



**THEME [INFRA-2012-1.1.16.]  
[Natural History Collections]**

Grant agreement for: Combination of CP & CSA\*

**Annex I - "Description of Work"**

Project acronym: SYNTHESYS3

Project full title: " Synthesis of systematic resources "

Grant agreement no: 312253

Version date:

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# A1: Project summary

Project Number <sup>1</sup>	312253	Project Acronym <sup>2</sup>	SYNTHESYS3
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One form per project

## General information

Project title <sup>3</sup>	Synthesis of systematic resources		
Starting date <sup>4</sup>	01/09/2013		
Duration in months <sup>5</sup>	48		
Call (part) identifier <sup>6</sup>	FP7-INFRASTRUCTURES-2012-1		
Activity code(s) most relevant to your topic <sup>7</sup>	INFRA-2012-1.1.16.: Natural History Collections		
Free keywords <sup>8</sup>	Collections; biodiversity, geodiversity; collection management, digitisation, natural history		

## Abstract <sup>9</sup>

SYNTHESYS3 will create an accessible, integrated European resource for researchers in the natural sciences in Europe and globally. Building on the success of the previous SYNTHESYS IA, the NA will focus on improving collections management of new physical and virtual collections. By focusing the JRA on extracting and enhancing data from digitised collections, SYNTHESYS3 will increase the accessibility of these 340 million strong collections. A wide range of services and access – both physical and digital – will be provided to a broad range of scientific Users (from biological and geological related disciplines) in a consistent and accessible way. The natural history collections, held within the museums and herbaria, of Europe are World-class in terms of their magnitude and taxonomic coverage. They represent a resource unique in Europe as a model of the diversity of life on earth and are a physical dataset enabling Users to research how the human activity (including climate change) is having an increasingly negative impact on the diversity and distribution of biodiversity, which is threatening the continued provision of ecosystem services essential to human well-being.

# A2: List of Beneficiaries

Project Number <sup>1</sup>	312253	Project Acronym <sup>2</sup>	SYNTHEYS3
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## List of Beneficiaries

No	Name	Short name	Country	Project entry month <sup>10</sup>	Project exit month
1	NATURAL HISTORY MUSEUM	NHM	United Kingdom	1	48
2	ROYAL BOTANIC GARDENS KEW	RBGK	United Kingdom	1	48
3	ROYAL BOTANIC GARDEN EDINBURGH	RBGE	United Kingdom	1	48
4	MUSEUM NATIONAL D'HISTOIRE NATURELLE	MNHN	France	1	48
5	KOBENHAVNS UNIVERSITET	UCPH	Denmark	1	48
6	AGENCIA ESTATAL CONSEJO SUPERIOR DE INVESTIGACIONES CIENTIFICAS	CSIC	Spain	1	48
7	NATURHISTORISKA RIKSMUSEET	NRM	Sweden	1	48
8	STICHTING NATURALIS BIODIVERSITY CENTER	Naturalis	Netherlands	1	48
9	FREIE UNIVERSITAET BERLIN	FUB-BGBM	Germany	1	48
10	MUSEUM FUR NATURKUNDE - LEIBNIZ-INSTITUT FUR EVOLUTIONS- UND BIODIVERSITATSFORSCHUNG AN DER HUMBOLDT-UNIVERSITAT ZU BERLIN	MfN	Germany	1	48
11	NATURHISTORISCHES MUSEUM	NHMW	Austria	1	48
12	MAGYAR TERMESZETTUDOMANYI MUZEUM	HNHM	Hungary	1	48
13	INSTITUT ROYAL DES SCIENCES NATURELLES DE BELGIQUE	RBINS	Belgium	1	48
14	MUSEE ROYAL DE L'AFRIQUE CENTRALE	MRAC	Belgium	1	48
15	NARODNI MUZEUM-NATIONAL MUSEUM NM	NMP	Czech Republic	1	48
16	VIZZUALITY SL	VIZZ	Spain	1	48
17	STICHTING VU-VUMC	VU	Netherlands	1	48
18	HELLENIC CENTRE FOR MARINE RESEARCH	HCMR	Greece	1	48

# A3: Budget Breakdown

Project Number <sup>1</sup>	312253	Project Acronym <sup>2</sup>	SYNTHEYS3
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One Form per Project

Participant number in this project <sup>11</sup>	Participant short name	Fund. % <sup>12</sup>	Ind. costs <sup>13</sup>	Estimated eligible costs (whole duration of the project)						Requested EU contribution
				RTD (A)	Coordination (B)	Support (C)	Management (D)	Other (E)	Total A+B+C+D+E	
1	NHM	75.0	A	252,105.00	528,539.00	1,480,484.10	762,709.00	0.00	3,023,837.10	2,029,972.91
2	RBGK	75.0	T	55,200.00	141,216.00	181,351.40	0.00	0.00	377,767.40	280,676.84
3	RBGE	75.0	T	212,960.00	205,920.00	249,085.68	2,000.00	0.00	669,965.68	496,685.45
4	MNHN	75.0	T	94,560.00	57,120.00	705,278.24	0.00	0.00	856,958.24	680,129.16
5	UCPH	75.0	T	41,760.00	199,360.00	330,885.20	2,000.00	0.00	574,005.20	448,776.74
6	CSIC	75.0	A	186,622.00	362,037.00	316,544.00	2,000.00	0.00	867,203.00	622,970.25
7	NRM	75.0	T	0.00	74,656.00	513,151.00	2,000.00	0.00	589,807.00	488,420.65
8	Naturalis	75.0	T	76,320.00	66,880.00	367,540.00	2,000.00	0.00	512,740.00	421,380.72
9	FUB-BGBM	75.0	T	86,880.00	149,200.00	62,308.14	0.00	0.00	298,388.14	218,209.67
10	MfN	75.0	T	140,960.00	359,740.80	202,686.88	2,000.00	0.00	705,387.68	517,812.43
11	NHMW	75.0	T	46,560.00	30,400.00	330,636.20	0.00	0.00	407,596.20	324,086.61
12	HNHM	75.0	A	56,160.00	25,440.00	270,898.84	0.00	0.00	352,498.84	285,754.78
13	RBINS	75.0	T	77,600.00	28,160.00	199,376.14	0.00	0.00	305,136.14	247,235.88
14	MRAC	75.0	T	25,696.00	93,120.00	154,050.09	0.00	0.00	272,866.09	213,595.26
15	NMP	75.0	F	86,040.00	174,120.00	211,959.06	2,000.00	0.00	474,119.06	423,975.65
16	VIZZ	75.0	T	200,160.00	15,840.00	0.00	0.00	0.00	216,000.00	160,713.00
17	VU	75.0	T	53,920.00	56,680.00	0.00	0.00	0.00	110,600.00	78,344.75
18	HCMR	75.0	A	76,543.00	6,111.00	0.00	0.00	0.00	82,654.00	61,259.25
<b>Total</b>				<b>1,770,046.00</b>	<b>2,574,539.80</b>	<b>5,576,234.97</b>	<b>776,709.00</b>	<b>0.00</b>	<b>10,697,529.77</b>	<b>8,000,000.00</b>

Note that the budget mentioned in this table is the total budget requested by the Beneficiary and associated Third Parties.

**\* The following funding schemes are distinguished**

Collaborative Project (if a distinction is made in the call please state which type of Collaborative project is referred to: (i) Small of medium-scale focused research project, (ii) Large-scale integrating project, (iii) Project targeted to special groups such as SMEs and other smaller actors), Network of Excellence, Coordination Action, Support Action.

**1. Project number**

The project number has been assigned by the Commission as the unique identifier for your project, and it cannot be changed. The project number **should appear on each page of the grant agreement preparation documents** to prevent errors during its handling.

**2. Project acronym**

Use the project acronym as indicated in the submitted proposal. It cannot be changed, unless agreed during the negotiations. The same acronym **should appear on each page of the grant agreement preparation documents** to prevent errors during its handling.

**3. Project title**

Use the title (preferably no longer than 200 characters) as indicated in the submitted proposal. Minor corrections are possible if agreed during the preparation of the grant agreement.

**4. Starting date**

Unless a specific (fixed) starting date is duly justified and agreed upon during the preparation of the Grant Agreement, the project will start on the first day of the month following the entry into force of the Grant Agreement (NB : entry into force = signature by the Commission). Please note that if a fixed starting date is used, you will be required to provide a detailed justification on a separate note.

**5. Duration**

Insert the duration of the project in full months.

**6. Call (part) identifier**

The Call (part) identifier is the reference number given in the call or part of the call you were addressing, as indicated in the publication of the call in the Official Journal of the European Union. You have to use the identifier given by the Commission in the letter inviting to prepare the grant agreement.

**7. Activity code**

Select the activity code from the drop-down menu.

**8. Free keywords**

Use the free keywords from your original proposal; changes and additions are possible.

**9. Abstract**

**10. The month at which the participant joined the consortium, month 1 marking the start date of the project, and all other start dates being relative to this start date.**

**11. The number allocated by the Consortium to the participant for this project.**

**12. Include the funding % for RTD/Innovation – either 50% or 75%**

**13. Indirect cost model**

**A: Actual Costs**

**S: Actual Costs Simplified Method**

**T: Transitional Flat rate**

**F :Flat Rate**

# Workplan Tables

Project number

312253

Project title

SYNTHESYS3—Synthesis of systematic resources

Call (part) identifier

FP7-INFRASTRUCTURES-2012-1

Funding scheme

Combination of CP & CSA





# WT1

## List of work packages

Project Number <sup>1</sup>	312253	Project Acronym <sup>2</sup>	SYNTHESSYS3
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### LIST OF WORK PACKAGES (WP)

WP Number <sup>53</sup>	WP Title	Type of activity <sup>54</sup>	Lead beneficiary number <sup>55</sup>	Person-months <sup>56</sup>	Start month <sup>57</sup>	End month <sup>58</sup>
WP 1	Management	MGT	1	208.00	1	48
WP 2	Improving collections management and enhancing accessibility.	COORD	10	163.00	1	48
WP 3	Innovation, Impact and sustainability	COORD	15	71.00	1	48
WP 4	Moving from physical to digital collections	RTD	3	177.00	1	48
WP 5	TAF Management	SUPP	1	83.00	1	48
WP 6	AT TAF	COORD	11	0.00	1	48
WP 7	BE TAF	COORD	13	0.00	1	48
WP 8	CZ TAF	COORD	15	0.00	1	48
WP 9	DE TAF	COORD	10	0.00	1	48
WP 10	DK TAF	COORD	5	0.00	1	48
WP 11	ES TAF	COORD	6	0.00	1	48
WP 12	FR TAF	COORD	4	0.00	1	48
WP 13	GB TAF	COORD	1	0.00	1	48
WP 14	HU TAF	COORD	12	0.00	1	48
WP 15	NL TAF	COORD	8	0.00	1	48
WP 16	SE TAF	COORD	7	0.00	1	48
				Total	702.00	

# WT2: List of Deliverables

Project Number <sup>1</sup>	312253	Project Acronym <sup>2</sup>	SYNTHESYS3
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## List of Deliverables - to be submitted for review to EC

