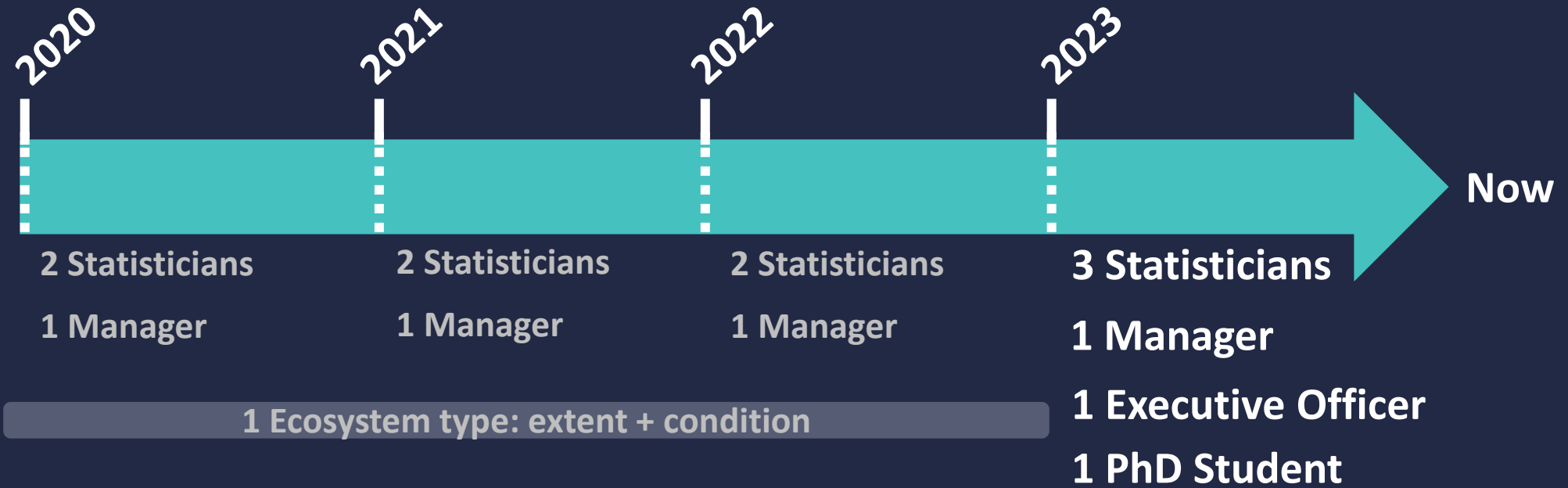


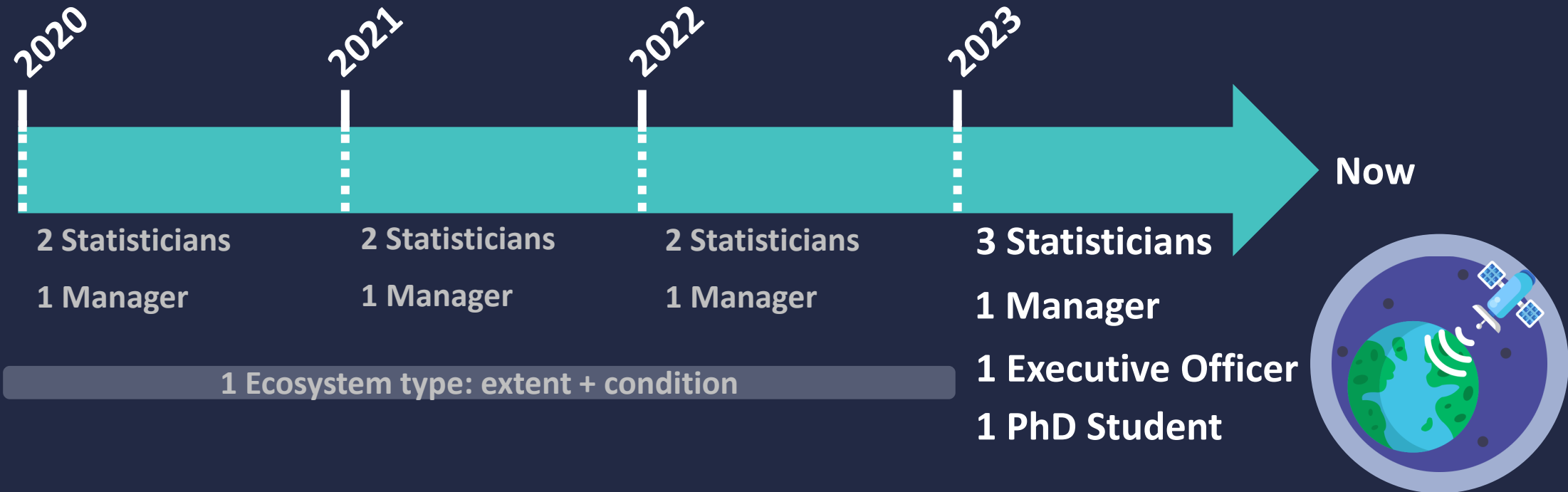




1 Ecosystem type: extent + condition









# What kind of Earth Observation?

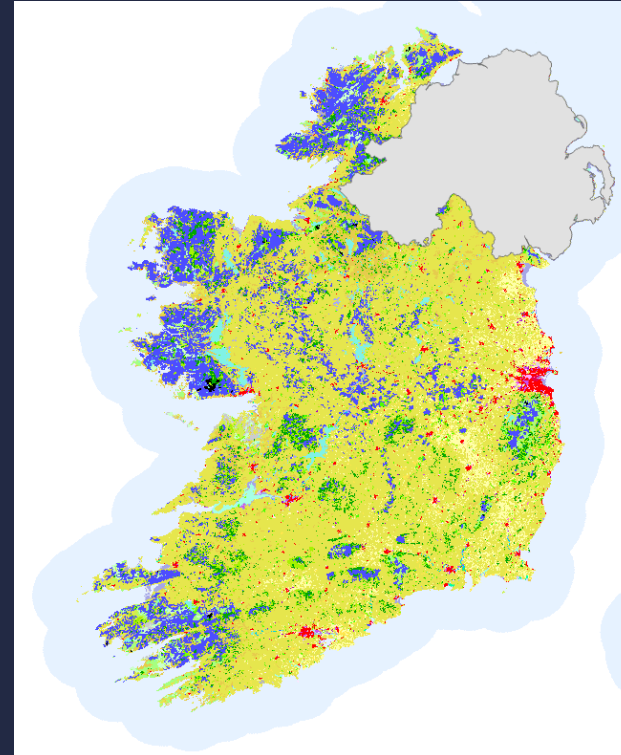


# What kind of Earth Observation?

## Satellite imagery



## Modelled Spatial Layers

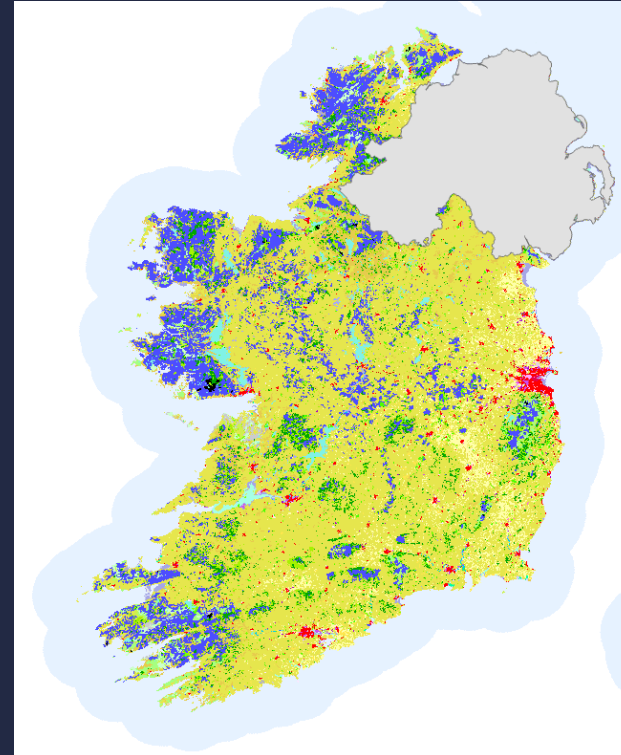


# What kind of Earth Observation?

## Satellite imagery



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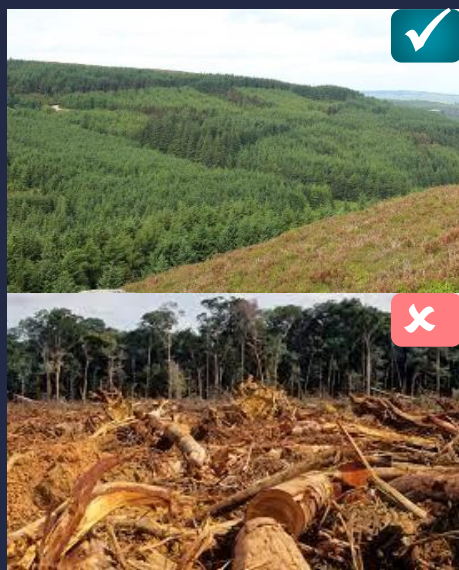


# Where was Earth Observation used?

## Extent Accounts



## Condition Accounts



## Ecosystem Services Accounts



# Where was Earth Observation used?



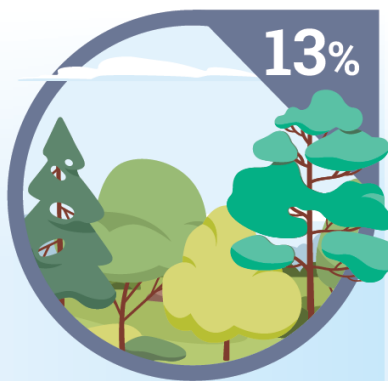
