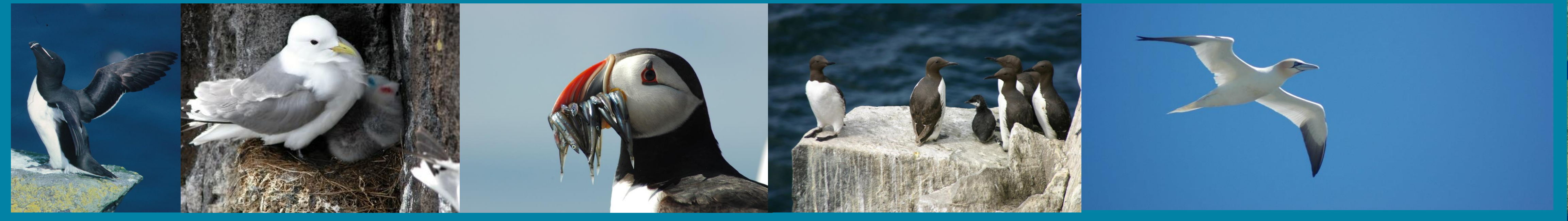


MS Cumulative Effects Framework

Workshop B
Sept 14th 2020





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SMRU: Prof John Harding
SMRU: Dr Magda Chudzinska
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UKCEH: Graham Dean

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DMP Stats: Dr Carl Donovan
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JNCC: Dr Karen Hall
JNCC: Dr Sonia Mendes
MacArthur Green: Dr Mark Trinder
RSPB: Dr Aly McCluskie
RSPB: Dr Lucy Wright
SeaWatch: Dr Peter Evans
SMRU: Dr Carol Sparling
UHI: Dr Elizabeth Masden

Project Overview

Robust assessment of cumulative effects requires a consistent and transparent approach to the collation and analysis of the best available data.

Three key requirements for developing a Cumulative Effects Framework (CEF):

- A Data Library, including Knowledge Base and Data Store, holding the key knowledge, parameters and data that feed into each of the modelling tools
- An R package that contains functions to run each of the modelling tools, link them together in feasible combinations, and perform a project-level or cumulative assessment
- A user interface that allows non-technical users to generate predicted impacts at a population level for both individual projects and cumulative assessments, with a clear audit trail to provide transparency and reproducibility

Project Work Packages

WP 1: Collation of generic information e.g. biometrics and project level information on activity and key receptors, and development of associated database

