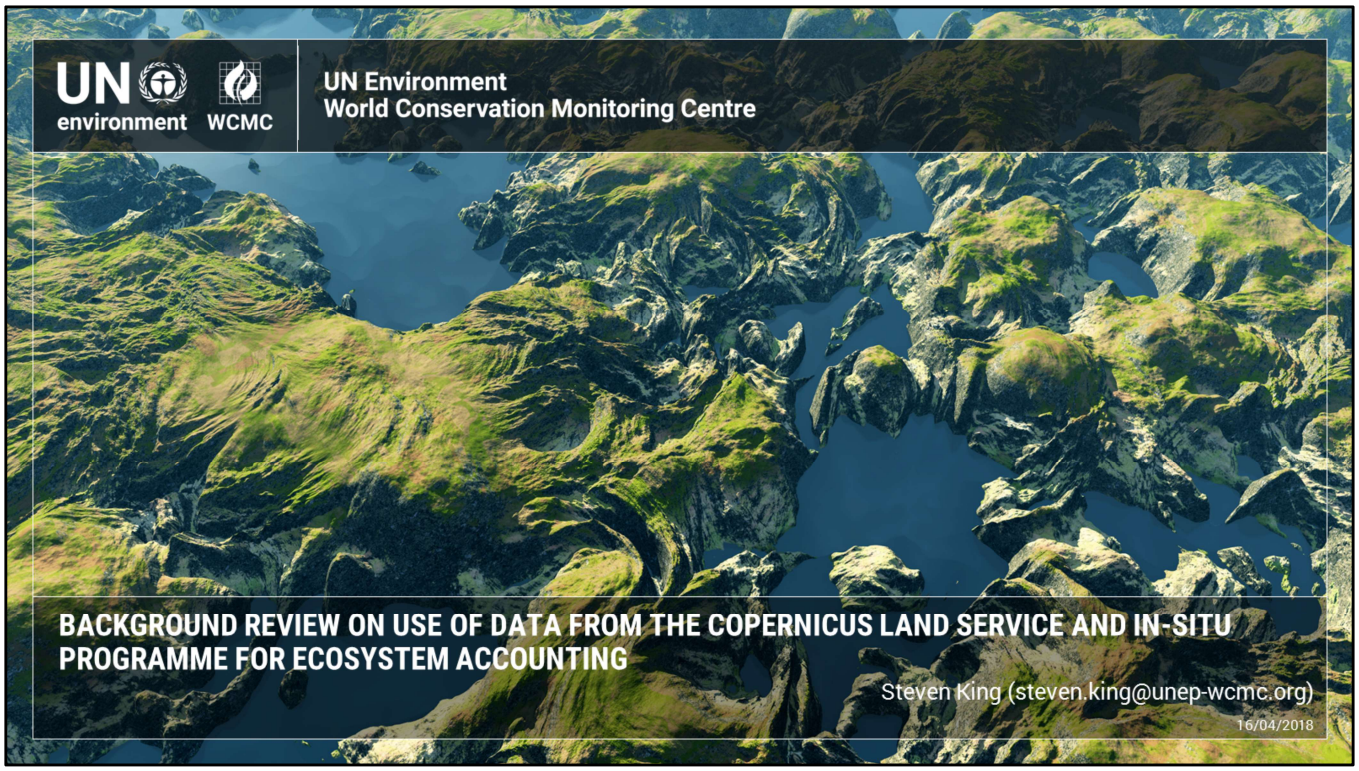