An Phríomh-Oifig Staidrimh

Central Statistics Office

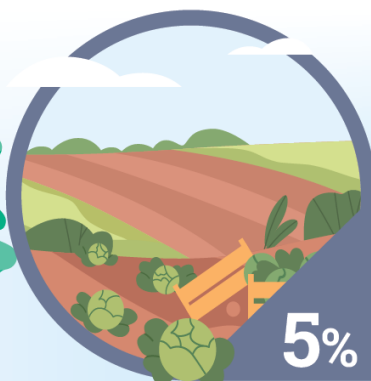
## Ecosystem Extent Accounts 2000–2018



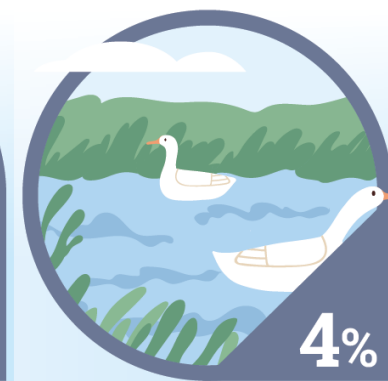
16% increase in **Settlements and Other Artificial Areas**



13% increase in **Forest and Woodlands**



5% decrease in **Croplands**



4% decrease in **Inland Wetlands**

Almost 70,000 hectares of **Inland Wetlands** and **Grasslands** converted into **Forests and Woodlands**

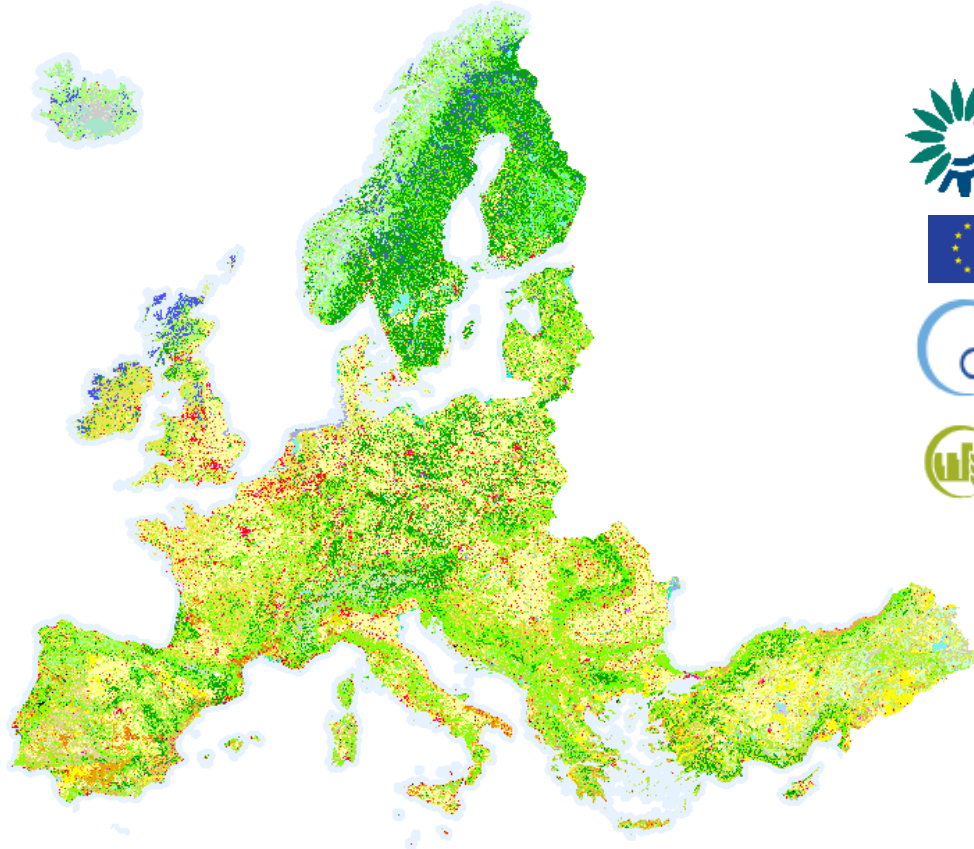
Based on Corine Land Cover Accounting Layers