Deliverable Number <sup>61</sup>	Deliverable Title	WP number <sup>53</sup>	Lead beneficiary number	Estimated indicative person-months	Nature <sup>62</sup>	Dissemination level <sup>63</sup>	Delivery date <sup>64</sup>
D1.1	Reallocate UD	1	1	1.00	O	PP	19
D1.2	Reallocate UD	1	1	1.00	O	PP	31
D1.3	Kick off meeting (NRSG)	1	1	1.00	O	PP	4
D1.4	AGM1	1	1	1.00	O	PP	14
D1.5	AGM2	1	1	1.00	O	PP	27
D1.6	Risk workshop	1	1	0.20	O	PP	1
D1.7	Risk update 1	1	1	0.20	O	PP	7
D1.8	Risk update 2	1	1	0.20	O	PP	13
D1.9	Risk update 3	1	1	0.20	O	PP	19
D1.10	Risk update 4	1	1	0.20	O	RE	25
D1.11	Risk update 5	1	1	0.20	O	PP	31
D1.12	Risk update 6	1	1	0.20	O	PP	37
D1.13	Risk update 7	1	1	0.20	O	PP	43
D2.1	"Virtual Collections" management Policy meeting	2	10	2.00	O	PU	28
D2.2	"Virtual Collections" management Policy	2	10	14.50	O	PU	36
D2.3	New physical CM policy meeting	2	10	2.50	O	PU	28
D2.4	Best practise handbook	2	10	5.50	O	PU	32
D2.5	new physical collections policy	2	10	15.00	O	PU	36
D2.6	Strategic priorities for barcoding	2	8	38.50	R	PU	28
D2.7	DNA Library construction workshop	2	8	2.00	O	PU	24
D2.8	Protocols for DNA extraction	2	8	14.00	O	PU	38
D2.9	Updated CSAT tool	2	1	4.00	O	PU	40

# WT2: List of Deliverables

Deliverable Number <sup>61</sup>	Deliverable Title	WP number <sup>53</sup>	Lead beneficiary number	Estimated indicative person-months	Nature <sup>62</sup>	Dissemination level <sup>63</sup>	Delivery date <sup>64</sup>
D3.1	Promotion NA2	3	15	6.50	O	PU	48
D3.2	Promotion JRA	3	15	6.50	O	PU	48
D3.3	Optimal digitisation pilot study	3	1	6.50	R	PU	15
D3.4	Crowdsourcing report	3	1	16.50	R	PU	12
D3.5	Sustainability workshop	3	15	2.00	O	PU	24
D3.6	European roadmap	3	15	4.00	R	PU	34
D4.1	Edge detection technology	4	3	32.00	O	PU	12
D4.2	Optimal automated metadata capture	4	3	32.00	R	PU	24
D4.3	Crowdsourcing for metadata enrichment	4	10	53.00	R	PU	24
D4.4	Protocols for optimal MicroCT	4	10	12.00	R	PU	36
D4.5	Digitisation on demand	4	1	12.00	R	PU	30
D5.1	User day delivery	5	1	77.00	O	PU	48
<b>Total</b>				<b>364.60</b>			

# WT3: Work package description

Project Number <sup>1</sup>	312253	Project Acronym <sup>2</sup>	SYNTHEYS3
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## One form per Work Package

Work package number <sup>53</sup>	WP1	Type of activity <sup>54</sup>	MGT
Work package title	Management		
Start month	1		
End month	48		
Lead beneficiary number <sup>55</sup>	1		

## Objectives

1. Ensure deliverables are produced on time and within budget
2. Communication between Participants and Users on project status
3. Risk management
4. Effective dissemination of opportunities and outputs to User community
5. Robust financial management
6. Adoption of Consortium
7. Effective project interface with the Commission

## Description of work and role of partners

1. NHM Management Team (NHMMT):
  - SYNTHESYS Coordinator
  - Project Manager (Deputy to Coordinator)
  - SYNTHESYS Access Leader (SAL)
  - Administration assistant (AA)

Tasks include: Liaison with the Infrastructure Project Officer; delivering annual reports, project review and plans to the Commission; communication with the Consortium and Users; delivery of TA application system; arranging Annual General Meetings (AGM); ensure completion of deliverables; encouraging broad involvement in the project; maintaining risk register; and preparing for the inclusion of additional partners if required.

NHMMT will meet monthly to review progress against deliverables and will agree actions to be fed back to the SYNTHESYS3 Consortium and the wider User community.

Two-day AGMs, comprising all Work Package (WP) leaders, will allow for reports on progress against all deliverables but will also be an opportunity to discuss how the outputs of SYNTHESYS3 can be delivered to a wider User Community. AGMs will allocate time for NRSG and ASG meetings and is in effect a general assembly.

The AA will make available from AGM, plus the deliverables and dissemination plans for all outputs online via [www.SYNTHESYS.info](http://www.SYNTHESYS.info) to ensure transparency.

2. Networking & Research Steering Group (NRSG): The NAs and the JRA will be coordinated through the NRSG.

- SYNTHESYS3 Coordinator (Chair)
- Project manager
- NA2 & NA3 WP Leaders (or deputies)
- JRA Leader (or deputy)

Tasks include: six monthly conference calls to review progress and spend, confirm the work and budgets for the subsequent six months; discuss exploitation of project results. Representatives from SMEs may be included to discuss technical developments.

NA/JRA Activity Leader Deputy Lead Participant No.  
NA1 Phil Rainbow (NHM) Kristina Duffin (NHM) 1

# WT3: Work package description

NA2 Thomas von Rintelen (MfN) Rob Huxley (NHM) 10  
 NA3 Jiri Kvacek (NMP) Christiane Quaiser (MfN) 15  
 JRA David Harris (RBGE) Elspeth Haston (RBGE) 3

The majority of NRSG business will be conducted by email. Minor issues or conflicts will be resolved by the SYNTHESYS3 Coordinator and NA & JRA WP Leaders. Major issues will be debated and resolved at the AGM invoking Consortium Agreement rulings. Each WP Leader will present expenditure reports that the Project Manager will review against planned spend and delivery.

### 3. Access Steering Group (ASG):

- SAL as Chair
- 11 TAF Leaders (or deputies)

Tasks include: TA Call promotion, User Selection Panels (USP); approval of changes to User Day allocation; dealing with User feedback.

TAF Leaders will respond to enquiries from potential Access applicants, NHMMT will act as the backstop on any enquiries the TAF Leaders are unable to address. NHMMT members will observe at a selection of USPs to ensure coherent and transparent practice. Each quarter the TAF Leaders will be required to review online User feedback reports and notifications of User outputs. The SAL will also check the User feedback and, follow-up with all Users who score any aspect of their visit 'fair' or 'poor'. The AA will assist TAF Leaders with chasing up notifications of new publications.

### TAF TAF Leader TAF Deputy

AT TAF Ernst Vitek (NHMW) Karin Wiltchshke (NHMW)  
 BE TAF Patrick Grootaert (RBINS) Patricia Mergen (RMCA)  
 CZ TAF Jiri Kvacek (NMP) Jiřina Dašková (NMP)  
 DE TAF Carsten Lueter (MfN) Regine Jahn (BGBM)  
 DK TAF Henrik Enghoff (UCPH) Giles Cuny (UCPH)  
 ES TAF Marian Ramos (CSIC) Gonzalo Nieto (CSIC)  
 FR TAF Michel Guiraud (MNHN) Vanessa Demanoff (MNHN)  
 GB TAF Harry Rousham (NHM) Kristina Duffin (NHM)  
 HU TAF Beatta Papp (HNHM) Laszlo Lokos (HNHM)  
 NL TAF Ronald Sluys (NBC) Rene Dekker (NBC)  
 SE TAF Irene Bisang (NRM) Stefan Claesson (NRM)

The ASG will meet annually (at the AGM) to review the User application levels, User feedback, quality and quantity of outputs, and to agree the plans for the provision of future access. This includes reviews of the revised User Day allocations. The majority of ASG business will be conducted by email. Minor issues or conflicts will be resolved by the SAL, in consultation with the ASG. Major issues will be debated and resolved in the annual ASG meetings.

### Person-Months per Participant

Participant number <sup>10</sup>	Participant short name <sup>11</sup>	Person-months per participant
1	NHM	208.00
	Total	208.00

### List of deliverables

Delive- rable Number <sup>61</sup>	Deliverable Title	Lead benefi- ciary number	Estimated indicative person- months	Nature <sup>62</sup>	Dissemi- nation level <sup>63</sup>	Delivery date <sup>64</sup>
D1.1	Reallocate UD	1	1.00	O	PP	19
D1.2	Reallocate UD	1	1.00	O	PP	31

# WT3: Work package description

## List of deliverables

Deliverable Number <sup>61</sup>	Deliverable Title	Lead beneficiary number	Estimated indicative person-months	Nature <sup>62</sup>	Dissemination level <sup>63</sup>	Delivery date <sup>64</sup>
D1.3	Kick off meeting (NRSG)	1	1.00	O	PP	4
D1.4	AGM1	1	1.00	O	PP	14
D1.5	AGM2	1	1.00	O	PP	27
D1.6	Risk workshop	1	0.20	O	PP	1
D1.7	Risk update 1	1	0.20	O	PP	7
D1.8	Risk update 2	1	0.20	O	PP	13
D1.9	Risk update 3	1	0.20	O	PP	19
D1.10	Risk update 4	1	0.20	O	RE	25
D1.11	Risk update 5	1	0.20	O	PP	31
D1.12	Risk update 6	1	0.20	O	PP	37
D1.13	Risk update 7	1	0.20	O	PP	43
Total			6.60			

## Description of deliverables

- D1.1) Reallocate UD: Reallocate TS User Days based on demand [month 19]
- D1.2) Reallocate UD: Reallocate TS User Days based on demand [month 31]
- D1.3) Kick off meeting (NRSG): Kick off Meeting - Production of minutes and follow up on actions [month 4]
- D1.4) AGM1: Annual General Meeting (NRSG & ASG) - Production of minutes and follow up on actions [month 14]
- D1.5) AGM2: Annual General Meeting (NRSG & ASG)- Production of minutes and follow up on actions [month 27]
- D1.6) Risk workshop: Create risk register and communicate to Participants [month 1]
- D1.7) Risk update 1: Updated risk register communicated to Participants [month 7]
- D1.8) Risk update 2: Updated risk register communicated to Participants [month 13]
- D1.9) Risk update 3: Updated risk register communicated to Participants [month 19]
- D1.10) Risk update 4: Updated risk register communicated to Participants [month 25]
- D1.11) Risk update 5: Updated risk register communicated to Participants [month 31]
- D1.12) Risk update 6: Updated risk register communicated to Participants [month 37]
- D1.13) Risk update 7: Updated risk register communicated to Participants [month 43]

# WT3: Work package description

Schedule of relevant Milestones

Milestone number <sup>59</sup>	Milestone name	Lead beneficiary number	Delivery date from Annex I <sup>60</sup>	Comments
MS1	Kick off meeting	1	11	Minutes & actions circulated
MS2	AGM1	1	23	Minutes & actions circulated
MS3	AGM2	1	35	Minutes & actions circulated
MS4	NRSG teleconference	1	1	Minutes & actions circulated
MS5	NRSG teleconference	1	7	Minutes & actions circulated
MS6	NRSG teleconference	1	13	Minutes & actions circulated
MS7	NRSG teleconference	1	19	Minutes & actions circulated
MS8	NRSG teleconference	1	25	Minutes & actions circulated
MS9	NRSG teleconference	1	31	Minutes & actions circulated
MS10	NRSG teleconference	1	37	Minutes & actions circulated
MS11	NRSG teleconference	1	43	Minutes & actions circulated
MS12	Risk workshop	1	1	To create risk register and update countermeasures
MS13	Risk workshop	1	7	Revise risk register and update countermeasures
MS14	Risk workshop	1	13	Revise risk register and update countermeasures
MS15	Risk workshop	1	19	Revise risk register and update countermeasures
MS16	Risk workshop	1	25	Revise risk register and update countermeasures
MS17	Risk workshop	1	31	Revise risk register and update countermeasures
MS18	Risk workshop	1	36	Revise risk register and update countermeasures
MS19	Risk workshop	1	43	Revise risk register and update countermeasures
MS20	Launch Access Call	1	2	Open website