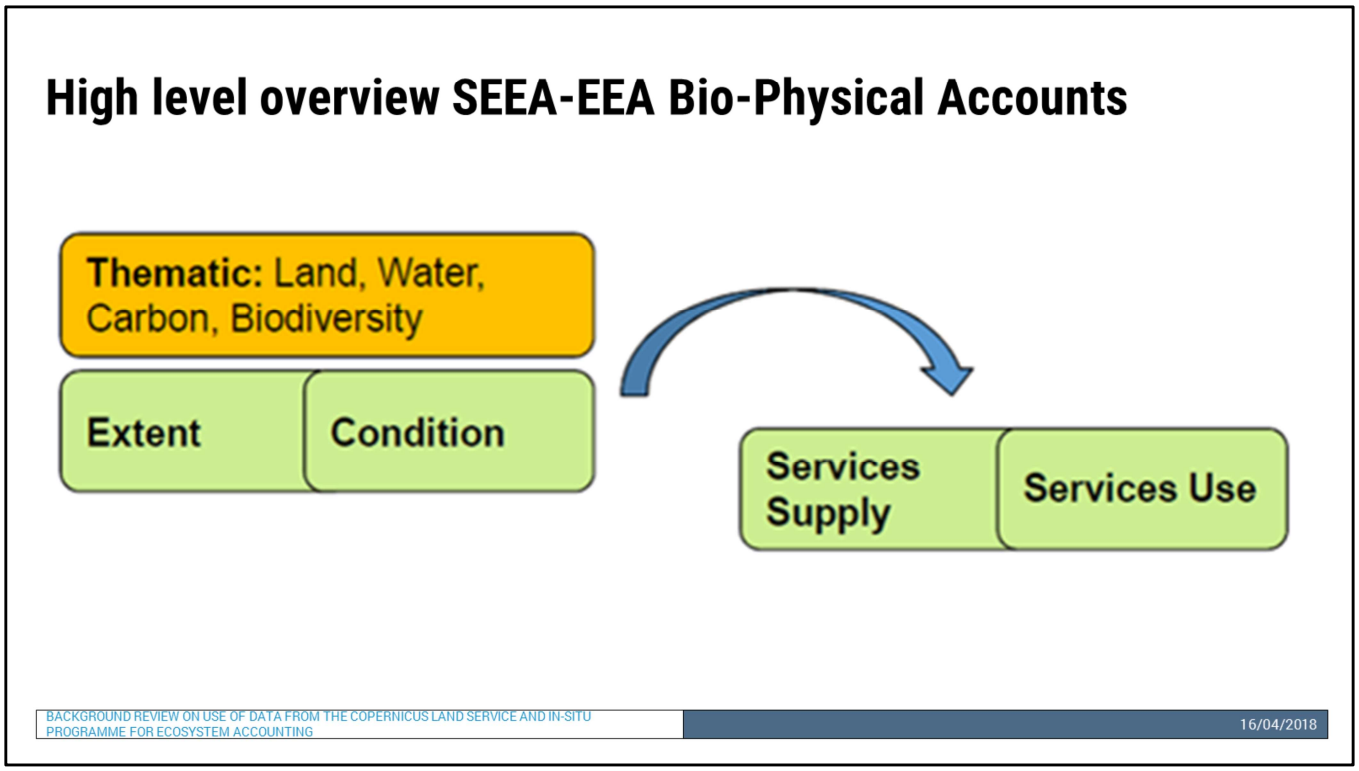