Almost 23,500 hectares of **Grasslands** and **Croplands** converted into **Settlements and Other Artificial Areas**



# Where was Earth Observation used?

## Corine Land Cover Accounting Layers



European  
Environment  
Agency

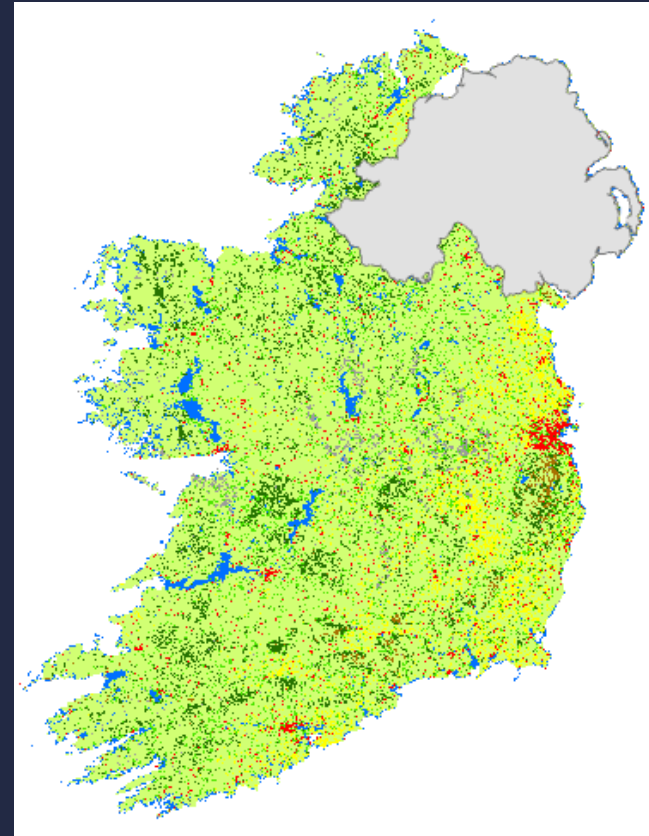


# Where was Earth Observation used?

National Land Cover Map



CLC+ BackBone

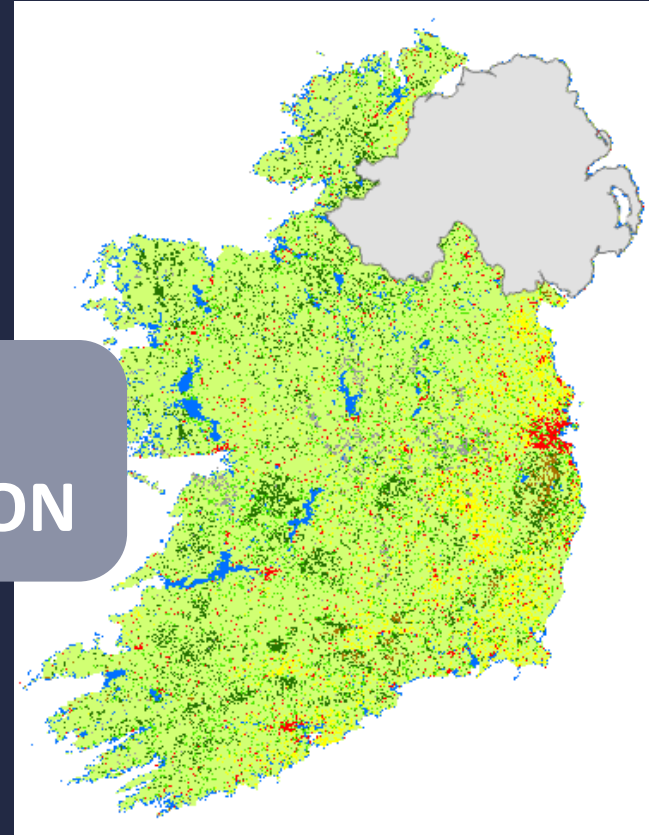


# Where was Earth Observation used?

National Land Cover Map



CLC+ BackBone



DATA  
AUGMENTATION





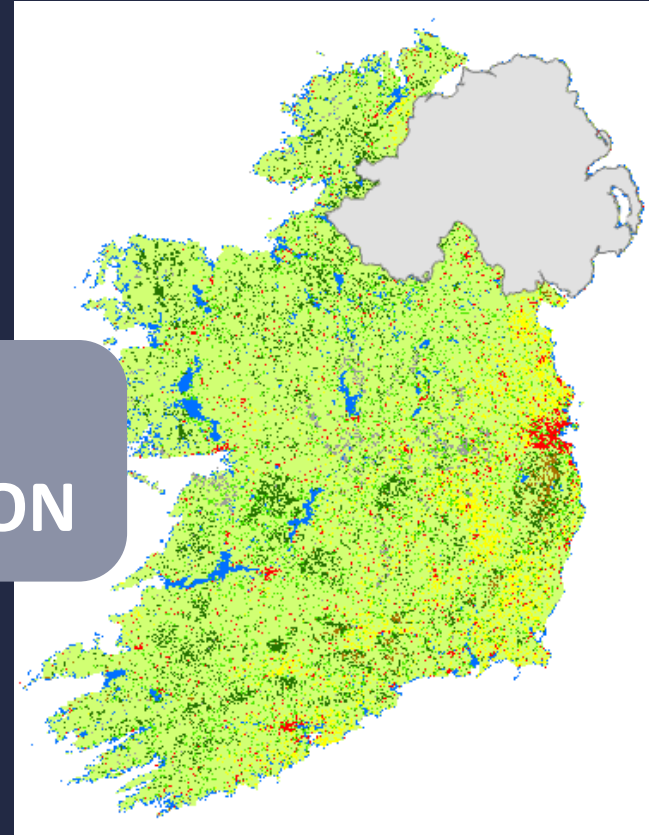
# Where was Earth Observation used?