# WT3: Work package description

## Schedule of relevant Milestones

Milestone number <sup>59</sup>	Milestone name	Lead beneficiary number	Delivery date from Annex I <sup>60</sup>	Comments
MS21	Launch Access Call	1	14	Open website
MS22	Launch Access Call	1	26	Open website
MS23	Launch Access Call	1	38	Open website
MS24	Allocation algorithm run	1	3	Calculate UD allocation based on demand from Call 1
MS25	Allocation algorithm run	1	15	Calculate UD allocation based on demand from Call 2
MS26	Allocation algorithm run	1	27	Calculate UD allocation based on demand from Call 3



# WT3: Work package description

Project Number <sup>1</sup>	312253	Project Acronym <sup>2</sup>	SYNTHESSYS3
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## One form per Work Package

Work package number <sup>53</sup>	WP2	Type of activity <sup>54</sup>	COORD
Work package title	Improving collections management and enhancing accessibility.		
Start month	1		
End month	48		
Lead beneficiary number <sup>55</sup>	10		

## Objectives

Obj. 1: Managing new (virtual and physical) collections  
 Obj. 2: Developing strategic priorities for molecular related NH collections  
 Obj. 3: Develop Collections Self-Assessment Tool (CSAT) for new collections

## Description of work and role of partners

Obj 1 Managing new (virtual and physical) collections  
 MfN (lead), NHM; RBGK, RBGE, UCPH, CSIC, RMCA, NMP

Task 1.1 Develop policies for virtual CM (CM) and integrate JRA outputs

Collate existing European virtual collection policies and use these as a basis for recommendations on a common European virtual data management policies and procedures. A meeting will be held with external representatives to discuss and refine the policies. Recommendations will include areas such as sustainable storage, open access (e.g. links with Europeana/GBIF), and IPR and Access and Benefit Sharing. In conjunction with NA3, policies will be promoted via CPB, CETAF, SPNHC and national fora. All policies will be placed on EU-CoM. JRA outputs will be included into policies to ensure that data generated from the new digital extraction techniques and crowdsourcing are fully integrated.

Task 1.2 Produce handbook of best practice and standards for 3D imaging of NH specimens

To get an overview of all relevant 3D techniques, software and equipment, a handbook of best practice for 3D imaging will be produced. The handbook will use JRA obj. 2 results and include recommendations concerning which techniques should be used for different types of object, and which technical standards exist for creating a 3D image and for visualisation of the images.

International groups working on 3D imaging will be invited to a workshop to discuss the handbook content and to horizon scan the domain. Chapters will be written by working groups constituted at the workshop (including others deemed relevant). The results will be used by JRA obj. 4.

Task 1.3 Develop policies for new physical CM

Collate existing European policies that relate to new physical collections and use these as a basis to agree recommendations for common European CM policies and procedures. A meeting will be held with representatives from outside the Consortium to discuss and refine the policies. The recommendations will include areas such as optimal storage, cost of access/sustainability, data integration, and acquisition, access and use regulations (in agreement with ABS/CBD). Promotion as task 1.1. Horizon scanning will be an integral part of this task.

Objective 2: Developing strategic priorities for molecular related NH collections

Participants: NCB (lead), NHM; RBGK, RBGE, MNHN, UCPH, CSIC, NRM, BGBM, MfN, NHMW, RMCA, RBINS, NMP

Task 2.1. Develop strategic priorities for barcoding of NH collections

Working alongside members of IBOL, create a common strategy for prioritising the barcoding of NH collections. Host workshop of NH institutions and key IBOL members to achieve this aim. CETAF, SPNHC, CPB, ECBOL and LifeWatch will be used to recruit institutions outside the Consortium to adopt the policy, ensuring a coordinated action across Europe.

Task 2.2. Develop strategic priorities for DNA library creation of NH collections

# WT3: Work package description

Creation and use of DNA Libraries (developed in SYNTHESYS2) will be reviewed for feasibility of implementation at institutional scale by European NH institutions. Host a two day workshop to assess the scope and protocols for common integration. Day one will be used to demonstrate the outputs of the previous SYNTHESYS JRA outcomes, which are methodologies for optimal extraction of DNA from NH collections. Day two will be used to agree priorities and integrated strategies for the creation of DNA libraries.

Task 2.3. Develop protocols for data collection from DNA extraction

Develop protocols for collecting data from sequencing activities on NH collections and feedback on the success of different methodologies. Working alongside the CPB, NA2 aims to produce a Memorandum of Understanding for a European protocol.

Task 2.4. Establish network of DNA and tissue banks

Work with Biological Resource Centres and ESBB to establish a network of DNA and tissue banks in Europe.

Advice will be sought from seed and germplasm banks who have already overcome some of the potential issues for their specific group of organisms. The aims of this network will be to:

- 1) Enable easy access and exchange of DNA, RNA, and tissue samples
- 2) Coordinate the use of protocols to improve the storage of and access to collections (with Task 1.1)
- 3) Extend the international participation in the DNA Bank Network
- 4) Enhance the information system to better cover the links between specimens, tissue collections, and DNA/RNA collections.
- 5) Integrate RNA collections into the access system
- 6) Investigate integration of the network with ESBB to strengthen the biodiversity biobank community, and join efforts to integrate with the BBMRI and the GBRCN project.
- 7) Investigate the inclusion of samples stored using new techniques
- 8) Adapt existing business plan for the technical maintenance of the network (if necessary), establish fee-based long term maintenance.

Objective 3: Develop Collections Self-Assessment Tool (CSAT)

Participants: NHM (Lead), RBGE, UCPH, CSIC, BGBM, MfN

Task 3.1 Collections Self Assessment provision

Operation and promotion of CSAT (developed in SYNTHESYS2). Results fed back to institutions so that they can prioritise and implement changes to improve collections accessibility. Results will be used to identify key problem areas in CM and information passed on to the CPB for action via EU-CoM.

Task 3.2 Integration of new CM approaches into the CSAT

Questions will be added to the CSAT to enable institutions to assess the management of their virtual and new physical collections. SYNTHESYS3 will support institutions that are shown not to be managing these new collections suitably, so that they can improve and increase their accessibility.

## Person-Months per Participant

Participant number <sup>10</sup>	Participant short name <sup>11</sup>	Person-months per participant
1	NHM	19.00
2	RBGK	12.00
3	RBGE	16.00
4	MNHN	4.00
5	UCPH	15.00
6	CSIC	15.00
7	NRM	4.00
8	Naturalis	4.00
9	FUB-BGBM	14.00
10	MfN	32.00
11	NHMW	3.00

# WT3: Work package description

## Person-Months per Participant

Participant number <sup>10</sup>	Participant short name <sup>11</sup>	Person-months per participant
13	RBINS	5.00
14	MRAC	6.00
15	NMP	13.00
18	HCMR	1.00
Total		163.00

## List of deliverables

Deliverable Number <sup>61</sup>	Deliverable Title	Lead beneficiary number	Estimated indicative person-months	Nature <sup>62</sup>	Dissemination level <sup>63</sup>	Delivery date <sup>64</sup>
D2.1	"Virtual Collections" management Policy meeting	10	2.00	O	PU	28
D2.2	"Virtual Collections" managementPolicy	10	14.50	O	PU	36
D2.3	New physical CM policy meeting	10	2.50	O	PU	28
D2.4	Best practise handbook	10	5.50	O	PU	32
D2.5	new physical collections policy	10	15.00	O	PU	36
D2.6	Strategic priorities for barcoding	8	38.50	R	PU	28
D2.7	DNA Library construction workshop	8	2.00	O	PU	24
D2.8	Protocols for DNA extraction	8	14.00	O	PU	38
D2.9	Updated CSAT tool	1	4.00	O	PU	40
Total			98.00			

## Description of deliverables

D2.1) "Virtual Collections" management Policy meeting: Meeting to discuss virtual collection management policies [month 28]

D2.2) "Virtual Collections" managementPolicy: Finalised policy for virtual collection management available [month 36]

D2.3) New physical CM policy meeting: Meeting to discuss new physical collections management policies [month 28]

D2.4) Best practise handbook: Handbook on best practise in 3D imaging for natural history collections. [month 32]

D2.5) new physical collections policy: Finalised policy for new physical collections management available [month 36]

D2.6) Strategic priorities for barcoding: Report on the strategic priorities for barcoding of natural history collections [month 28]

D2.7) DNA Library construction workshop: Workshop on the construction of DNA libraries [month 24]

D2.8) Protocols for DNA extraction: Protocols for DNA extraction made available [month 38]

# WT3: Work package description

D2.9) Updated CSAT tool: Updated Collections Self Assessment Tool (CSAT) launched [month 40]

## Schedule of relevant Milestones

Milestone number <sup>59</sup>	Milestone name	Lead beneficiary number	Delivery date from Annex I <sup>60</sup>	Comments
MS28	Network of DNA & tissue banks established	5	18	Remit of network agreed
MS29	CSAT utilisation	1	24	Minimum of 10 institutions have used CSAT

# WT3: Work package description

Project Number <sup>1</sup>	312253	Project Acronym <sup>2</sup>	SYNTHEYS3
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## One form per Work Package

Work package number <sup>53</sup>	WP3	Type of activity <sup>54</sup>	COORD
Work package title	Innovation, Impact and sustainability		
Start month	1		
End month	48		
Lead beneficiary number <sup>55</sup>	15		

## Objectives

The overall aim of NA3 is to ensure that SYNTHEYS3 has a clear pathway to impact by making certain that outputs are well publicised to, and utilised by, the broader research and development community – and that the work undertaken and benefits created continue beyond the life of the project. Moreover, the outputs assist in the delivery of other key European initiatives including, but not limited to, LifeWatch

The main objectives of NA3 are:

Obj. 1: Innovation

Obj.2: Impact

Obj. 3: Sustainability

## Description of work and role of partners

### Objective 1 Innovation

Participants: NHM (lead), RBGE, CSIC, MfN, NHMW, RMCA, NMP, VIZZ, VU

#### Task 1.1. Engagement of Scientific Advisory Board (SAB)

NHMMT will provide progress reports to the SAB every six months and seek opinion to ensure that the work undertaken, particularly the JRA, remains relevant and is utilising the most up-to-date technology available. SAB Members who have accepted the invitation already extended to them are:

Rod Page: Bioinformatician, Uni of Glasgow

Gregor Hagedorn: Bioinformatician, Julius Kühn-Institute,

Donald Holbern: Exec Sec GBIF

Scott Miller: IBOL, Science Steering Cttee member

Chris Norris: President of SPNHC

Pamela Soltis: iDigBio, Director for Research Activities

Sarah Simons: CABI

Steve Welch: Knowledge Transfer Network

Further members will be co-opted as required during the life of the project.

#### Task 1.2. Foster relationships with industry and support technological development

Should there be innovation in the wider imaging field (outside scope of VIZZ) that merits further commercial development; NA3 will be responsible for identifying new industrial collaborators to take this forward. The initial step will be to seek advice from the SAB.

Working alongside the JRA, NA3 will support the technological developments of SYNTHEYS3 by gathering User feedback on the application of software, allowing the technology to be further developed to better meet User needs.