WP 2: Estimation of project level effects

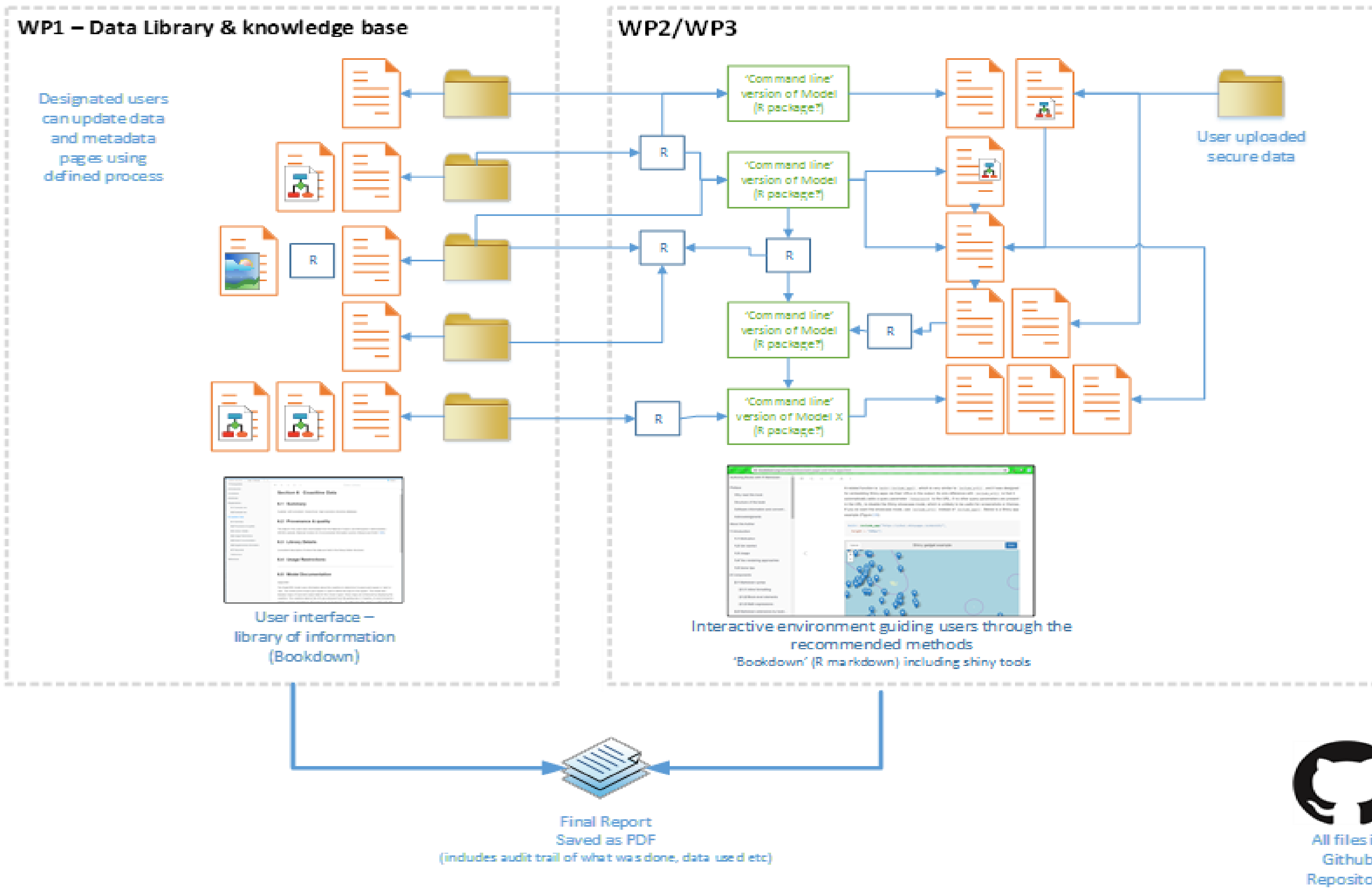
WP 3: Estimation of cumulative effects

WP 4: Web Application Development

WP 5: Stakeholder engagement

WP5 – Stakeholder engagement

WP4 - collaborative data science framework





MS Cumulative Effects Framework Workshop B - Aims



CEF and Workshop B

- Workshop B to cover data requirements feeding into data store and knowledge base
- Engagement with participants:
 - Have we identified the right parameters?
 - What data are out there that we should be using?
 - How can we access this data?

Workshop C – Data Sign-off

- Workshop C to run c. **mid-November**
- Purpose:
 - Presentation of data store and knowledge base
 - Stakeholder sign-off on contents

Technical Working Groups (TWGs) - BIRDS

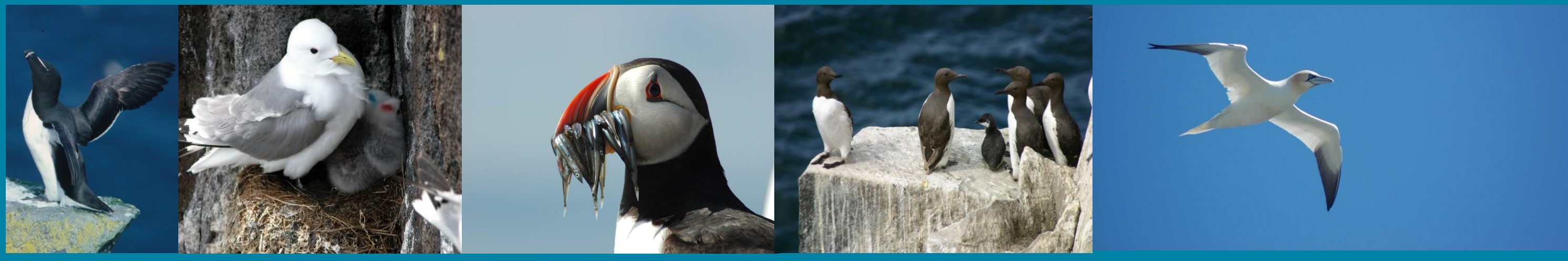
- Series of c. 5 TWGs for ornithology
- Will run between Workshop B (Data Requirements) and Workshop C (Data Sign-off)
- Will run **mid-Sept to mid-Nov**
- Small group of key users
- Advising on technical details:
 - Density data and spatial layers
 - OWF project specifications
 - Consensus defaults
 - Cumulative effects/integrating displacement and collision
 - Uncertainty