National Land Cover Map



36 classes

CLC+ BackBone

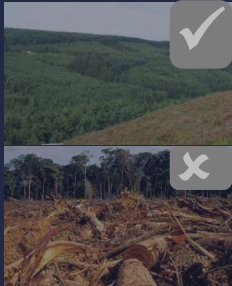


8 classes

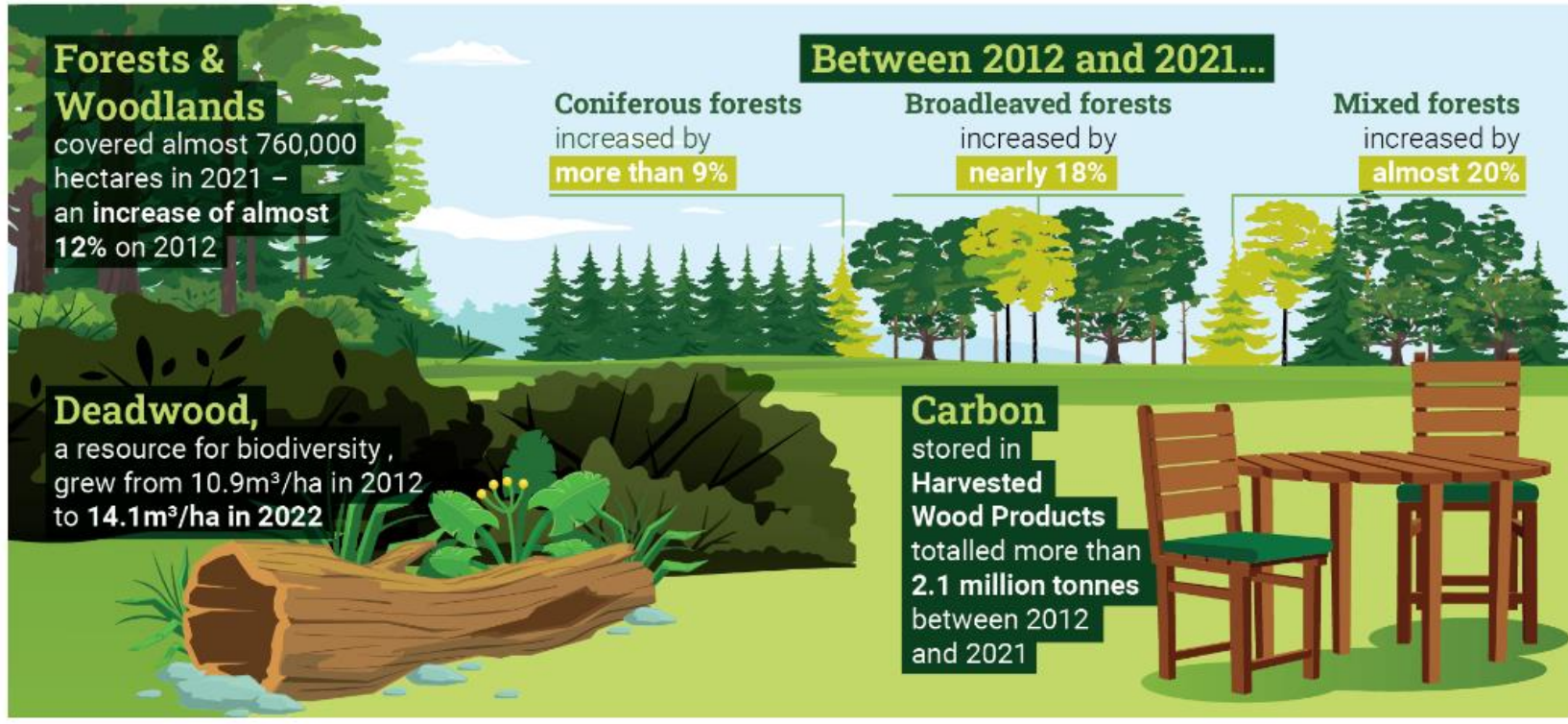
DATA  
AUGMENTATION



# Where was Earth Observation used?



## Forests and Woodlands 2012-2022



# Where was Earth Observation used?

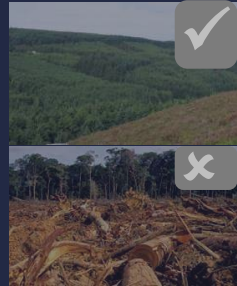
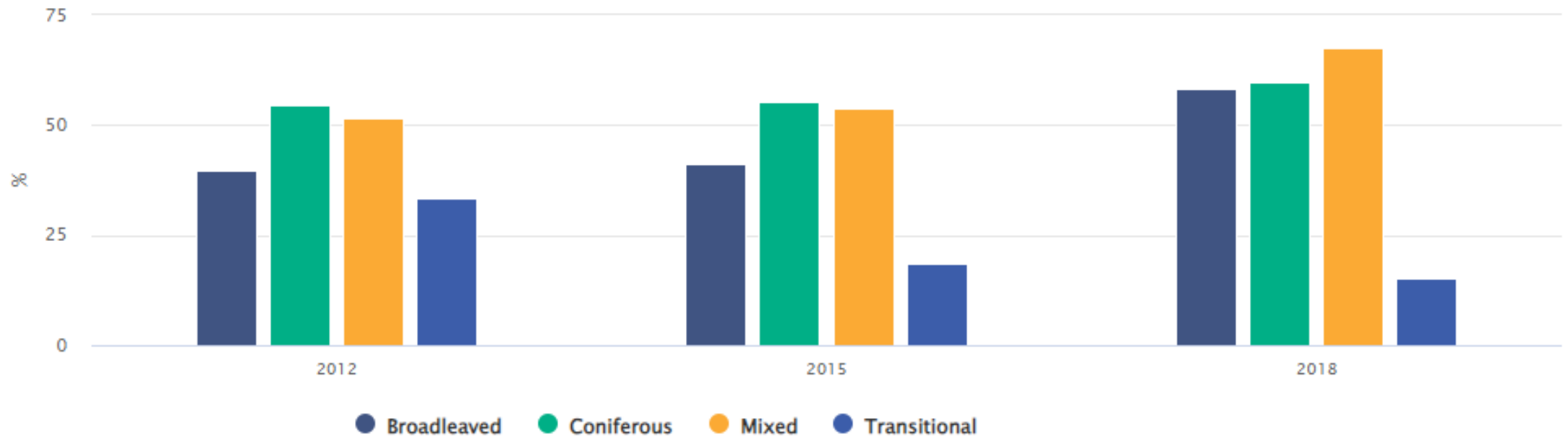
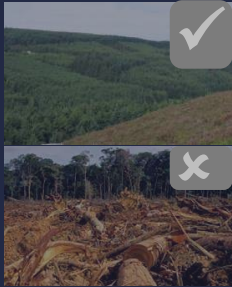