#### Task 1.3 Pilot study into optimal digitisation technologies and equipment

In collaboration with the JRA, a pilot project will review operational aspects of access to new forms of digitised images. The study will seek to identify which digitisation techniques and equipment provide virtual collections that are most suitable to permit research on particular specimens. The pilot will involve gathering data from Participants on their current digitisation facilities and needs, plus a literature review and questionnaire on how their equipment has been used and their successes and challenges. The JRA will undertake further research on the use potential of key digitisation equipment with Participants that currently lack optimal facilities. Results

# WT3: Work package description

will be fed back to manufacturers where appropriate to be used in their future R&D to develop new tools fit for market.

An output of the pilot study will be a digitisation work flow that can support Users/collection managers when requesting/accessing surrogate collections for their research needs. Institutions can also benefit from the results when considering which new equipment to purchase for their infrastructure.

## Task 1.4 Pilot study into optimal crowdsourcing processes for NH institutions

In collaboration with the JRA, a two-phase pilot project will be completed. Phase 1 will identify which are the most appropriate target groups for crowdsourcing. The review will include general public, amateur taxonomists/retired experts and other researchers. This will be achieved by: i) mapping the current Users of the collection facilities and then identify who are the 'Power Users'; ii) data mine social media for active cyber users with a clear interest in biodiversity. These users will then be approached to engage in the crowdsourcing website development and testing.

Phase 2 will look at what projects are the most appropriate and engaging for use with crowdsourcing efforts. The results will feed in to the development of the crowdsourcing websites (JRA, task 2.2) and can be used by other NH organisations interested in using crowdsourcing as a way of increasing the volume of data associated with their digitised collections.

## Objective 2: Impact

Participants: NMP (Lead), NHM, RBGE, UCPH, CSIC, NRM, NCB, BGBM, MfN, HNHM, RMCA

### Task 2.1. Promotion and dissemination

Promote the outputs of SYNTHESYS3 both within and outside of Europe, including:

Promotion of CSAT (NA2, task 3.1) internationally to allow institutions in Third Countries to assess the status of their CM and provide information on where they need to adopt better standards.

The crowdsourcing website (JRA, task 2.2) will be promoted to appropriate European stakeholders (Task 1.4).

The expertise of citizen science projects such as Open Air Laboratories ([www.opal.co.uk](http://www.opal.co.uk)) will be used to engage with members of the public. NA3 and JRA will work with Participants to develop the software to meet their specific needs. Once the tool is well developed, NA3 will explore the opportunities of providing the software to NH institutions outside the SYNTHESYS3 Consortium.

The immediate European NH community will be reached via CETAF and the CPB. All relevant outputs will be channelled directly into EU-CoM. Disseminating outputs beyond the realm of the European NH community will be achieved via routes including: SPNHC, TDWG, GBIF and ISBER

### Task 2.2. Improved access to collections and contribution to ERA

Improve access to virtual and new physical collections by making all data outputs freely available and open access. For peer-to-peer use the key portal for specimen data will be GBIF. For a wider audience including the public and media the newly accessible data will be made available on established open access outlets, e.g. Europeana.

Working alongside NA2, NH institutions will be enabled to make their DNA barcodes available via EBI ([www.ebi.ac.uk/](http://www.ebi.ac.uk/)). In addition, DNA, RNA and proteomes will be made available following the best practices of ISBER.

## Objective 3: Sustainability

Participants: NMP (Lead), NHM, RBGE, MNHN, UCPH, CSIC, NRM, BGBM, MfN, HNHM, RMCA

In the current financial climate, the availability of external funding for NH collections is increasingly difficult to obtain. SYNTHESYS3 will address this, by ensuring the outputs will be of value after SYNTHESYS3 funding has ended.

### Task 3.1. Meeting the future needs of Users of NH institutions

In 2008, the EU-funded EDIT project held a symposium on future trends in taxonomy for the 21st century. This will be used as a baseline document and workshop will be held on the sustainability of NH collections. This will result in a roadmap for European NH institutions to progress in a unified manner to meet the changing demands of research. The roadmap will be passed to CETAF for continued implementation.

### Task 3.2. Facilitating Access beyond SYNTHESYS3

The improvements to NH virtual collections as a result of improved digitisation methods will, over time, change the face of Access and reduce the need for lengthy physical visits. NH institutions will increasingly be able to send digital surrogates that are of excellent research quality. This new form of access will be of benefit not

# WT3: Work package description

only to the European research community but also to researchers in Third Countries who wish to undertake collaborative research with European scientists using collections based in Europe.

## Person-Months per Participant

Participant number <sup>10</sup>	Participant short name <sup>11</sup>	Person-months per participant
1	NHM	10.00
2	RBGK	5.00
3	RBGE	4.00
4	MNHN	2.00
5	UCPH	4.00
6	CSIC	9.00
7	NRM	2.00
8	Naturalis	2.00
9	FUB-BGBM	2.00
10	MfN	5.00
11	NHMW	2.00
12	HNHM	2.00
14	MRAC	4.00
15	NMP	11.00
16	VIZZ	1.00
17	VU	6.00
Total		71.00

## List of deliverables

Deliverable Number <sup>61</sup>	Deliverable Title	Lead beneficiary number	Estimated indicative person-months	Nature <sup>62</sup>	Dissemination level <sup>63</sup>	Delivery date <sup>64</sup>
D3.1	Promotion NA2	15	6.50	O	PU	48
D3.2	Promotion JRA	15	6.50	O	PU	48
D3.3	Optimal digitisation pilot study	1	6.50	R	PU	15
D3.4	Crowdsourcing report	1	16.50	R	PU	12
D3.5	Sustainability workshop	15	2.00	O	PU	24
D3.6	European roadmap	15	4.00	R	PU	34
Total			42.00			

## Description of deliverables

D3.1) Promotion NA2: Promotion of the NA2 outputs [month 48]

D3.2) Promotion JRA: Promotion of the JRA outputs [month 48]

# WT3: Work package description

D3.3) Optimal digitisation pilot study: Report on optimal digitisation methods pilot study [month 15]

D3.4) Crowdsourcing report: Report on findings of the crowdsourcing pilot study [month 12]

D3.5) Sustainability workshop: Workshop on sustainability of NH Collections [month 24]

D3.6) European roadmap: Rpadmap for European natural history collections [month 34]

## Schedule of relevant Milestones

Milestone number <sup>59</sup>	Milestone name	Lead beneficiary number	Delivery date from Annex I <sup>60</sup>	Comments
MS30	SAB meeting 1	1	1	
MS31	SAB meeting 2	1	11	
MS32	SAB meeting 3	1	23	
MS33	SAB meeting 4	1	35	



# WT3: Work package description

Project Number <sup>1</sup>	312253	Project Acronym <sup>2</sup>	SYNTHESSYS3
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## One form per Work Package

Work package number <sup>53</sup>	WP4	Type of activity <sup>54</sup>	RTD
Work package title	Moving from physical to digital collections		
Start month	1		
End month	48		
Lead beneficiary number <sup>55</sup>	3		

## Objectives

The aim of the JRA is to improve the quality of and increase access to digital collections and data within NH institutions – virtual collections.

Obj 1: Automated data collection from digital images

Obj 2: New methods for 3D digitisation of NH collections

Obj 3: Crowdsourcing metadata enrichment of digital images

Obj 4. Access and management of an integrated European digital collection (with NA2)

## Description of work and role of partners

Obj 1: Automated data collection from digital images

Participants: RBGE (Lead), NHM, RBGK, MNHN, CSIC, BGBM, MfN, HNHM, RBINS, RMCA, NMP

Task 1.1. Automatic processing (segmentation) of digital images

Research and develop edge detection technology to locate and classify multiple regions of interest within images of NH specimens. Using the principle that pixels in a segment are similar with respect to some characteristic or computed property (e.g. colour, intensity, or texture), develop a method to semi-automatically detect, crop and classify these regions of interest such that they can be subject to appropriate additional processing.

Task 1.2. Automatic metadata capture

Develop software that will automatically identify properties of an image. These data “facets” will be automatically captured without human intervention and provide categories of information that allow Users to easily search and browse virtual collections more effectively.

Specimen label data will be subjected to Optical Character Recognition (OCR) software to extract the text string and research methods to improve the accuracy of OCR use on handwritten labels. OCR-extracted text collected from handwritten labels will need to be subject to further processing and validation, such as via crowdsourcing methodologies (obj. 2).

Task 1.3. High Resolution 3D colour image acquisition

Complementary approaches (colour surface scanning, photogrammetry) will be developed in order to provide complete information (3D and colour data) of the specimen. Collaborate with existing European projects such as 3DCOFORM whose focus is on Cultural Heritage digitisation. This task will develop 3DCOFORM outputs to enable their use with NH specimens.

Obj 2: New methods for 3D digitisation of NH collections

Participants: MfN (Lead), NHM, RBGE, NHMW, HCMR, BGBM

Task 2.1. Research on different 3D techniques

The size, shape and the different structured surfaces of specimens make it necessary to adapt the process of digitisation and to develop different standards by selecting exemplary object classes with which to optimise the process of 3D imaging. The aim is to create digital 3D objects viewable from every angle and with high depth of focus by using stacking techniques. The resultant 3D images will show all relevant details necessary for determination of the specimen. Every image will have the possibility to zoom into every part of the specimen. It is anticipated that some taxon groups or specimens will not fit the exemplary object classes, and a determination might not be possible from one 3D scan; high-resolution images attached to the 3D model to show special

# WT3: Work package description

details (i.e. microscopic pictures of copulatory organs) will make the resultant new virtual collection a multimedia object.

The results of this task will input into NA2 handbook of best practice and standards for 3D imaging of type specimens (Task 1.2).

## Task 2.2 Micro-Computed Tomography (Micro-CT) for NH collections

Develop protocols and workflows for the rapid digitisation of collections (sample preparation, scanning parameters, model creation). The resulting models will be displayed and disseminated through a web-based framework which will allow the user to manipulate the 3D tomograms through a series of online tools that will be created.

## Obj 3: Crowdsourcing metadata enrichment of digital images

Participants: VIZZ (Lead), NHM, RBGE, MNHN, CSIC, MfN, NHMW, NMP, VU

### Task 3.1. Research into crowdsourcing methodologies for NH collections

Identify which digital image data are most appropriate for use with crowdsourcing. This work will draw on experience with other citizen science crowdsourcing efforts, such as the Zooniverse ([www.zooniverse.org](http://www.zooniverse.org)) project.

Work will focus on 1) the potential for crowdsourcing transcription of handwritten materials (e.g. specimen labels, catalogue cards, letters and diaries), which contain a vast and untapped wealth of historical information about the distribution, identity and origin of NH specimens and 2) image-based identification of unidentified specimen by expert communities. The goals will be to develop a specification that supports these functions on a website that hosts NH crowdsourcing projects. This specification will include a mechanism to integrate output with existing social media sites, maximising the reach to interested parties.

### Task 3.2 Development of website to allow crowdsourcing data capture

Engage with existing crowdsourcing sites and use the results of the pilot study (NA 3 task 1.4) to develop an online mechanism for allowing the public to engage with biodiversity research. As part of this work, map the Darwin Core data standard field to crowdsource label data information, ensuring that the collected data maps to existing NH collections data management systems. Once these integration mechanisms exist, the resultant website will be a sustainable source of volunteers that NH institutions can engage with after the life of the project. SYNTHESYS3 will offer LifeWatch the technology developed to use as a basis for its own crowdsourcing projects.