TWGs (MAMMALS)

- Series of c. 2 TWGs for marine mammals
- Will run between Workshop B (Data Requirements) and Workshop C (Data Sign-off)
- Will run **mid-Sept to mid-Nov**
- Small group of key users
- Advising on technical details:
 - Project level effects
 - Other marine mammal species

Workshop D – Demonstrator version

- Workshop D to run c. **mid-December**
- Purpose:
 - Presentation of “demonstrator” version of the CEF
 - Final discussion of structure of the CEF, and how tools will be used within it
 - Final sign-off on the agreed methodology for the project will follow shortly after Workshop D



MS Cumulative Effects Framework Framework



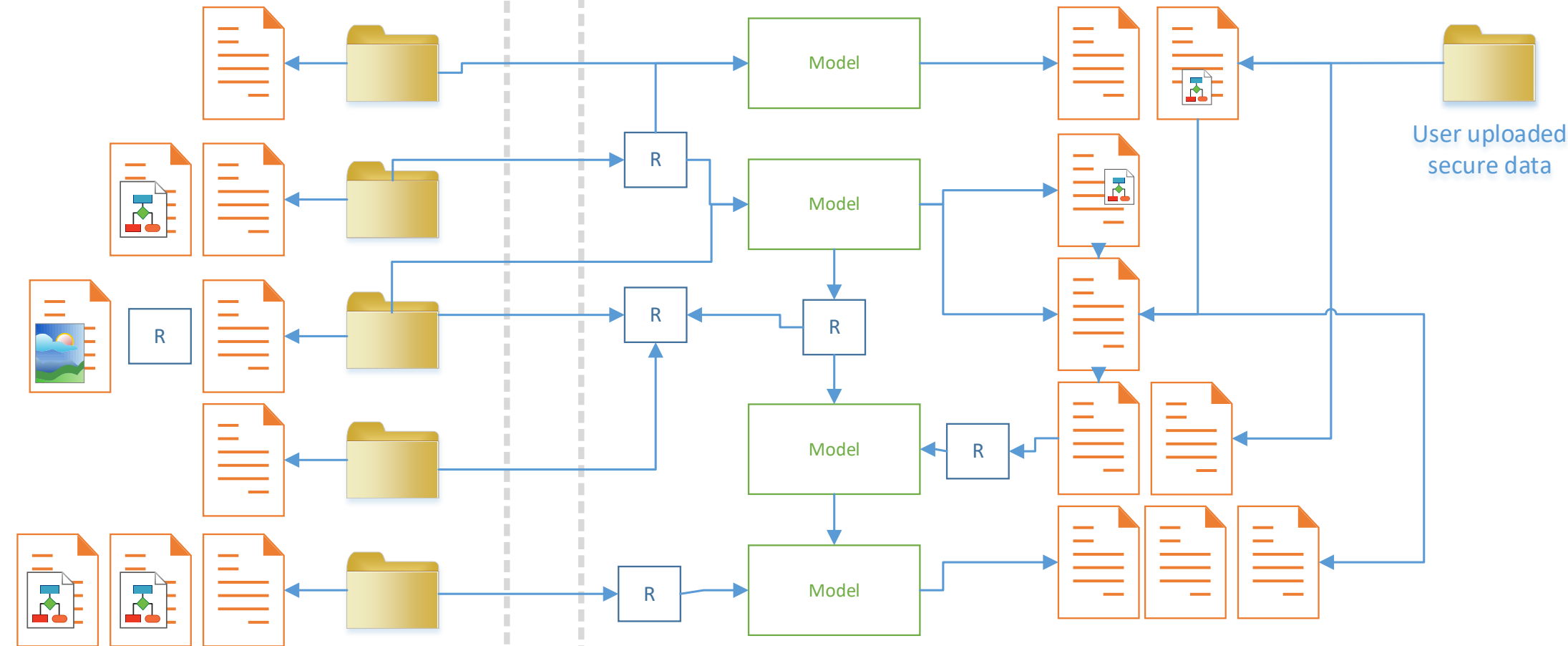
WP4 - collaborative data science framework