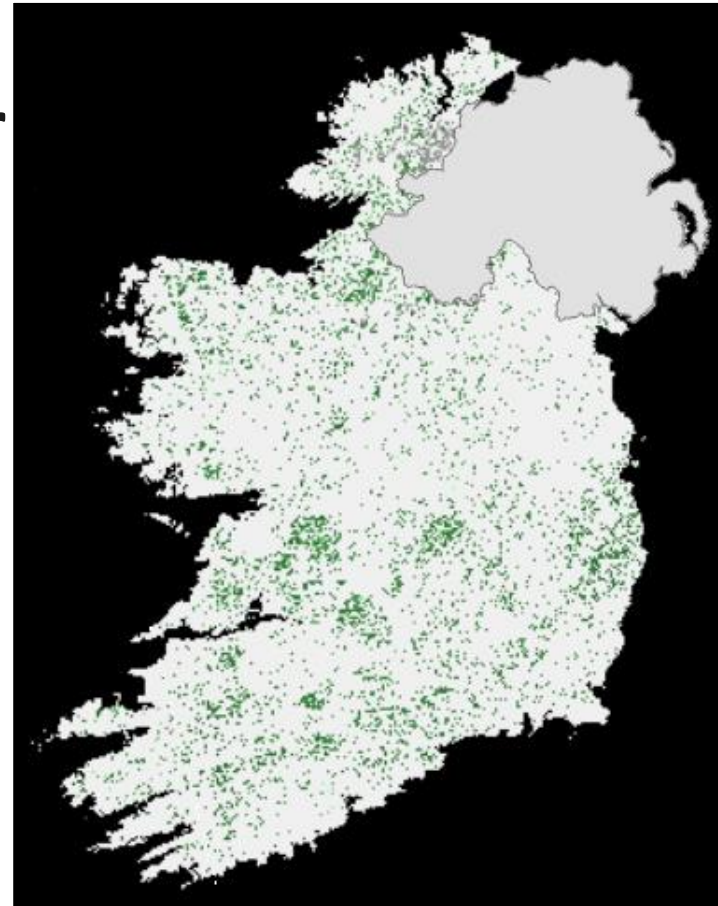
Figure 3.2 Tree Cover Density (%) by forest type 2012-2018



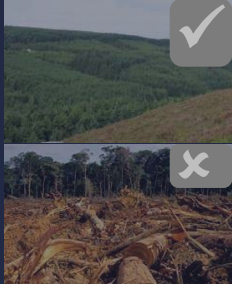
# Where was Earth Observation used?



## High Resolution Layer Tree Cover Density



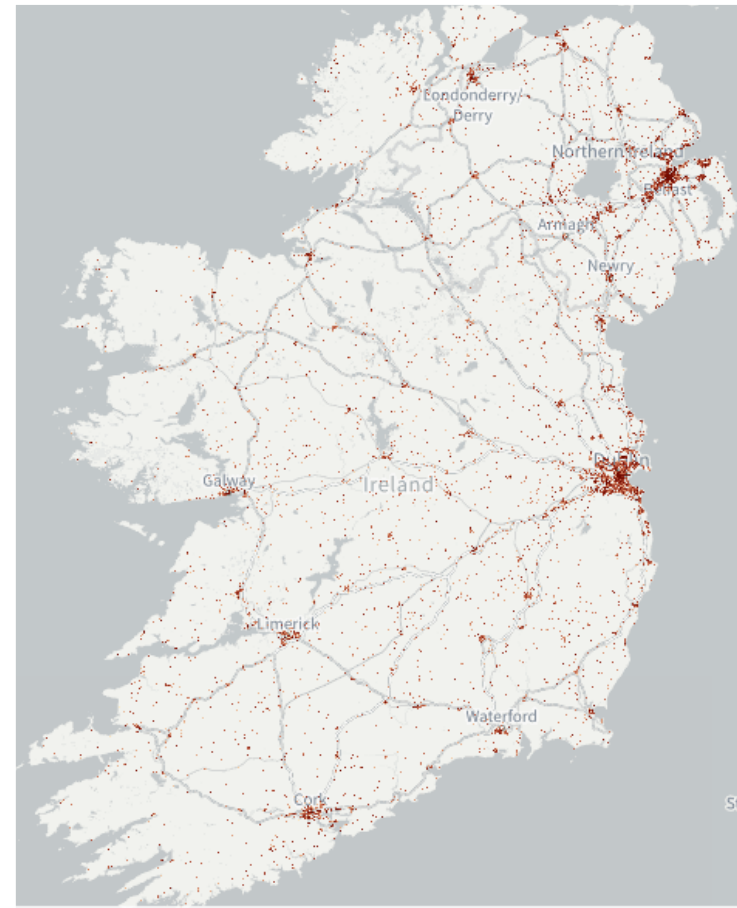
# Where was Earth Observation used?