Hi = good afternoon – my name is Steve and I'm from the UN Environment World Conservation Monitoring Centre. My colleague

So many thanks for having me here and over the next few slides I would like to present some work we have been doing with Jan-Erik and Kremena, my colleague Katherine and SYKE in Finland looking at eh role Copernicus could play in supporting European efforts on ecosystem accounting.

Very much aware that this is EEA data and our work is a rapid assessment of how this can be used to support ecosystem accounting

We very much invite feedback from you guys, who are more familiar with the data, to help refine initial findings.



The System of Environmental-Economic Accounting - Experimental Ecosystem Accounting (SEEA-EEA) provides the measurement framework for building ecosystem accounts

It is grounded in a spatially explicit and time series based approach.

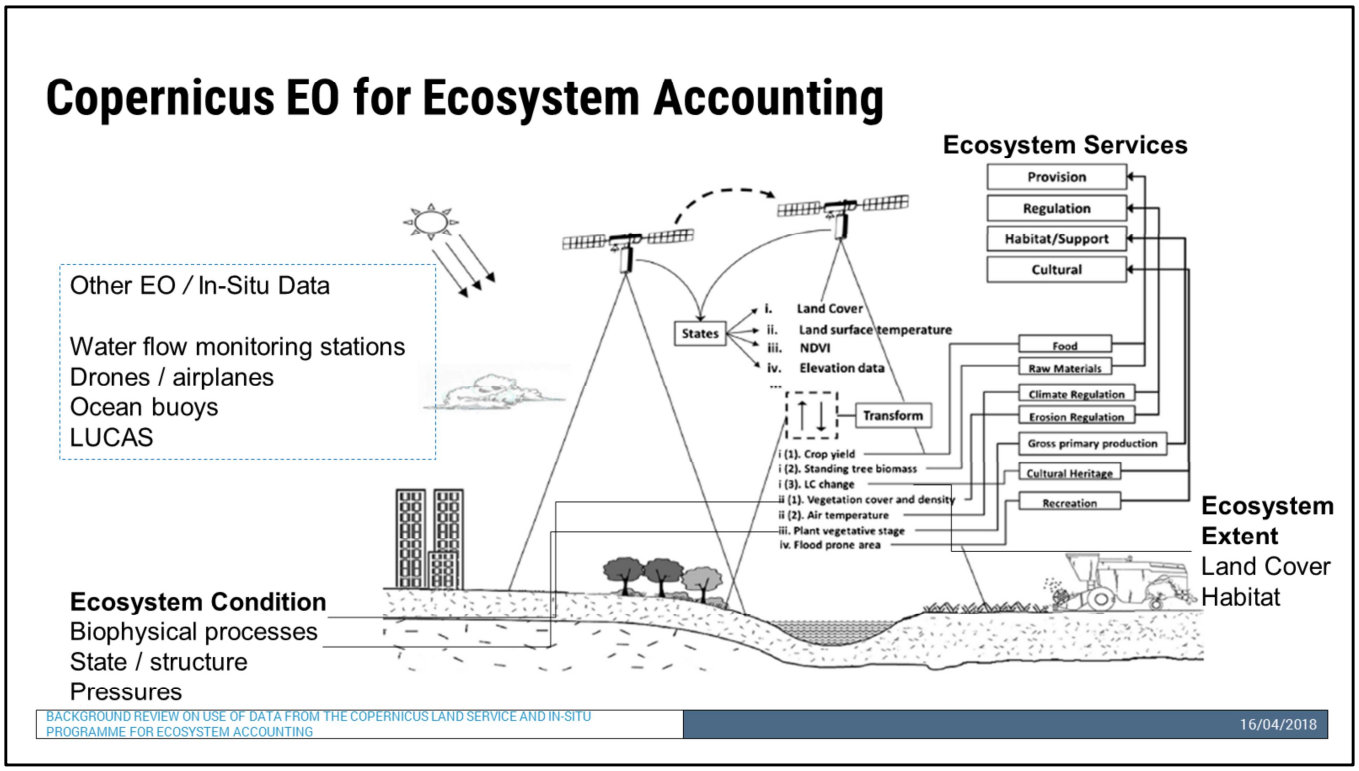
This experimental framework characterises ecosystems on the basis of their extent and a set of condition characteristics (stock) and their ability to deliver ecosystem services (flow) at different points in time.

The figure below sets out these core bio-physical ecosystem accounting modules (in green) and a set of associated accounting themes (in orange) of specific environmental management and policy interest.

The testing of this framework is being implemented in Europe under the KIP INCA project, jointly between the EEA, JRC and DG Env.

What we are interested in discussing today is the role Copernicus produts and services can play in providing regular, consistent information to allow calculation

of the core bio-physical ecosystem extent, condition and services supply and use



The Copernicus programe provides a ready source of data to inform the compilation of the core bio-physical ecosystem accounts we are interested in under KIP-INCA.

We understand Copernicus to comprise of three programmes of activity - Space, Services and *In*-situ

And Earth Observation is specifically related to the use of satellite data to provide data products and services - this diagram tries to set out where such data can support ecosystem accounting for extent condition and services

In addition, to develop a more holistic appreciation of these ecosystem themes, a wider range of data sources and parameters need to be considered. These include other EO data, such as from water flow monitoring stations, drones and traditional *in-situ* measurement (e.g., LUCAS, biodiversity surveys, forest inventories, soil analyses). We are hoping, the Copernicus services and in-situ activities can also inform on these

Parameters to fill these accounts?

Ecosystem extent

- Land cover
- Land use
- Ecosystem / Habitat type

Ecosystem condition

- State / Structure
- Biophysical processes
- Pressures
- Biodiversity

Ecosystem services

- Provisioning
- Regulating
- Cultural
- Beneficiaries – demand!*

Over the past weeks we have completed a rapid assessment of the potential for Copernicus to inform ecosystem accounting.

In order to help organise this assessment we developed this preliminary list to help direct the selection and organisation of parameters for which Copernicus data is available under different accounting themes.