WP1 – Data store & knowledge base

Designated users can update data and metadata pages using defined process

2

WP2/WP3



1

3

Final Report
Saved as PDF
(includes audit trail of what was done, data used etc)

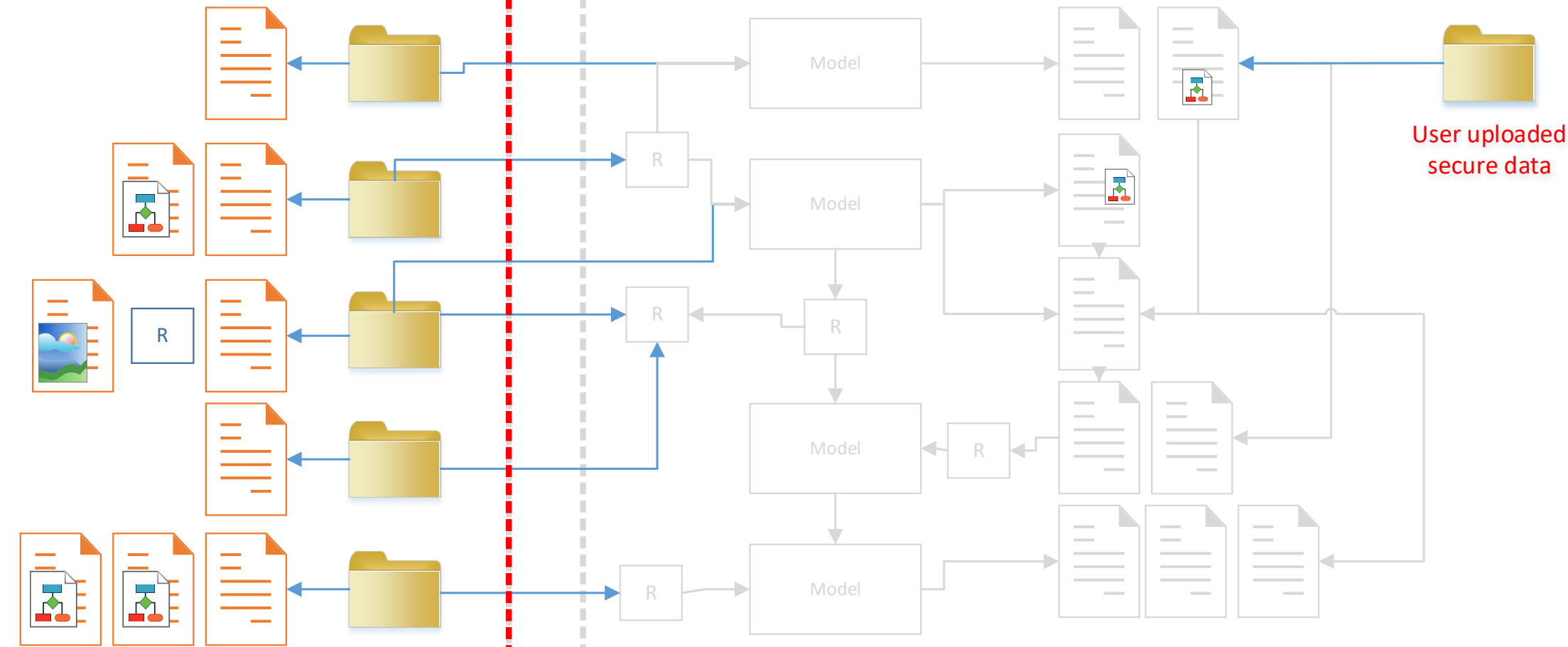
Cumulative Effects Framework

1. Framework
2. Data Library
3. Final assessment including record of analysis