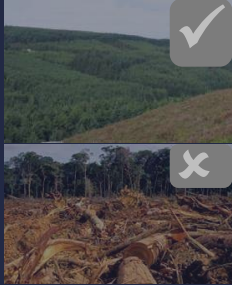
## High Resolution Layer Imperviousness



Source: Copernicus map viewer



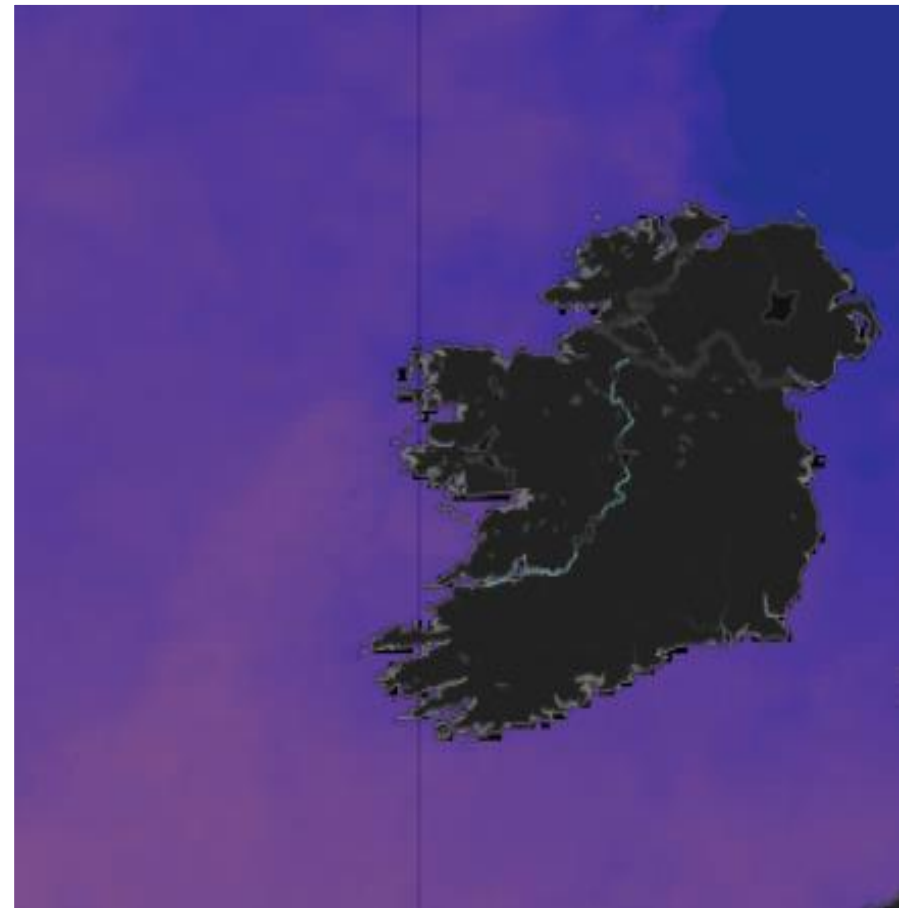
# Where was Earth Observation used?



## High Resolution Layer Sea Surface Temperature



Source: Copernicus map viewer





# Where was Earth Observation used?

*Work in progress*





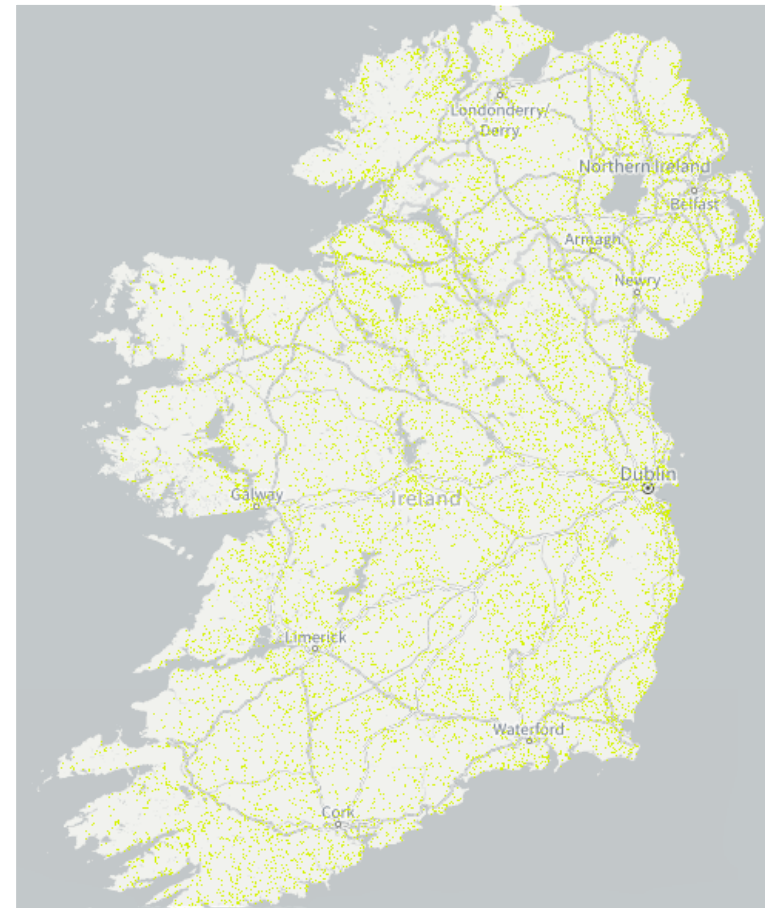
# Where was Earth Observation used?

Work in progress

## High Resolution Layer Small Woody Features



Source: Copernicus map viewer







# Where was Earth Observation used?

Work in progress

## High Resolution Layer Vegetation Phenology and Productivity



Source: Copernicus map viewer

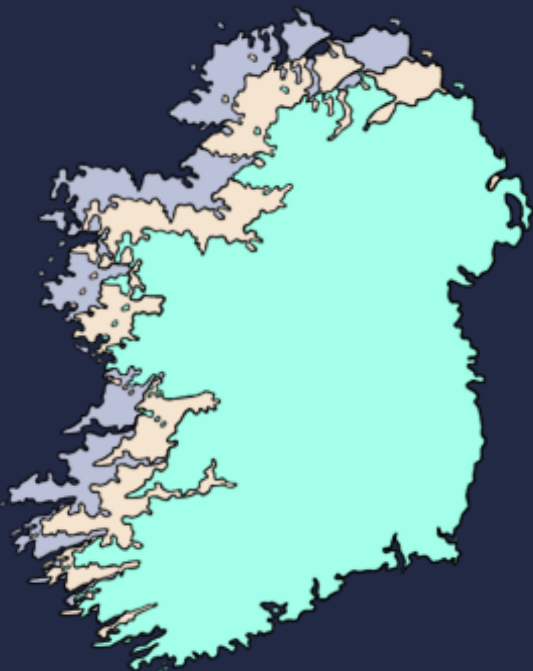


# Where was Earth Observation used?

Work in progress



Earth Observation



+

Species survey data



=

Species distribution map



# Artificial Intelligence and Machine Learning for Official Statistics

**DI**STATIS  
Statistisches Bundesamt

## Events

Conference on Foundations and Advances of Machine Learning in Official Statistics, 3rd to 5th April, 2024