*The specific demand category is a development from the spreadsheet we shared with you guys

The ecosystem extent categories reflect common data identified in the literature

Condition refelects a combination of the CICES Cascade diagram and MAES recommendations

Services is based on broad CICES divisions and also the notion of demand (this was added over the last couple of days)

Characteristics of the data we want for Europe

Spatial

- Comprehensive coverage
- At the resolution that captures the finer grain mosaics patterns of Europe.

Temporal

- Need to have a time series to integrate with other key data (e.g., CLC)

Consistent

- Across time and space - but also surety of production into the future

Thematically accurate

- Needs to meaningfully represent key ecosystem accounting parameters
- Needs to represent key ecosystem types (e.g., MAES / EUNIS)

The challenge is for Copernicus to support all this!

As the Copernicus products and services are user orientated their metadata is readily accessible – this allowed us to quickly compile information on the cheacteristics of the data provided that we felt was of most relevance for ecosystem accounting –

This includes – (Describe)

Our *a prori* assumption is that Copernicus can meet these cahllenges!

Land Services Database

Structure

- Captured all 68 datasets and their description on https://land.copernicus.eu/ ~ Easter*
- Captured selected metadata relevant to important characteristics
- Subjective judgement on the thematic links to extent, condition and services**

  Clear match – data is directly representative of the accounting parameter of interest. For example, using land cover data to represent ecosystem extent.

  Potential match – implies a proxy or causal (i.e., modelled) association. For example Fraction of Vegetation cover (Fcover) may be used to model carbon sequestration.

  No match

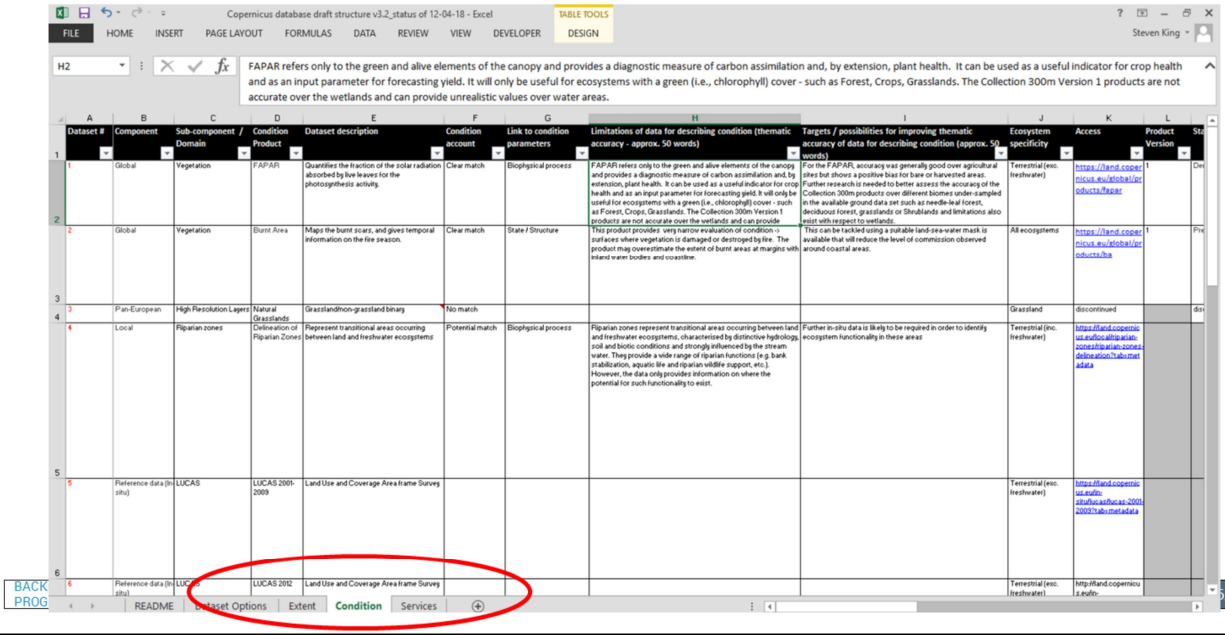
- Preliminary judgement on possibilities to improve thematic accuracy***

- Changing all ready – for instance a new set of data on HRLs on water and wetness and small woody features

** This was based on a rapid assessment of the data between Brian and I – would benefit from review in the future from those more familiar with the data

*** This was based on our superficial understanding of th data -> data providers will have a far greater appreciation of these potentials.