4. User interface via web browser

WP1 – Data store & knowledge base

WP2/WP3

2



User interface – library of information

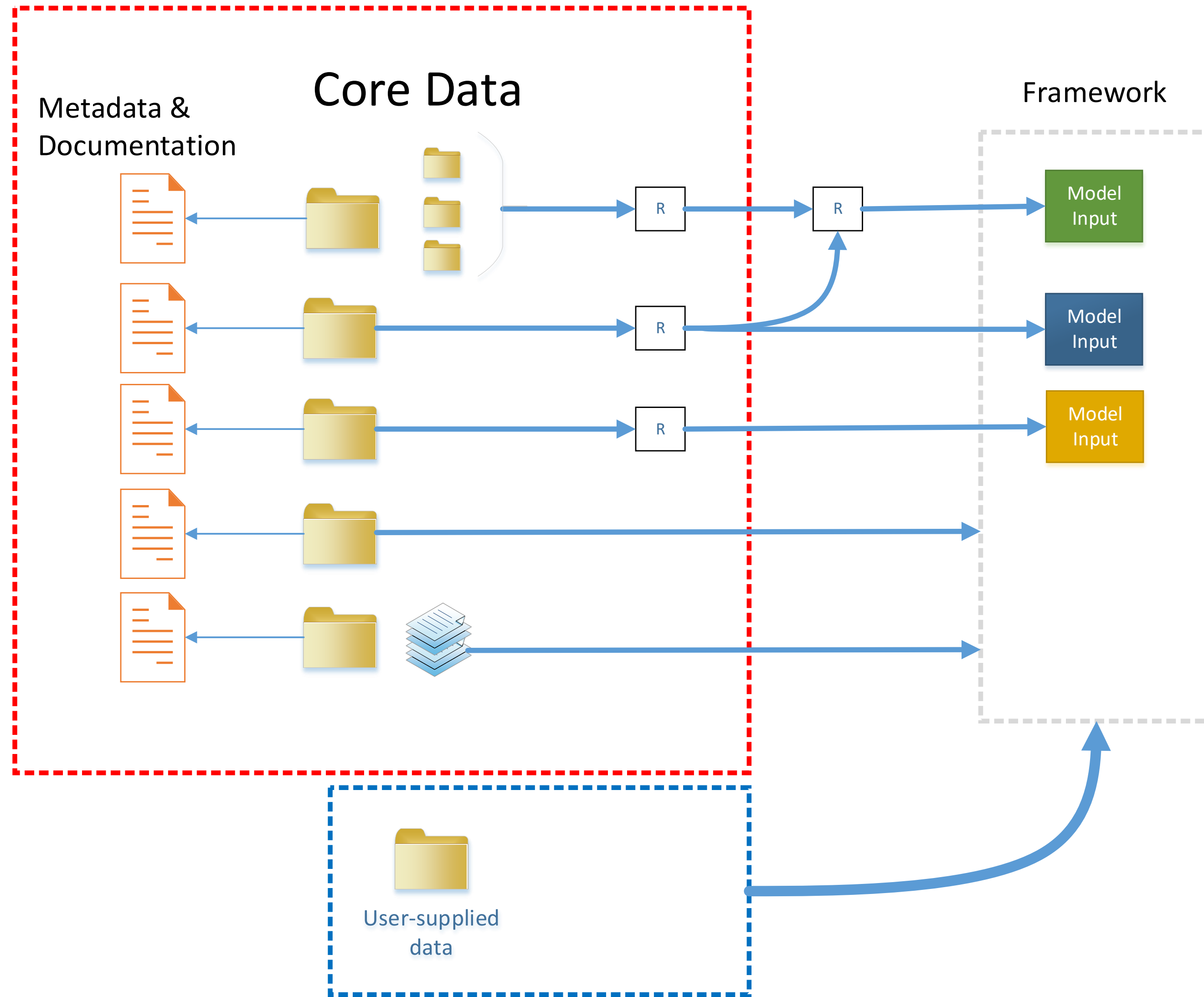
Interactive environment guiding users through the recommended methods

Final Report
Saved as PDF
(includes audit trail of what was done, data used etc)