Short-Plenary



# Earth Observation for Ecosystem Accounting: what's next?

## Best practices and international standards



# Earth Observation for Ecosystem Accounting: what's next?

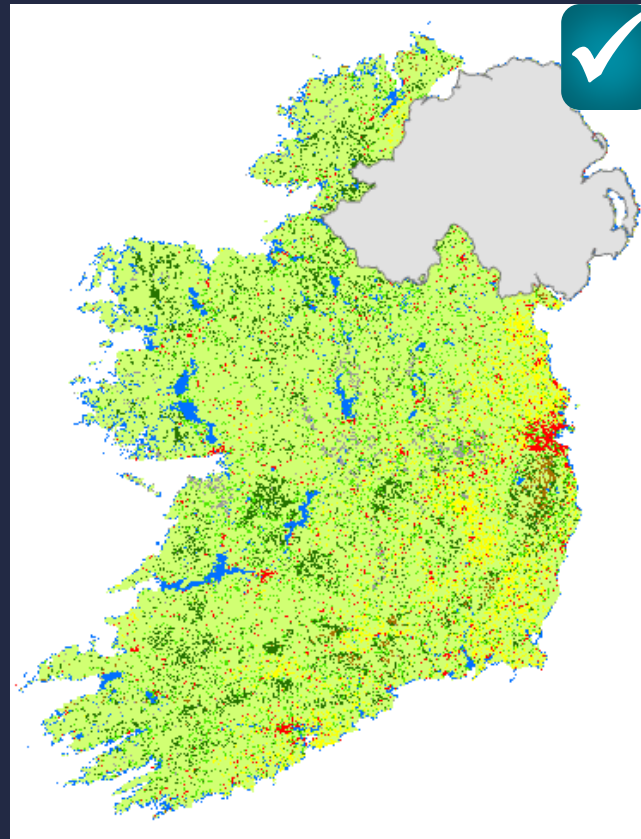


# Earth Observation for Ecosystem Accounting: what's next?

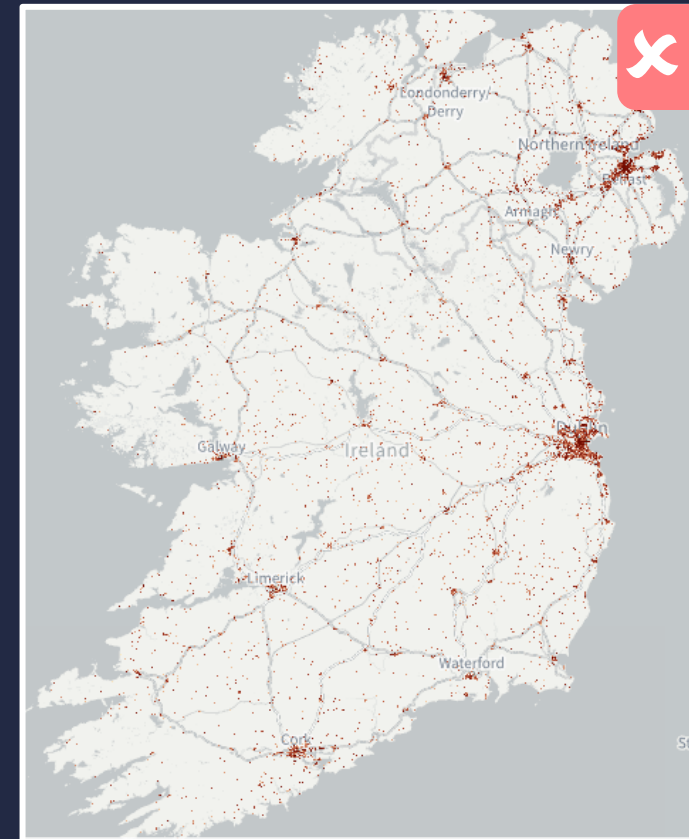
National  
assessment



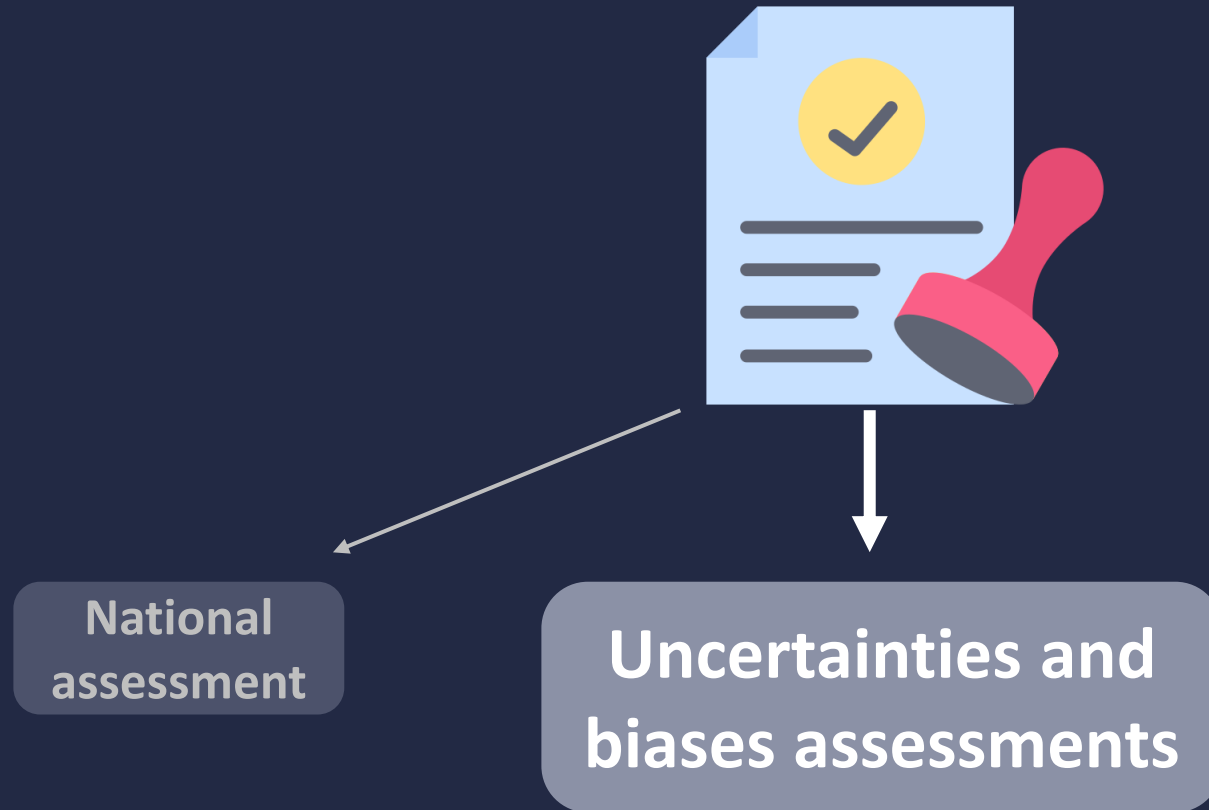
## CLC+ BackBone



## Imperviousness




# Earth Observation for Ecosystem Accounting: what's next?



# Earth Observation for Ecosystem Accounting: what's next?




## Uncertainties and biases assessments



Contents lists available at [ScienceDirect](#)

### Ecosystem Services


journal homepage: [www.elsevier.com/locate/ecoser](http://www.elsevier.com/locate/ecoser)