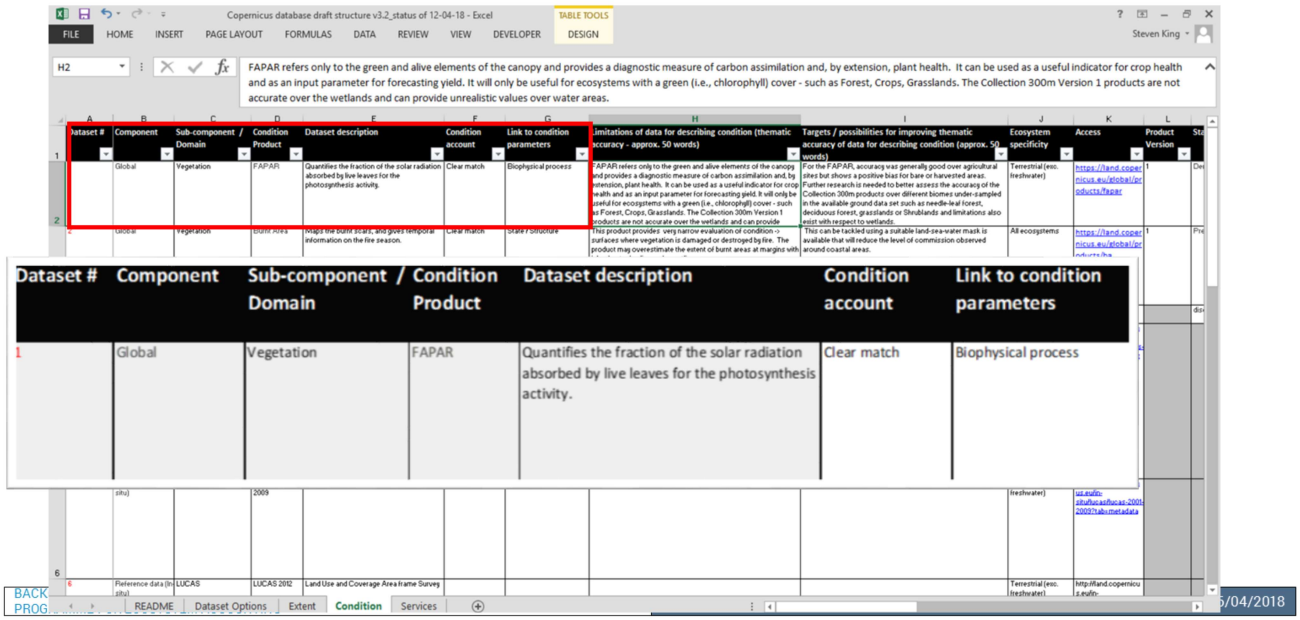
Database overview



This is the broad layout – see there are separate tabs for extent, condition and services – each provides an assessment of links of data to these accounts, thematic limitations and targets and possibilities for improvement for ecosystem accounting purposes.

Lets take condition as an example and look in more detail

Database – Datasets and their links to accounts

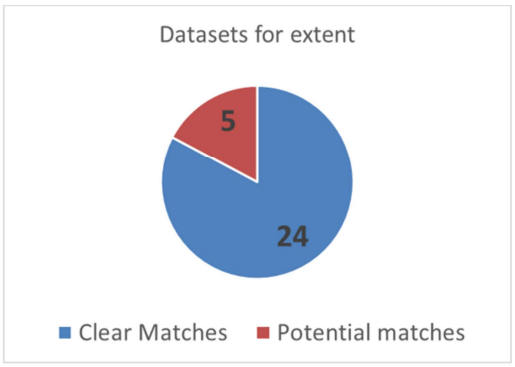


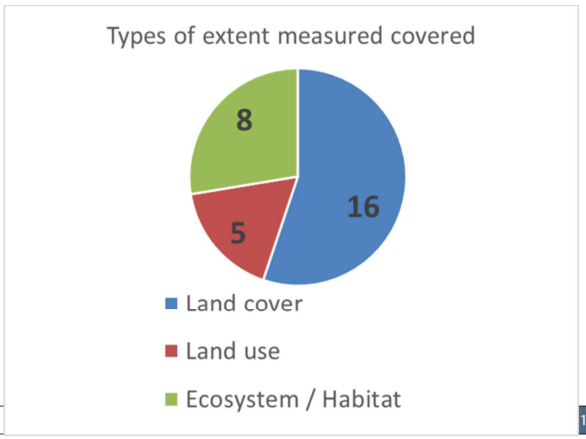
Describe what we see is info on the dataset, a high level description and the match level and relevant parameter category for the account – this coarse assessment yields some preliminary findings with respect to the potential for the Copernicus products and services to inform ecosystem accoutig