The crowdsourcing website will be monitored and the User engagement tracked. This will be used further improve User uptake. Recommendations will be made on the organisational embedding and sustainability of the website into Consortium partners' subsequent workflows.

## Obj 4: Access and management of an integrated European digital collection

Participants: NHM (Lead), RBGE, UCPH, CSIC, NCB; NMP

### Task 4.1. Feasibility research on a "digitise on demand" (DoD) service for European NH Institutions

In order to validate the market for a DoD service, feasibility research will be completed to identify the barriers to adopting a DoD approach across Participants. Specific activities include establishing the technical DoD infrastructure for a detailed market validation; to conduct market validation towards potential adopters; collecting data on the feasibility of the service; and preparing a deployment plan for the future of the DoD network. Research will require careful costing of all activities, including provision for a pay-as-you-go service to help prioritise activities. Requests for digitisation will need to be carefully matched to appropriate technologies through an automated system that incorporates the best practice guide produced in NA3 (task 1.3). Development of a DoD service has the potential to offer access NH specimens across Europe in a highly scalable manner that can be used to either digitise all material for select groups or complete gaps in a particular collection.

### Task 4.2. Open Access to captured data

Public-facing, Open Access portals will be utilised to publish the resulting SYNTHESYS content (images and metadata). Initially the data will be made available via GBIF and supplied to the EU-funded LifeWatch project. SYNTHESYS will also develop the protocols to ensure that this output can be accessed by the EU-funded Europeana portal and the international Encyclopedia of Life project. Open licensing and comprehensive dissemination is essential to ensure that all audiences are aware of, and able to access, the NH images and metadata.

# WT3: Work package description

## Person-Months per Participant

Participant number <sup>10</sup>	Participant short name <sup>11</sup>	Person-months per participant
1	NHM	16.00
2	RBGK	7.00
3	RBGE	22.00
4	MNHN	10.00
5	UCPH	4.00
6	CSIC	14.00
8	Naturalis	7.00
9	FUB-BGBM	10.00
10	MfN	14.00
11	NHMW	5.00
12	HNHM	6.00
13	RBINS	7.00
14	MRAC	3.00
15	NMP	12.00
16	VIZZ	21.00
17	VU	6.00
18	HCMR	13.00
Total		177.00

## List of deliverables

Deliverable Number <sup>61</sup>	Deliverable Title	Lead beneficiary number	Estimated indicative person-months	Nature <sup>62</sup>	Dissemination level <sup>63</sup>	Delivery date <sup>64</sup>
D4.1	Edge detection technology	3	32.00	O	PU	12
D4.2	Optimal automated metadata capture	3	32.00	R	PU	24
D4.3	Crowdsourcing for metadata enrichment	10	53.00	R	PU	24
D4.4	Protocols for optimal MicroCT	10	12.00	R	PU	36
D4.5	Digitisation on demand	1	12.00	R	PU	30
Total			141.00			

## Description of deliverables

D4.1) Edge detection technology: Refined method of edge detection technology for natural history collections [month 12]

D4.2) Optimal automated metadata capture: Report on optimal automated metadata capture for natural history collections [month 24]

# WT3: Work package description

D4.3) Crowdsourcing for metadata enrichment: Report on crowdsourcing as a tool for metadata enrichment [month 24]

D4.4) Protocols for optimal MicroCT: Report on protocols for optimal MicroCT use for natural history collections [month 36]

D4.5) Digitisation on demand: Report on feasibility of a Digitisation on Demand (DOD) service [month 30]

## Schedule of relevant Milestones

Milestone number <sup>59</sup>	Milestone name	Lead beneficiary number	Delivery date from Annex I <sup>60</sup>	Comments
MS34	Crowdsourcing website launch	1	36	Website open for use

# WT3: Work package description

Project Number <sup>1</sup>	312253	Project Acronym <sup>2</sup>	SYNTHEYS3
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## One form per Work Package

Work package number <sup>53</sup>	WP5	Type of activity <sup>54</sup>	SUPP
Work package title	TAF Management		
Start month	1		
End month	48		
Lead beneficiary number <sup>55</sup>	1		

## Objectives

To ensure the smooth and consistent management of the Access provision across all TAFs

## Description of work and role of partners

Participant 1 will maintain a website for managing all TA enquiries and applications, enabling applicants to submit their proposals and external referees to submit their testimonies securely. Comments from the internal Hosts and Facility Managers (FM) will also be integrated. All this information is consolidated so that the User Selection Panel (USP), which assesses the applications suitability for support, can view all this data online and submit their scores in advance of the annual USP Meetings. After the Users' visit additional website functionality will allow Users to provide feedback and record outputs of their work.

Access provision - User day. One user days is one full working week day (hours subject to local operating hours)

Details of the collections, facilities and support on offer are provided in WP6-16

Users' projects are primarily independent pieces of work designed by them to meet their own research objectives. Each of the TAFs will provide appropriate scientific and technical support, and the requirements for this are determined in conjunction with the Users when their applications are prepared. This will include additional specialist training on the use of state-of-art facilities and scientific advice during both the preparation phase and the access periods. Each User will have a designated Host (scientific advisor) and logistical support contact person (TAF Admin).

All Users will be invited to give a lecture at the TAF on their work to stimulate debate on research developments. Users will work in the same labs and collections as permanent staff and other. Where possible, Users will be housed in the same accommodation in close proximity to the TAF Institution.

Outreach to new Users

SYNTHEYS has a very high profile among the European Users. Calls for proposals will be made annually in October. The level of recruitment will be built upon via a concerted marketing campaign and raising awareness within the partner institutions to ensure staff are ready and able to deal with enquiries from potential Users.

Cost-effective advertising will be achieved using:

- SYNTHEYS website [www.SYNTHEYS.info](http://www.SYNTHEYS.info)
- Notifications via the SYNTHEYS mailing list
- Presentations at international conferences
- Posters displayed at European research institutes, universities and scientific conferences
- Email footers of TAF staff
- EARMA newsgroups
- Articles in CORDIS Focus & Research Fortnight etc.
- Emails to European NH Societies, universities and research centres.

The ASG will ensure that new Users are given priority access. A mandatory ceiling of 10% per Call will be placed on the User Days awarded to prior Users who have benefited from EU funding support to visit any of the 11 TAFs. To attract Users beyond the immediate taxonomic community a mandatory 15% ceiling per Call is placed on Users from within SYNTHEYS Consortium.

Application Review procedures

# WT3: Work package description

To ensure a fair and transparent peer-review procedure the application process will follow five steps. Each TAF will arrange its own USP and the ASG Chair or Deputy will observe at a selection of USPs to help ensure consistent practices are applied.

- 1.) Upon receipt applications checked for eligibility; prior Access, and ensuring proposed Host is the most appropriate person from within the TAF considering the proposal requirements or whether an alternative TAF is more appropriate.
- 2.) Completed applications sent to Host and, if necessary, the FM for a technical appraisal that includes; assessment that the project objectives can be met using the named TAF; ensuring aims are achievable within the proposed timeframe and the required analytical facility(s) is available and appropriate for the proposed study.
- 3.) The application forms and Host/FM comments sent to the USP who complete an online scoring form for each applicant prior to the USP meeting. The Host/FM comments are not a formal part of the project assessment but are provided as background information on the viability of the proposal.
- 4.) Each TAF USP meet to discuss applications and formally agree which are to be offered support. Some applicants may be invited to re-apply to a later Call after revision if the USP deems it appropriate. The scores of all applications will be stored on a secure area of the TAF website.
- 5.) Rejected applicants provided with written feedback on why their application was unsuccessful and those who are successful are offered access. The Hosts and FMs will be copied in on all feedback to applicants to ensure they are aware of the outcome. All applicants will be notified of the outcome within ten weeks from the date of the Call deadline and all visits are expected to be completed within 12 months.

USP Membership: discipline mix will reflect the proposals that have been submitted. Prior Users will be encouraged to become members so that the cohort grows over the life of the project. All USPs will have an equal number of internal and external members and no one is permitted to score a proposal for which they are the proposed Host. The TAF Admin will be present to formally record the outcomes of the proceedings. USP meetings will occur approximately six weeks after each Call deadline.

User Feedback A User feedback system will gather experiences and suggestions from individual Users. The ASG Chair will monitor feedback and at each AGM highlights the strengths and, if found, any weaknesses in the TAFs. Mitigating recommendations are discussed by the ASG.

## Person-Months per Participant

Participant number <sup>10</sup>	Participant short name <sup>11</sup>	Person-months per participant
1	NHM	13.00
4	MNHN	7.00
5	UCPH	7.00
6	CSIC	7.00
7	NRM	7.00
8	Naturalis	7.00
10	MfN	7.00
11	NHMW	7.00
12	HNHM	7.00
13	RBINS	7.00
15	NMP	7.00
<b>Total</b>		<b>83.00</b>

# WT3: Work package description

## List of deliverables

Deliverable Number <sup>61</sup>	Deliverable Title	Lead beneficiary number	Estimated indicative person-months	Nature <sup>62</sup>	Dissemination level <sup>63</sup>	Delivery date <sup>64</sup>
D5.1	User day delivery	1	77.00	O	PU	48
		Total	77.00			

## Description of deliverables

D5.1) User day delivery: Deliver a minimum of 11313 User days [month 48]

## Schedule of relevant Milestones

Milestone number <sup>59</sup>	Milestone name	Lead beneficiary number	Delivery date from Annex I <sup>60</sup>	Comments
MS35	USPs Call 1	1	4	Applicants notified of USP outcome
MS36	USPs Call 2	1	16	Applicants notified of USP outcome
MS37	USPs Call 3	1	28	Applicants notified of USP outcome
MS38	USPs Call 4	1	40	Applicants notified of USP outcome

# WT3: Work package description

Project Number <sup>1</sup>	312253	Project Acronym <sup>2</sup>	SYNTHESYS3
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## One form per Work Package

Work package number <sup>53</sup>	WP6	Type of activity <sup>54</sup>	COORD
Work package title	AT TAF		
Start month	1		
End month	48		
Lead beneficiary number <sup>55</sup>	11		

## Objectives

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## Description of work and role of partners

Name of the infrastructure: Naturhistorisches Museum Wien (AT TAF)

Location: Vienna, Austria

Web site: [www.nhm-wien.ac.at/](http://www.nhm-wien.ac.at/)

Legal name of organisation operating the infrastructure: Naturhistorisches Museum

Location of organisation (town, country): Vienna, Austria

Annual operating cost (excl. investment costs) of the infrastructure (€): 2,503,464

Description of the Infrastructure: Naturhistorische Museum Wien (NHMW) was founded 250 years ago based on the support of the Emperor of Austria and houses collections of 36 million specimens including 600,000 unique types.

AT TAF at NHMW:

**COLLECTIONS & EXPERTISE:** Collections are especially strong and important for taxonomic work for the Central and South-East European area, the Balkan Peninsula (especially Albania, Bulgaria & Greece), Crete, the Iranian area north to the Caucasus, Australia and New Zealand. In other geographical areas the collections also have global importance for single taxonomic groups including: Brazil, Chile, South Africa, China and the Philippines. Plus, there is unique historical material dating back to 1690.

A library with historically important volumes is available to Users, with c.6,000 scientific journals and c.200,000 books (including over 50,000 historically valuable books).

Based on the history of the Austrian-Hungarian monarchy and Austria's position as neutral state NHMW maintained academic contacts with the countries of the former Eastern Block. A history of reciprocal collaborative projects continues today. Based on this tradition AT TAF can offer much material from this region in its collections material which is not available in other museums outside the CIS-States.