Cumulative Effects Framework

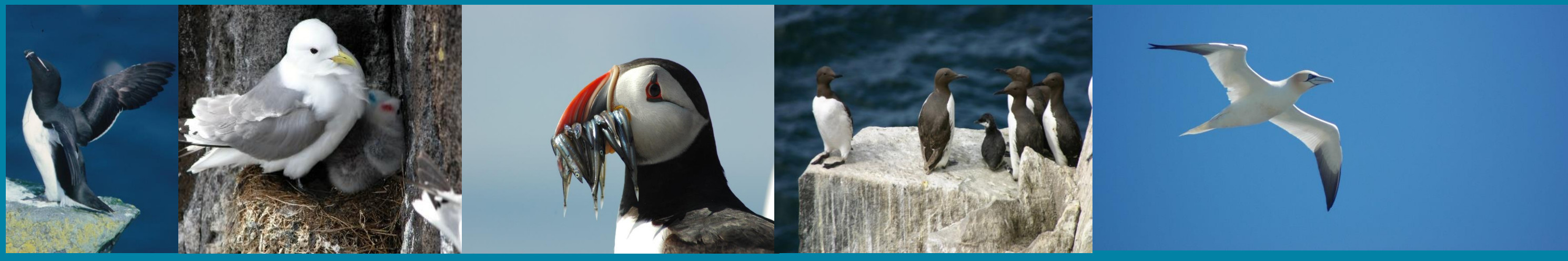
1. Framework
2. **Data Library**
3. Final assessment including record of analysis
4. User interface via web browser

Data Library: store + knowledge base



Data Library

- **Core data**
 - Key datasets / tool inputs
 - Alternative versions
 - Defined procedures for updating core data store
 - Avoid duplication (common values stored in a simple format)
- **Metadata + additional information**
 - Online 'manual'
- **User-supplied data**
 - Specific assessment



MS Cumulative Effects Framework

Data Store: Parameters



Data Store

- Hold data necessary to run tools for CEF
 - Marine Scotland Apportioning Tool
 - ORJIP Sensitivity Mapping Tool
 - Stochastic Collision Risk Model
 - Displacement Matrix
 - SeaBORD
 - Natural England PVA Tool
 - iPCoD
 - Agent Seal

Project Scope

- Collate data in format necessary for each tool
- E.g – processed survey data from within wind farm footprints
- Beyond the scope of this project to collate raw survey data

Data

- Data will be stored in a simple (e.g. “Tidy” format)
- Metadata file associated with each dataset created using R Markdown

Excel

File Home Insert Formulas Data Review

Calibri 11 B

A1 SPA

	A	B	C	D	E
1	SPA	Subsite_n	Receptor	FR_metric	Foraging_range
2		Generic	Common	Mean	3.2
3		Generic	Red-throat	Mean	4.5
4		Generic	European	Mean	NA
5		Generic	Leach's sto	Mean	657
6		Generic	Northern I	Mean	134.6
7		Generic	Manx shea	Mean	136.1
8		Generic	Northern C	Mean	120.4
9		Generic	European	Mean	9.2
10		Generic	Cormoran	Mean	7.1
11		Generic	Black-legg	Mean	54.7

Foraging Range Data

Summary

This dataset contains information related to seabird foraging sites from a review. The review searched published literature in order to identify studies which had published foraging range data and used those data to calculate generic foraging range estimates (Mean, Mean Maximum and Maximum). These data are used in the cumulative effects framework to [assess the risk of disturbance to seabirds](#).

Data Source and authors

Data are taken from a literature review carried out by the BTO (with additional input from the RSPB) under contract to NRSAS, working on behalf of the Crown Estate. The literature search covered papers and reports published up to April 2019, including both peer-reviewed papers and 'grey literature'. Additional data from the BTO and from the RSPB FAME and STAR projects were also included for some species. Generic foraging range estimates were calculated using data based on the best available methods for each species; for most species the foraging range estimates are based on direct measurements from birds tracked using GPS. [Quality assessment](#) of the confidence level for the foraging range estimates is provided in the original report - this is available for each species, depending on the number of studies and the variability across different sites. Site-specific foraging ranges from LIC SPAs are also included in this dataset (provided the SPA measurement is based on the best available method for that species). The review did not assess data quality for site-specific foraging ranges but includes information on the number of studies and the number of birds tracked (larger sample sizes will generally lead to improved foraging range estimates).