Some preliminary results

Ecosystem extent – 29 out of 68 products and services

- Note: Products are nested – 12 out of 29 relate to CLC



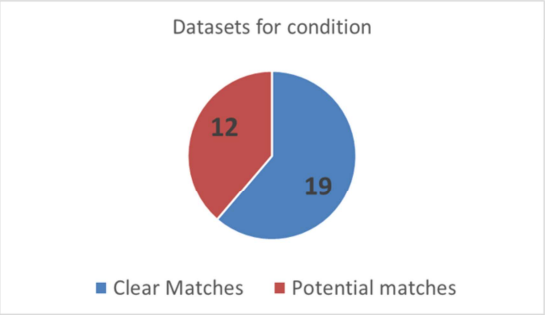


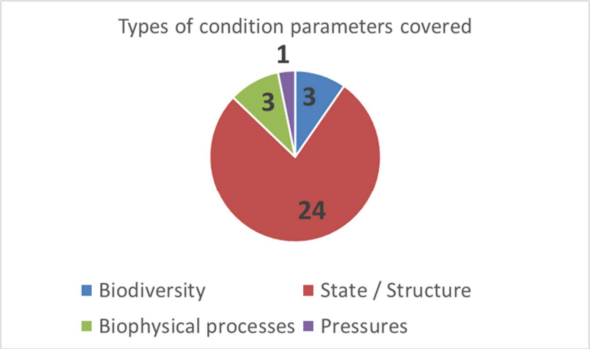
Describe breakdown

Important to note that a number of these products and services are nested – for example 12 out of the 29 datasets represent Corrine Land Cover time series and change observations, plus their underlying image mosaics

Some preliminary results

Ecosystem condition – 31 out of 68 products and services

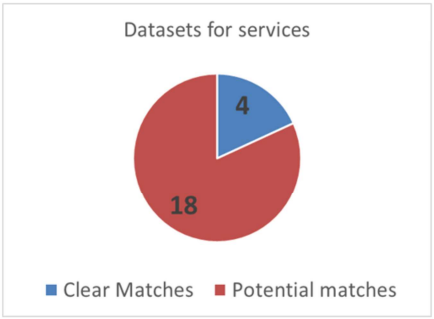


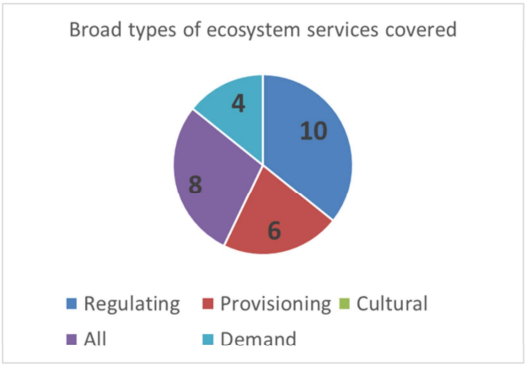


Dominated by structural indicators – very little data n pressures (these are population based) and limited data on biodiversity (these are actually Natural 2000 and Ripiran cover too)