**SUPPORTING FACILITIES & SERVICES:** All the equipment necessary for taxonomic work is available, including; electron microscopes, microprobes, X-ray diffraction, photography studios, DNA labs and workstations for data-capture and sharing plus a chemosystematic Laboratory was established holds 9,000 tissue or blood samples preserved in alcohol or frozen (-80°C). The Herbarium of the University of Vienna is closely connected with NHMW. Under an existing MoU the access to these collections is also offered at no charge to the SYNTHESYS project. 40 full time scientists, plus 60 part-time researchers, students and emeritus staff with expertise that that complements the collections strengths will host the incoming Users.

**INFORMATION TECHNOLOGY & ACCESS:** The in-house Botanical database is an international web-platform giving access to botanical specimens in more than 10 institutions from Central Europe to Afghanistan. The in house digitization services are available to all Users.

Research supported by the infrastructure: The main fields of research at AT TAF cover the origins of our solar system; the evolution of animals and plants; human evolution, as well as prehistoric traditions and customs. The availability of zoologists, botanists, paleontologists and geologists in one building offers the opportunity for multi-disciplinary approaches to phylogeny and systematics. The Staff members of AT TAF collaborate with Users on floras in regions all over the world: including Austria, Germany, Spain, Morocco, Ethiopia, plus several



# WT3: Work package description

floras in the Neotropic Region. The staff are also expert in historical biogeography. The zoological collaborative projects include ongoing research on the Ephemeroptera of central Europe, the inventories of water beetles for Austria, Greece and Spain; the Neuropteridea of NW Europe (together with Bergen, Copenhagen, Helsinki and Sofia). On a broader international scale, projects include the inventories of the water beetles of China and the waterbugs of the Philippines or the contributions on the Staphylinidae of Myanmar. Zoological DNA laboratories are rapidly evolving and hold extracted material from collections available to Users. Combining traditional methods with state-of-the-art DNA techniques for systematic studies means molecular work is increasing apace at AT TAF.

Services currently on offer and Scientific Highlights: Full access to the installations, collections, facilities and expertise are on offer as detailed above

## Person-Months per Participant

Participant number <sup>10</sup>	Participant short name <sup>11</sup>	Person-months per participant
11	NHMW	0.00
Total		0.00

## List of deliverables

Deliverable Number <sup>61</sup>	Deliverable Title	Lead beneficiary number	Estimated indicative person-months	Nature <sup>62</sup>	Dissemination level <sup>63</sup>	Delivery date <sup>64</sup>
		Total	0.00			

## Description of deliverables

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## Schedule of relevant Milestones

Milestone number <sup>59</sup>	Milestone name	Lead beneficiary number	Delivery date from Annex I <sup>60</sup>	Comments

# WT3: Work package description

Project Number <sup>1</sup>	312253	Project Acronym <sup>2</sup>	SYNTHEYS3
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## One form per Work Package

Work package number <sup>53</sup>	WP7	Type of activity <sup>54</sup>	COORD
Work package title	BE TAF		
Start month	1		
End month	48		
Lead beneficiary number <sup>55</sup>	13		

## Objectives

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## Description of work and role of partners

Name of the infrastructure: Belgian Taxonomic Access Facility (BE TAF)

Location Brussels & Tervuren, BE

Web site: [www.synthesys.info/betaf.htm](http://www.synthesys.info/betaf.htm)

Legal name of organisation operating the infrastructure: The Royal Belgian Institute of Natural Sciences

Location of organisation: Brussels, BE

Annual operating cost (excl. investment costs) of the infrastructure (€): 1,393,723.19 (RBINS), 1,212,345.14 (RMCA) = Total 2,606,068.33

Description of the Infrastructure: BE TAF holds one of the world largest collection in terms of volume of specimens stored and available for research with 47 million specimens. BE TAF represents the best Belgium has to offer with exceptional and diverse zoological collections and related research expertise and analytical facilities as well as a focus on the biodiversity of Central Africa..

BE TAF at Royal Belgian Institute of Natural Sciences (RBINS)

**COLLECTIONS & EXPERTISE:** Founded in 1846, RBINS houses a diverse and exceptionally rich zoological collection, palaeoanthropological and mineralogical collections and prehistoric items involving c.37,000,000 specimens with c.100,000 primary types. This places RBINS among the world top ten collections in terms of volume of specimen stored and available for research. The mollusc collection includes some 9,000,000 specimens representing 45,000 species and is ranked among the world top five.

The RBINS scientific library is one of the largest documentary resources of NH in Belgium. It offers 695,368 volumes. The Filing Cabinet owns about 35,000 geographical, hydrological and geological maps. The unique Dautzenberg collection contains rare volumes concerning conchology.

Taxonomic expertise is present for many groups of invertebrates and vertebrates worldwide. Focus ecosystems are terrestrial, freshwater and marine. Geographical areas of taxonomical expertise are the fauna of Belgium and of other regions of the world as Africa (great lakes, national parks of DRC), SE Asia, Papua New Guinea, South America (Galapagos Islands, Argentina), Russia (Lake Baikal) and Antarctica. RBINS is a member of numerous European biodiversity-related initiatives such as CETAF, Fauna Europeana and SciColl.

**SUPPORTING FACILITIES AND SERVICES:** The Molecular Systematic Facility provides a dynamic working environment for researchers who aim at applying various DNA markers for molecular systematic research. Practical training in DNA analysis is provided within the context of collaborative research projects. It is equipped with an ABI 3130 capillary sequencer. This infrastructure allows for a wide variety of DNA marker analyses, though most applications involve nucleotide sequencing and microsatellite genotyping.

**INFORMATION TECHNOLOGY & ACCESS:** A suite of equipment is available for scanning collections objects. The data and references are recorded in a common management tool developed by RBINS ICT service.

Research supported by the infrastructure: Research focuses on the study of biodiversity through taxonomy and phylogeny in all animal groups (extant and fossils). RBINS staff also studies the land, fresh water and

# WT3: Work package description

marine ecosystems, the history of life, of the climate and of human installations, plus, mechanisms involved in the evolution of life along with the geology of Belgium and modelling of the North Sea. In addition, RBINS develops tools and methods for monitoring natural land or marine environments. It also offers useful advice for the development of national and European policies for the protection and conservation of biotopes and biodiversity and serves as Belgium's National Focal Point to the Global Taxonomy Initiative.

BE TAF at Royal Museum for Central Africa (RMCA)

**COLLECTIONS & EXPERTISE:** It holds the largest biodiversity collection anywhere in the world on Central Africa, offering a complete cross-section of reference material from many central African taxa. Furthermore, the majority of the specimens originate from the relatively poorly studied megadiversity belt in the equatorial region of Africa, and from West Africa. Collections from this region are relatively poorly represented in museums elsewhere in the world

The NH collections include 10 million specimens of animals, 57,000 wood specimens, 316,000 minerals, and rocks and 21,500 fossils. RMCA has about 1.2 km of Archives of unique interest. Human Sciences collections contain 200 000 cultural objects, one million photographs, 700 movies, over 6,000 hours of traditional music and voice recordings and 8,000 musical instruments. RMCA maintains an extensive library, including 300 scientific journals and 130,000 monographs and serials, of which many are unique collection of rare old colonial publications.

**SUPPORTING FACILITIES AND SERVICES:** RMCA has a fully equipped molecular lab with PCRs sequencers and storage facilities. See BE TAF Annex for details.

**INFORMATION TECHNOLOGY AND ACCESS** RMCA has a Biodiversity Information and Cybertaxonomy Service including key competence in Geospatial Services. Users have access to GIS facilities, databasing, servers, helpdesk infrastructure and support in terms of usage of international standards such as INSPIRE, OGC, GBIF, EUROPEANA.

**Research supported by the infrastructure:** RMCA is the prime reference facility for multidisciplinary and comparative research on African biodiversity. RMCA is a leading multidisciplinary research institute and knowledge centre on the cultural and natural heritage in Africa, particularly Central Africa. It develops interest and understanding for African heritage in the scientific communities and the public. Researchers carry out studies in the natural and urban environments, including historical-socio-economical aspects.

**Relationship of the infrastructure:** The RBINS and RMCA offer facilities providing complementary assets to Users working on molecular systematics for which both institutions are equipped with dedicated teams and laboratories. The same is true in entomology and mammal research. The unique zoological collections of joint Congo expeditions (2009-10) are currently processed by RBINS and RMCA. Additionally the unique collections of the Central African Natural Parks are shared by the two institutions. The collection management systems of both institutions are to be shared through the DaRWIn system developed by the RBINS.

**Services currently on offer and Scientific Highlights:** Full access to the installations' collections, facilities and expertise are on offer as detailed above.

## Person-Months per Participant

Participant number <sup>10</sup>	Participant short name <sup>11</sup>	Person-months per participant
13	RBINS	0.00
14	MRAC	0.00
	Total	0.00

# WT3: Work package description

## List of deliverables

Deliverable Number <sup>61</sup>	Deliverable Title	Lead beneficiary number	Estimated indicative person-months	Nature <sup>62</sup>	Dissemination level <sup>63</sup>	Delivery date <sup>64</sup>
			Total	0.00		

## Description of deliverables

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## Schedule of relevant Milestones

Milestone number <sup>59</sup>	Milestone name	Lead beneficiary number	Delivery date from Annex I <sup>60</sup>	Comments

# WT3: Work package description

Project Number <sup>1</sup>	312253	Project Acronym <sup>2</sup>	SYNTHEYS3
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## One form per Work Package

Work package number <sup>53</sup>	WP8	Type of activity <sup>54</sup>	COORD
Work package title	CZ TAF		
Start month	1		
End month	48		
Lead beneficiary number <sup>55</sup>	15		

## Objectives

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## Description of work and role of partners

Name of the infrastructure: Czech Taxonomic Access Facility (CZ TAF)  
 Location: Prague, Czech Republic  
 Web site: www.nm.cz  
 Legal name of organization operating the infrastructure: Národní muzeum, Praha  
 Location of organization: Praha, Czech Republic  
 Annual operating cost (excl. investment costs) of the infrastructure (€): 2.539.025

### CZ TAF at NMP

Description of the Infrastructure: CZ TAF offers access to the most important museum in the Czech Republic with close to 15 million specimens including 140,000 type specimens representing 200 years of collecting and research.

**COLLECTIONS & EXPERTISE:** CZ TAF collections represent a diverse selection organisms, fossils, minerals, wet collections, frozen tissues, DNA & slides. They are focused particularly on central European nature and geology. CZ TAF collections cover also tropical regions, particularly South America and Australasia. The collections are organised into seven core collections reflecting the primary scientific disciplines. Several special collections are unique globally (e.g. Sternberg Fossil Plant Collection, Barrande Palaeontological Collection). The collections are managed using modern methodologies by staff that disseminate this knowledge in collection management with their colleagues in the county and abroad. CZ TAF is engaged in EU projects to support current digitization efforts, of type and historic collections. The libraries house over 500 000 volumes and 10,000 periodical titles.

CZ TAF scientists have expertise in a range of disciplines within the natural sciences and they actively collaborate across departments particularly in research on Diversity of Life in central Europe. The combination of scientifically important collections, excellent expertise and advanced analytical equipment creates a stimulating.