References

Woodward, I.D., [Dunlop](#), C.B., Owen, E. & Cook, A.S.C.P. 2019. [Down-based revision of seabird foraging ranges used for NRSAS screening](#). Report of work carried out by the BTO on behalf of NRSAS and the Crown Estate. BTO, Titchfield.

Versions

- Folder01_v1.0 original data created 11/09/2020 by Ien Woodward

Update details

No updates

Terms of Use

These data are published in a publicly available report and are therefore freely available to use, subject to standard copyright terms.

Data set attribution

How to cite use of this dataset (DOI)

Data Store Location

This may not be necessary for end users, Data Store structure will be hidden but it might be useful.

Display

Related or additional info

The 2019 review that produced the foraging ranges used in this dataset updated previous results from an earlier review published in 2012 ([Dunlop et al. 2012](#)). Seabird foraging ranges as a preliminary test for identifying candidate Marine Protected Areas. *Biological Conservation* 158: 55-61. The full descriptions are as follows:

Subsite_name The name of the subsite for which the foraging range data were collected. The word 'Generic' will be used in this field if the data refer to generic foraging range estimates for the species.

Receptor Species name.

FR_metric The foraging range metric - can be 'Mean', 'Maximum' or 'Max I'.

Foraging_range The foraging range (km).

Keywords

Seabird, foraging ranges

Data inputs birds

Tool	Data needs
Marine Scotland Apportioning Tool	Colony locations
	Densities
	Development footprint
	Apportioning %ages
ORJIP Sensitivity Mapping Tool	Breeding season definition
	Abundance maps from MERP
	Apportioning %ages
	Colony locations
	Development footprint

Data inputs birds

Tool	Data needs
Stochastic Collision Risk Model	Body length
	Wingspan
	Flight speed
	Flight height distribution / % at Collision risk height
	Avoidance Rate
	Bird densities
	Flight type (flap/glide)
	Nocturnal activity
	Development latitude
	N turbines
	Rotor diameter
	Wind farm width
	% time operational
N Blades, Pitch, blade width	

Data inputs birds

Tool	Data needs
SeaBORD	Adult & Chick body mass at start of breeding season
	Chick mass gain
	Adult & Chick energy expenditure
	Maximum prey intake rate
	Assimilation efficiency
	Energy gained from prey
	Energy density of tissue
	Energetic cost of flight/foraging etc.
	Length of chick rearing period
	Minimum body mass for chick/adult
	Minimum nest attendance
	Colony size & location
	Development footprint
	Displacement rate

Data inputs birds

Tool	Data needs
Displacement Matrix	Breeding season period
	Bird density
	Displacement rate
	Mortality rate for displaced birds
PVA Tool	Juvenile, Immature & Adult Survival Rates
	Maximum brood size
	Age at first breeding
	Productivity rates
	Population size
	First & Last year of operations

Data Inputs MAMMALS

Tool	Data needs
iPCoD	Demographic parameters for each species and MU
	Abundance for each species/MU
	Project level impact estimates (Disturbance, auditory injury, collisions)
	Project details – timing of impacts
AgentSeal	Habitat preference map
	Location of haul out and proportion of seals at each
	Number of seals
	Energetics parameters
	Diet parameters

Data Inputs

- Some tools more complex than others
- Some commonalities in the data needs (e.g. density data)
- Other data more unique to specific tools

Points for discussion

- Any glaring omissions?
- Best sources for these data?
 - Reviews (e.g. Woodward et al. 2020, Horswill & Robinson 2018)
 - Environmental Statements
 - MERP
- What data should be in the data & what should be provided by users?
- How do we balance generic & site-specific data?

To consider over lunch.....

- How do we set a quality threshold for including data (e.g. density data)
- Best sources for species baseline data (e.g reviews/papers etc.)
- As assessed, as consented & as built wind farm parameters
 - Which to include?
 - Where to access?