Full Length Article

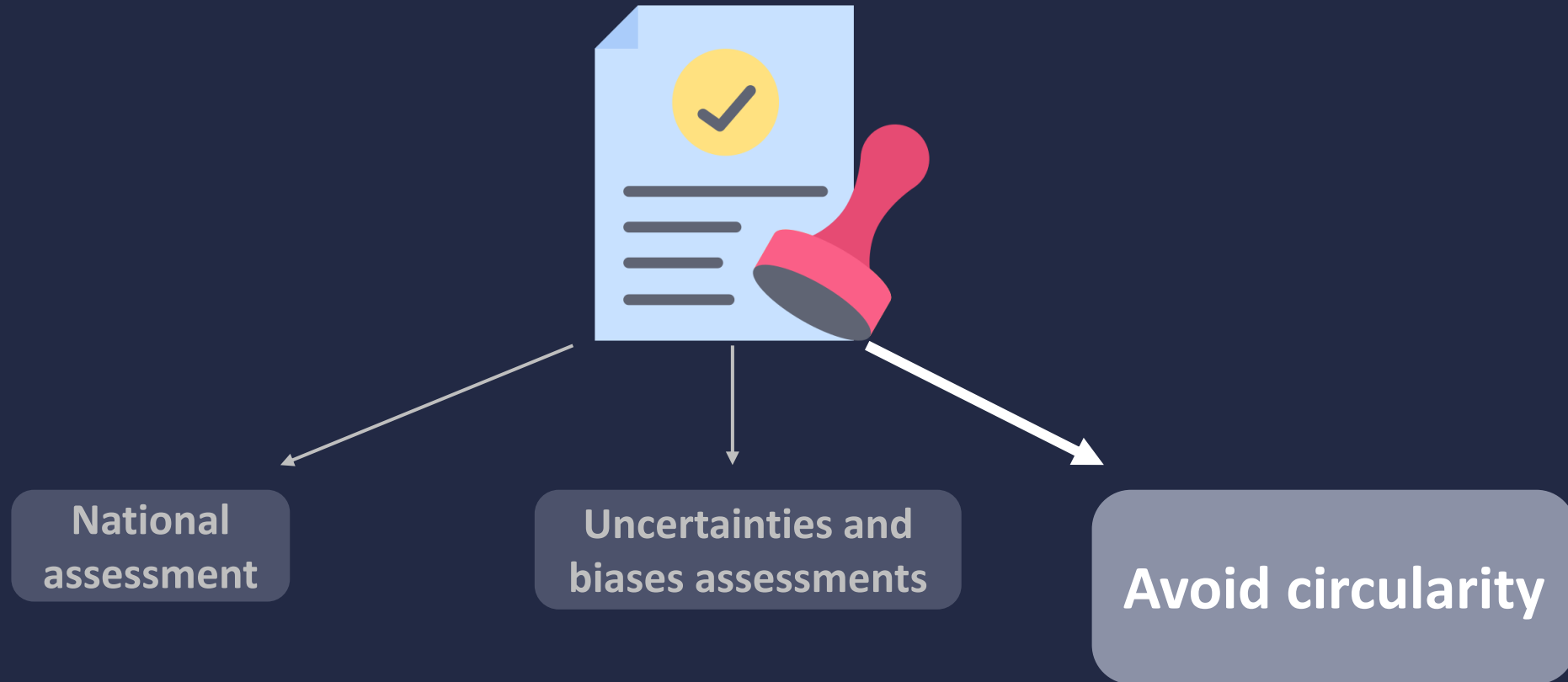
'Uncertainty audit' for ecosystem accounting: Satellite-based ecosystem extent is biased without design-based area estimation and accuracy assessment

Zander S. Venter<sup>\*</sup>, Bálint Czúcz, Erik Stange, Megan S. Nowell, Trond Simensen, Bart Immerzeel, David N. Barton





# Earth Observation for Ecosystem Accounting: what's next?



# Earth Observation for Ecosystem Accounting: what's next?



Avoid circularity

National Land  
Cover Map



# Earth Observation for Ecosystem Accounting: what's next?

Avoid circularity

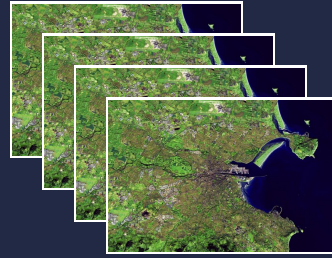


National Land  
Cover Map



# Earth Observation for Ecosystem Accounting: what's next?

Avoid circularity



National Land  
Cover Map

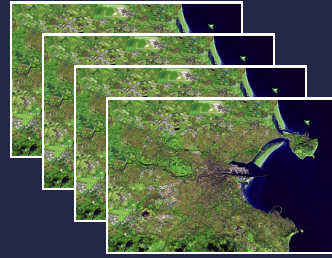


Extent  
Accounts



# Earth Observation for Ecosystem Accounting: what's next?

Avoid circularity



National Land  
Cover Map



Earth  
Observation  
products

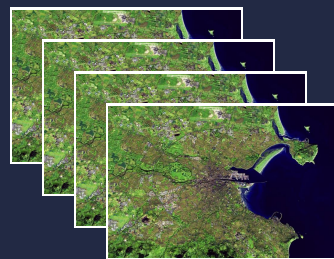


Extent  
Accounts



# Earth Observation for Ecosystem Accounting: what's next?

Avoid circularity



National Land  
Cover Map



Earth  
Observation  
products



Extent  
Accounts



# Conclusion

EA output

EA output

EA output

EA output

Earth Observation input



# Conclusion

National  
ground data



EA output

EA output

EA output

EA output

Earth Observation input





# Conclusion

National  
ground data



EA output

National  
ground data



EA output

*Earth  
Observation*



EA output

EA output

Earth Observation input



# Conclusion

National  
ground data



EA output

National  
ground data



EA output

Earth  
Observation



EA output

EA output

*Earth  
Observation*



*National  
ground data*



Earth Observation input



# Conclusion

National  
ground data



EA output

National  
ground data



EA output

*Earth  
Observation*



Earth  
Observation



EA output

*National  
ground data*



Earth  
Observation



EA output

Earth Observation input



# References

[https://www.flaticon.com/free-icon/signal-satellite\\_3301722?term=satellite+earth&page=1&position=1&origin=search&related\\_id=3301722](https://www.flaticon.com/free-icon/signal-satellite_3301722?term=satellite+earth&page=1&position=1&origin=search&related_id=3301722)

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<https://data.marine.copernicus.eu/products>

<https://www.sciencedirect.com/science/article/pii/S2212041624000056>





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Central  
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**Thank you for  
listening**

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