**SUPPORTING FACILITIES AND SERVICES:** Molecular Biology Unit focuses on the study of diversity and evolutionary history of various organisms, primarily vertebrates, using analysis of DNA sequences. The Laboratory is fully equipped by the state-of-the-art instruments and facilities capable to carry out DNA extraction from tissue samples, PCR amplification and purification. Using the methods of molecular taxonomy and DNA barcoding, the laboratory serves for identification of various biotic materials, including material from museum collections, which is difficult to identify by conventional methods. Several thousand of samples are processed in the laboratory each year. The laboratory also provides an expert advisory service in this field of research. Large collection of tissues of variety of organisms (animals, plants, fungi) is available for molecular genetic studies in CZ TAF.

Analytical and Imaging Facility (AIF) encompasses high quality analytical instruments: high-resolution, low-voltage and environmental scanning electron microscope with unique large chamber; electron probe microanalysis with 5 analysers, EDAX; X-ray analyzer; X-ray fluorescence analysis; high quality digital microscopy.

# WT3: Work package description

**INFORMATION TECHNOLOGY AND ACCESS:** Digitisation unit focuses on digitisation of old taxonomic literature and maps. The laboratory is equipped with several library scanners: ScanTECH 602i, Minolta Bizhub and Canon camera with accessory equipment and software. CZ TAF is involved in BHL – Europe which to date has provided over 35 million digitised pages of literature to support multiple bioinformatics initiatives and research.

Research supported by the infrastructure: The science strategy has five main directions research is organised into the following fields:

- Dynamic Earth:
- Evolution of Life:
- Plant Diversity
- World fauna biodiversity
- History of Man

Services currently on offer and Scientific Highlights: Full access to all the installations' collections, facilities, services and expertise are on offer as detailed above.

## Person-Months per Participant

Participant number <sup>10</sup>	Participant short name <sup>11</sup>	Person-months per participant
15	NMP	0.00
	Total	0.00

## List of deliverables

Deliverable Number <sup>61</sup>	Deliverable Title	Lead beneficiary number	Estimated indicative person-months	Nature <sup>62</sup>	Dissemination level <sup>63</sup>	Delivery date <sup>64</sup>
		Total	0.00			

## Description of deliverables

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## Schedule of relevant Milestones

Milestone number <sup>59</sup>	Milestone name	Lead beneficiary number	Delivery date from Annex I <sup>60</sup>	Comments

# WT3: Work package description

Project Number <sup>1</sup>	312253	Project Acronym <sup>2</sup>	SYNTHESSYS3
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## One form per Work Package

Work package number <sup>53</sup>	WP9	Type of activity <sup>54</sup>	COORD
Work package title	DE TAF		
Start month	1		
End month	48		
Lead beneficiary number <sup>55</sup>	10		

## Objectives

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## Description of work and role of partners

Name of the infrastructure: German Taxonomic Access Facility (DE TAF)  
 Location: Berlin, Germany  
 Web site: [www.naturkundemuseum-berlin.de](http://www.naturkundemuseum-berlin.de) and [www.bgbm.org](http://www.bgbm.org)  
 Legal name of organisation operating the infrastructure: Museum für Naturkunde, Leibniz-Institut für Evolutions- und Biodiversitätsforschung an der Humboldt-Universität zu Berlin  
 Location of organisation: Berlin, Germany  
 Annual operating cost (excl. investment costs) of the infrastructure (€): 4,587,207 (MfN) 3,558,729 (BGBM) = Total €8,145,756

Description of the Infrastructure: The BGBM and the MfN are the two principal institutions of their kind in Germany. The extensive plant collections of the BGBM, among the most important in the world, are perfectly complemented by the vast zoological, palaeontological and mineralogical collections of the MfN. Both institutions are involved in a broad spectrum of research spanning the breadth of biosystematics and geoscience. DE TAF is one of the world's key sites for biosystematic data. BGBM has a total of 3.5 million specimens (100,000 primary types), MfN has 30 million specimens (250,000 primary types), representing more than 500 years of collecting effort.

DE TAF at Museum für Naturkunde (MfN)

**COLLECTIONS & EXPERTISE:** The MfN offers an unrivalled collection of recent animal, fossil plant and animal, and mineralogical material making it the largest natural history depository in Germany. The storage facilities have recently been upgraded by the re-opening of the museum's east wing (2010) as a modern building to house all zoological wet collections (233,000 jars containing about 1 million specimens) under climate controlled and state-of-the-art safety conditions and to provide lab space for staff and visitors to work with these collections.

Collections are mostly arranged in systematic order providing easy access for researchers. In addition, the MfN houses many special collections, e.g. the Ehrenberg collection of micro organisms, the unique Hubrecht collection of sectioned vertebrate embryos and a vast collection of seeds. Another unique collection is the archive of ~120.000 animal voice recordings. All collections form a vital substrate for research, especially for projects focused on the biodiversity and geological history of central Europe.

MfN's libraries hold some 200,000 volumes and subscribe to ~850 periodicals. The libraries are particularly strong with regard to (i) rare works dating back up to the 15th century and (ii) literature from Eastern Europe, Russia and the CIS thereby forming a unique resource within the central European area.

**SUPPORTING FACILITIES AND SERVICES:** The DNA laboratory consists of state-of-the-art facility equipped for all current molecular systematics techniques, enabling high-throughput routines from automated DNA extraction to sequencing. The facility has a Li-Cor machine for fragment analyses and an Applied Biosystems 3130xl DNA analyser for standard sequencing. Dedicated technicians help Users in all practical aspects of lab work. Routinely employed techniques include the sequencing of mitochondrial and nuclear markers, also from museum specimens with an age of >100 yrs, genotyping (microsatellites and AFLPs), and genomics/transcriptomics of non-model organisms.

# WT3: Work package description

Morphological laboratories encompass a state-of-the-art environmental scanning electron microscope; fully digital transmission electron microscope; a confocal laserscan microscope; fully motorized compound microscopes and fluorescence microscopy and many partly motorized stereo microscopes, mostly equipped with digital cameras. The equipment is housed in a central modern lab which was recently upgraded by installation of an immunochemistry lab. The morphological labs are supervised by 3 staff. This facility enables visitors to conduct research on a diverse range of research questions including: taxonomy; morphology; immunocytochemistry and phylogeny.

The Geoscience laboratories comprise a range of state-of-the-art mineralogical-geochemical apparatus, micro-CT and stable isotope laboratory. Instrumentation includes X-ray fluorescence spectrometry for routine analysis of major and trace elements on fused disks or powder tablets, and a micro-XRF instrument for rapid in situ analysis of materials. Transmitted and reflected light polarization microscopy, cathodo-luminescence and micro-Raman spectrometry provide comprehensive optical analysis. This is complemented by a field-emission cathode electron microprobe with 5 wavelength dispersive spectrometers and additional energy-dispersive analytical facility. Hyper-element mapping is carried out routinely. Two scanning electron microscopes are available for micro-textural and EDS analysis, one of which allows investigation at low-vacuum. Stable isotope mass spectrometry is focused on the analysis of carbon and nitrogen isotopes. A GE Phoenix Nanotom Micro-CT machine allows analysis of geological and fossil samples, as well as modern organisms, up to a resolution of 0.5  $\mu\text{m}$ .

**INFORMATION TECHNOLOGY AND ACCESS:** A substantial amount of the Museum's type specimens in all collections are available through databases and can be easily accessed by Users. Computing resources include a Linux-cluster (1 TB RAM) and other PC, and Macintosh hardware, phylogenetic software, and a dedicated IT-team to support internal and external Users.

DE TAF at Botanischer Garten und Botanisches Museum (BGBM)

**COLLECTIONS & EXPERTISE:** The BGBM is the major depository for botanical materials and literature in Germany, and one of the major European botanical centres in Biodiversity Informatics. It holds the second largest living plant collection in Europe as well as dry and wet collections of vascular plants, fungi and algae from all over the world. The conservatories at BGBM and their living collections constitute a key asset of outstanding importance with a particularly high percentage of fully documented material collected. The Dahlem Seed Bank for highly endangered species from some European regions was the first seed bank for wild plants in Germany. Deep freeze repositories for the DNA of botanical organisms is a collection facility implemented recently as part of the German Network of DNA-Banks. The BGBM library contains almost 200,000 volumes, including many rare works and some 9,000 periodicals.

The expertise and research projects of the scientists at BGBM focus on the taxa Asterales, Caryophyllales and Bacillariophyta (diatoms) and on the geographic regions Europe & the Mediterranean as well as Cuba. The research and curatorial staff provide an expertise base that can support Users and their work by assisting with specimen recognition, taxonomy, systematics and the use of technical facilities and specimen handling.

**SUPPORTING FACILITIES AND SERVICES:** Over 550 m<sup>2</sup> of laboratory facilities include two fully equipped molecular systematics and population genetics facilities, optimized for middle high-throughput analysis, well-equipped facilities for classical (micro-) morphology (stereo-/microscopes with high resolution digital image documentation) and scanning electron microscopy, state-of-the-art next generation sequencing facilities (collaboration with the Berlin Center for Genomics in Biodiversity Research). Users will benefit from excellent scientific and technical know-how in molecular systematics, phylogenetics, genomics, morphology and microscopy, new state-of-the-art laboratories and equipment, as well as a large amount of established methods and protocols.

**INFORMATION TECHNOLOGY AND ACCESS:** The living collection is almost fully databased (40,000 records of 22,000 taxa). The data of approximately 100,000 herbarium specimens have been captured and published on the web, both through the local access system and the GBIF network. BGBM hosts the Euro+Med PlantBase network secretariat and its database (the checklist of European plants), as well as several specialised taxonomic research databases (e.g. AlgaTerra, Cichorieae, Campanulaceae, Flora of Cuba, El Salvador). The BGBM coordinates the German GBIF National Node providing access to millions of German collection records and the DNA-Bank Network. All these initiatives use state-of-the-art cybertaxonomy software developed by projects coordinated by the BGBM.



# WT3: Work package description

Research supported by the infrastructure: MfN's research is structured along 6 lines covering the following topics: 1. Speciation and biogeography. 2. Evolution of animal form. 3. Dynamics of biodiversity. 4. Impact events and meteorites. 5. Distribution of knowledge and history of science. 6. Development of collections and infrastructure.

BGBM is the centre of excellence for phytotaxonomical research in Germany and the central European region. BGBM staff are pursuing a broad spectrum of studies, under the umbrella of biodiversity research, focused both on certain taxonomic groups (Asterales, Caryophyllales and Bacillariophyta) and on specific regions of the world (Mediterranean, Cuba). Major collaborative research and development projects led by BGBM focus on the assessment and conservation of plant diversity in the Caucasus; online provision of images and other multimedia objects from NH collections across Europe.

Describe the relationship of the infrastructure

Since the two installations of DE TAF are former institutes of the same university, strong synergy and complementarity exists in collections, equipment and staff expertise; this has been strengthened since the German re-unification. For example, BGBM provides large molecular lab facilities and biodiversity informatics, whereas MfN has large capacities and knowledge in electron microscopy.

Services currently on offer and Scientific Highlights: Full access to all the installations' collections, facilities, services and expertise are on offer as detailed above.