Some preliminary results

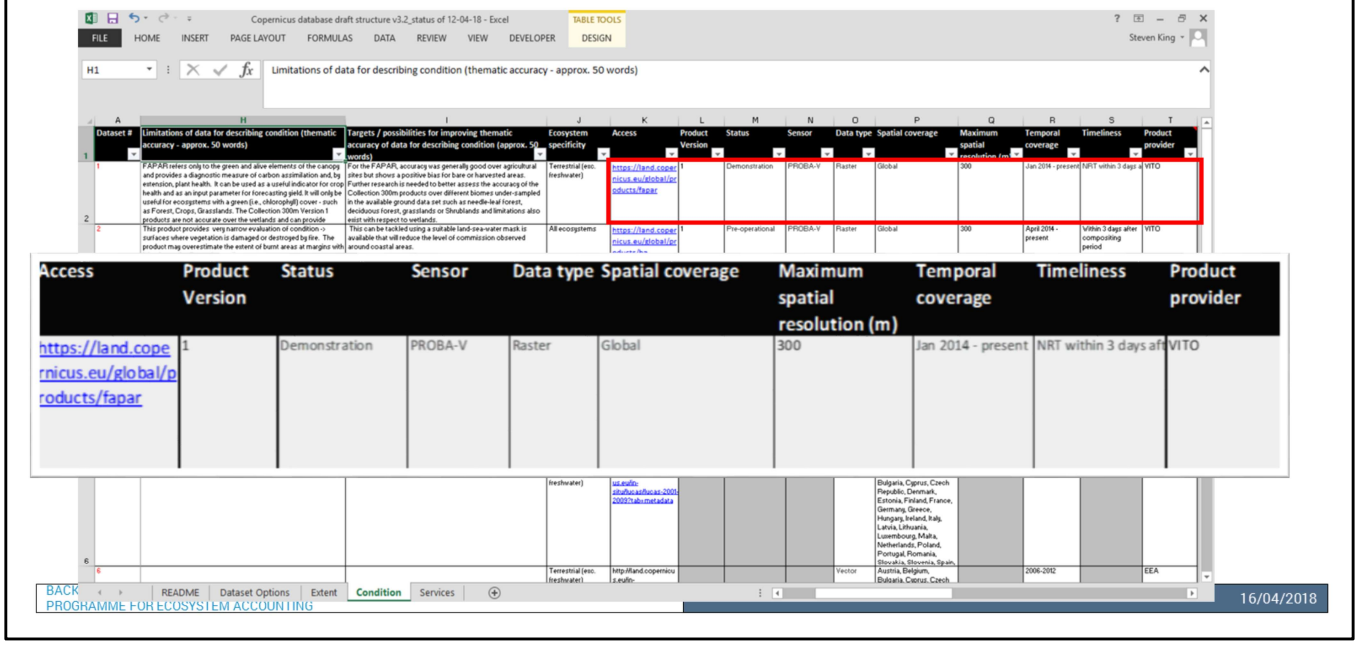
Ecosystem services– 22 out of 68 products and services





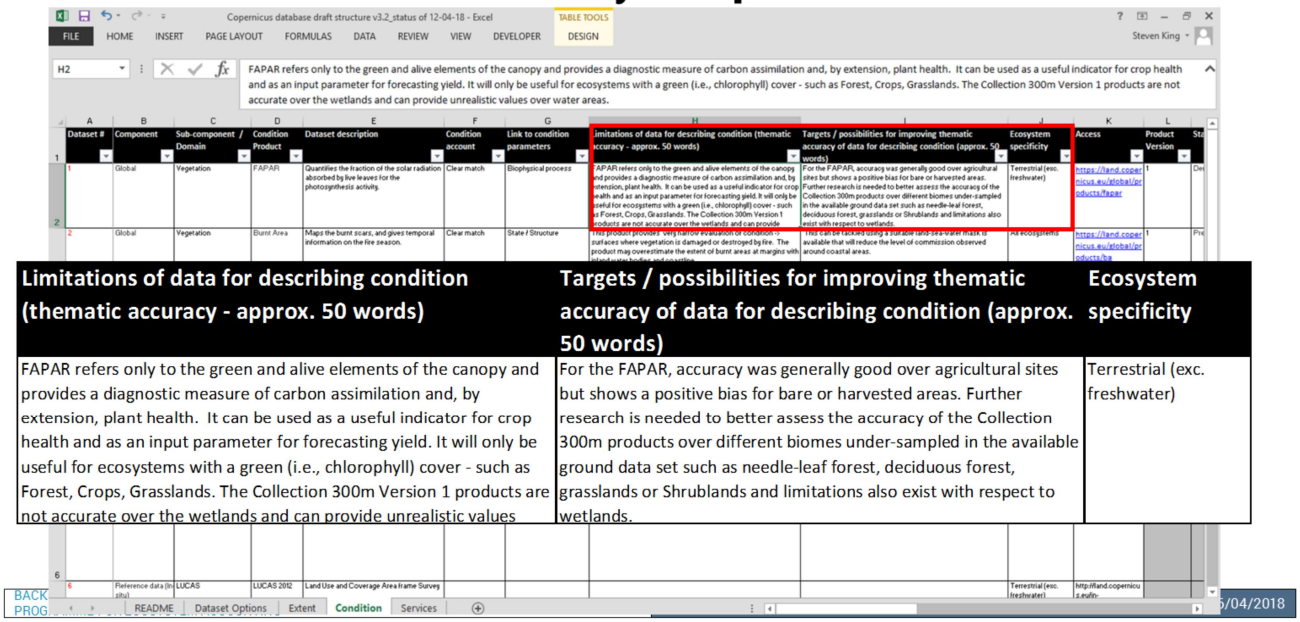
No data on cultural services Supply….

Database – Metadata



Describe what we see is info metadata taken directly from the Copernicus services website that is relevant to understanding the needs for ecosystem accouting in Europe

Database – Thematic accuracy and possibilities



Limitations of data for describing condition (thematic accuracy - approx. 50 words)	Targets / possibilities for improving thematic accuracy of data for describing condition (approx. 50 words)	Ecosystem specificity
FAPAR refers only to the green and alive elements of the canopy and provides a diagnostic measure of carbon assimilation and, by extension, plant health. It can be used as a useful indicator for crop health and as an input parameter for forecasting yield. It will only be useful for ecosystems with a green (i.e., chlorophyll) cover - such as Forest, Crops, Grasslands. The Collection 300m Version 1 products are not accurate over the wetlands and can provide unrealistic values	For the FAPAR, accuracy was generally good over agricultural sites but shows a positive bias for bare or harvested areas. Further research is needed to better assess the accuracy of the Collection 300m products over different biomes under-sampled in the available ground data set such as needle-leaf forest, deciduous forest, grasslands or Shrublands and limitations also exist with respect to wetlands.	Terrestrial (exc. freshwater)

Describe what we see is info on the dataset, a high level description and the match level and relevant parameter category for the account

We also identify if the product pertains to a certain type of MAES ecosystem or is cross-cutting – this is example is cross cutting with some obvious restrictions.

Copernicus *In-Situ* for Ecosystem Accounting (SYKE)

Overview

- Observation data from ground-, sea- or air-borne sensors, as well as reference and ancillary data
- Used by service providers to calibrate and supplement satellite data
- Provided by Member States, European Bodies, Global initiatives

Strengths

- Terrestrial domain for ecosystem accounting
- Captures data on many environmental measurements collected by providers external to Copernicus

Weaknesses

- *In-situ* observation data often dependent on time-limited funding
- Potential commercial restrictions
- Limited systematic collection and validation

In situ data is an observation data, which currently is not centralised available for service providers. Each service provide need make contracts with service providers .

Slide 14

SK1 Do we delete this? It may overlap quite a lot with the other presentation.
Steven King, 13/04/2018

Copernicus Reference Data Access (CORDA) (SYKE)

Overview

- Provides access to Spatial Reference Data from European data providers
- A precursor to the Copernicus In Situ Component Information System (CIS2)

Strengths

- Significant resource of spatial data (5,813 datasets)
- Includes relevant datasets for INSPIRE Themes: land use (141), Land cover and cadastral information

Weaknesses

- Limited additional data for ecosystem accounting (Data also on Pan-European services)
- Omits a number of relevant INSPIRE themes: Habitats & biotopes, Soil, Species distribution
- Metadata is inconsistent

Opportunities for Copernicus *In-Situ*, CORDA & Ecosystem Accounting (SYKE)

Increase awareness

- Many key stakeholders unaware of the in-situ data potentially available
- Provide free access (currently under way)
- Demonstrate use – show how contributing data will support Ecosystem Accounting and other applications

Data systems

- Include observation data on INSPIRE Themes for ecosystem accounting
- Improve metadata to stimulate use

Integration

- Consider integration of EU GeoPortal

Slide 16

SK2 Just focus on Cords?

Steven King, 13/04/2018

Key questions.

- How to improve our understanding of the thematic accuracy of Copernicus EO data?
  - What are the strengths and weaknesses for describing ecosystem extent, condition and services account?
- What are the best possibilities for improving Copernicus EO data?
  - What are the key data gaps? (thematic, spatial, temporal)?
  - Where can Copernicus EO data best be developed to addresses these?
- Where can *In-situ* data best contribute?
  - Where can *in-situ* data plug gaps? (in conjunction with EO or on its own)