## Person-Months per Participant

Participant number <sup>10</sup>	Participant short name <sup>11</sup>	Person-months per participant
9	FUB-BGBM	0.00
10	MfN	0.00
Total		0.00

## List of deliverables

Deliverable Number <sup>61</sup>	Deliverable Title	Lead beneficiary number	Estimated indicative person-months	Nature <sup>62</sup>	Dissemination level <sup>63</sup>	Delivery date <sup>64</sup>
			Total	0.00		

## Description of deliverables

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## Schedule of relevant Milestones

Milestone number <sup>59</sup>	Milestone name	Lead beneficiary number	Delivery date from Annex I <sup>60</sup>	Comments

# WT3: Work package description

Project Number <sup>1</sup>	312253	Project Acronym <sup>2</sup>	SYNTHESSYS3
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## One form per Work Package

Work package number <sup>53</sup>	WP10	Type of activity <sup>54</sup>	COORD
Work package title	DK TAF		
Start month	1		
End month	48		
Lead beneficiary number <sup>55</sup>	5		

## Objectives

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## Description of work and role of partners

Name of the infrastructure: Danish Taxonomic Access Facility (DK TAF)

Location: Copenhagen, DK

Web site address: [www.snm.ku.dk](http://www.snm.ku.dk)

Legal name of organisation operating the infrastructure: University of Copenhagen

Location of organisation: Copenhagen, DK

Annual operating cost (excl. investment costs) of the infrastructure (€): 6,200,000

Description of the Infrastructure: DK TAF comprises the University of Copenhagen's laboratories of Phycology, Zoomorphology, Biodiversity, Botany and Biological Anthropology in addition to 14 million specimens that comprise the collections of the Natural History Museum of Denmark (NHMD). DK TAF includes expertise and equipment for collections-based biological and geological research.

NHMD houses the Danish Centre for bird ringing, the C and CP herbaria, the Scandinavian Culture Centre for Algae and Protozoa, and the national sequencing centre. NHMD is a member of Geocentre Copenhagen. The dual role of NHMD as university institute and national museum is rare in Europe and offers optimal conditions for collaboration with other university institutes, while at the same time ensuring good relations to other Danish museums.

DK TAF at the University of Copenhagen

**COLLECTIONS AND EXPERTISE:** The collections of DK TAF are quantitatively as well as qualitatively, in an international top class. The collections are physically well-arranged, so desired specimens can easily be located and examined. A significant and ever-increasing part of the collections is digitised.

The scientists working at DK TAF possess expert knowledge in a vast array of zoological, botanical and geological disciplines. In many cases they are world-leading experts in their fields and/or represent unique or rare expertise in Europe. Curators of DK TAF collections are at the same time researchers specialising in some of the organisms/objects in their collections. They will act as mentors for Users. Since DK TAF is part of the University of Copenhagen, staff members take part in advanced teaching of pre- and postgraduate students in Denmark and abroad, including supervision of MSc. and PhD. theses.

**SUPPORTING FACILITIES AND SERVICES:** DK TAF is equipped with state-of-the-art lab facilities. The facilities are used not only by DK TAF staff and students but also by a large number of external Users coming from all over the world. These include scientists from corresponding foreign institutions but also such diverse groups as, e.g. students and trainees from developing countries, archaeologists, amateurs and artists.

**Research supported by the infrastructure:** The geographical proximity of the DK TAF components facilitates exchange of ideas between zoologists, botanists, palaeontologists and geologists who often use similar methods of analysis although their study objects differ. The combination of a strong and still vital classical systematic tradition and a similarly strong competence in state-of-the-art molecular methods makes DK TAF one of the leading European centres of the theory and practice of phylogeny reconstruction and related disciplines. Users benefit from this cross-disciplinary networking, e.g. by using the zoological as well as the geological collections

# WT3: Work package description

for access to Recent and fossil specimens of the same group of animals, or by using the herbarium for access to specimens, as well as the molecular lab for phylogenetic analysis.

DK TAF staff members take an active and often leading part in numerous European and international research programmes, e.g. All Birds Barcode Initiative; Assembling the Tree of Life (AToL); Flora of Ethiopia and Eritrea; Flora Nordica; Miomap (Miocene mammal mapping project) Africa; NordicCenter for Earth Evolution (NORDCEE) and Competitiveness and Innovation Framework Programme Best Practice Network.

DK TAF'S combination of international, top-class collections with many unique elements, a large staff of recognised researchers/teachers in biosystematics and related fields, state-of-the art research equipment and well-stocked libraries offers excellent opportunities to visiting researchers.

In addition to international research collaborations at the individual level, DK TAF plays important international roles, e.g., the Secretariat of GBIF ([www.gbif.org](http://www.gbif.org)), the Danish national GBIF node, DanBIF ([www.danbif.dk](http://www.danbif.dk)), is placed in NHMD.

Services currently on offer and Scientific Highlights: Full access to all DK TAF's collections, facilities, services and expertise are on offer as detailed above.

## Person-Months per Participant

Participant number <sup>10</sup>	Participant short name <sup>11</sup>	Person-months per participant
5	UCPH	0.00
Total		0.00

## List of deliverables

Deliverable Number <sup>61</sup>	Deliverable Title	Lead beneficiary number	Estimated indicative person-months	Nature <sup>62</sup>	Dissemination level <sup>63</sup>	Delivery date <sup>64</sup>
			Total	0.00		

## Description of deliverables

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## Schedule of relevant Milestones

Milestone number <sup>59</sup>	Milestone name	Lead beneficiary number	Delivery date from Annex I <sup>60</sup>	Comments

# WT3: Work package description

Project Number <sup>1</sup>	312253	Project Acronym <sup>2</sup>	SYNTHEYS3
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## One form per Work Package

Work package number <sup>53</sup>	WP11	Type of activity <sup>54</sup>	COORD
Work package title	ES TAF		
Start month	1		
End month	48		
Lead beneficiary number <sup>55</sup>	6		

## Objectives

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## Description of work and role of partners

Name of the infrastructure: Spain Taxonomic Access Facility (ES TAF)  
 Location: Madrid & Sierra de Guadarrama, ES  
 Web site: [www.mncn.csic.es](http://www.mncn.csic.es) & [www.rjb.csic.es](http://www.rjb.csic.es)  
 Legal name of organisation operating the infrastructure: Consejo Superior de Investigaciones Científicas (CSIC).  
 Location of organisation: Madrid, ES  
 Annual operating cost (excl. investment costs) of the infrastructure (€): 3,122,465.75

Description of the Infrastructure: ES TAF houses the most important NH collections in Spain, which - together with state-of-the-art analytical equipment - enables advanced research in a wide range of biodiversity topics including taxonomy, systematics, biogeography, phylogeography, bioacoustics, taphonomy and palaeontological heritage. There is also access to a field station (El Ventorrillo) for field experimental studies.

### ES-TAF at MNCN & RJB

**COLLECTIONS & EXPERTISE:** The ES TAF collections represent a unique resource for the study of two of Earth's biodiversity hotspots: the Mediterranean Basin and the Neotropics. With over 8.6 million specimens and c. 64.200 types, the ES TAF harbors the most important representative collection of the Mediterranean Basin in the world, including specimens from the Iberian Peninsula (comprising Balearic archipelago) and the Canary Islands, considered two of the most biodiverse regions in Europe. There is also an important collection from former overseas colonies such as Northern Africa and Latin America.

**SUPPORTING FACILITIES AND SERVICES:** ES TAF contains state-of-the-art equipment necessary for the study of biological and geological collections, including several laboratories for: molecular systematics, histology, ecophysiology, chromatography, chemical analysis (atomic absorption, electrophoresis and X-ray diffraction and fluorescence), preparation of biological, molecular, and geological samples, scanning electron microscopy and other non-destructive analytical facilities, photography and digital image services, fluorescence microscope and image analysis laboratory, a chamber for taphonomic studies, flow cytometer, growth and germination seed chambers, and greenhouses for storing and research activities.

Molecular Biology laboratories are equipped with top-of-the-range facilities for molecular systematics and population genetics. A wide range of molecular approaches (RT-PCR, DNA-fingerprinting, qPCR, AFLPs) are routinely used to study endangered species and to advise environmental authorities on conservation and management.

Along with the standard molecular facilities that would be expected in a modern research infrastructure ES TAF has a laboratory devoted to the handling and amplification of ancient DNA (fossil, subfossil and preserved modern but especially delicate material), which is rare in Europe.

**Non-Destructive Analytical and Imaging Facilities:** Besides SEM, ES TAF houses an EM suite that includes the combination of ESEM, catholuminescence spectrometer and two types of microanalyses: Wavelength dispersal spectrometer and Energy dispersive spectrometer. In addition, ES TAF offers the service of a microscope with RAMAN spectrometry and confocal laser scanning microscopy.

# WT3: Work package description

Ecophysiology laboratory consists of two units: 1. Reproductive Physiology fully equipped for research of the molecular, cellular and physiological mechanisms that underlie gametes function, fertilization and early embryonic development processes of mammals in an evolutionary context (includes cryobanking facility). 2. Animal Ecophysiology to facilitate a physiological approach to evolutionary ecology by studying the mechanisms that promote and limit the adaptation of organisms to the environment. This laboratory has equipment for detection and extraction of compounds from various biological matrices.

Chromatography laboratory fully equipped to analyse compounds or contaminants in soil and water, metabolic compounds and anions in plant samples and some samples of atmospheric gases.

Field Station 'El Ventorrillo' located in the Sierra de Guadarrama semi-natural enclosures plus respirometry laboratory.

**INFORMATION TECHNOLOGY AND ACCESS:** Approximately 60% of the specimens are electronically databased, guaranteeing easy retrieval and examination of the desired specimens. 1.1 million records offering distribution maps, images, common names and other associated data concerning Spanish vascular plants. Over 8,600 digitized images of botanical type specimens, in addition to 32,000 images of historical collections. Online access to more than 9,000 electronic journals and to a digital library with more than 2600 digitized botanical books. An Animal Sounds Library, with over 43,605 registers. ES TAF coordinates the Spanish GBIF node and a mirror of the GBIF central database.

Research supported by the infrastructure: ES TAF represents the leading institution in the study of biodiversity, systematics evolution and conservation biology in Spain. ES TAF research is carried out at the highest international level across multiple research lines: Systematics, Biodiversity and Conservation Biology (including genetic diversity and global change); Evolutionary Biology; Palaeobiology; Evolutionary Ecology; Environmental Biology (including ecosystems biochemistry); and Geology.

ES TAF researchers assist governmental and regional conservation agencies in the implementation of the EC Habitat Directive, Bern and Barcelona Conventions, the Global Taxonomic Initiative, the Intergovernmental Panel on Climate Change as well as in the study and input to conservation policies of endangered species.

Describe the relationship of the infrastructure: The two ES TAF institutions are legally part of CSIC and thus are integrated into the fabric of the Spanish research system.

Services currently on offer and Scientific Highlights: Full access to all the installations' collections, facilities, services and expertise are on offer as detailed above.

## Person-Months per Participant

Participant number <sup>10</sup>	Participant short name <sup>11</sup>	Person-months per participant
6	CSIC	0.00
	Total	0.00

## List of deliverables

Deliverable Number <sup>61</sup>	Deliverable Title	Lead beneficiary number	Estimated indicative person-months	Nature <sup>62</sup>	Dissemination level <sup>63</sup>	Delivery date <sup>64</sup>
		Total	0.00			

## Description of deliverables

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# WT3: Work package description

## Schedule of relevant Milestones

Milestone number <sup>59</sup>	Milestone name	Lead beneficiary number	Delivery date from Annex I <sup>60</sup>	Comments
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# WT3: Work package description

Project Number <sup>1</sup>	312253	Project Acronym <sup>2</sup>	SYNTHEYS3
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## One form per Work Package

Work package number <sup>53</sup>	WP12	Type of activity <sup>54</sup>	COORD
Work package title	FR TAF		
Start month	1		
End month	48		
Lead beneficiary number <sup>55</sup>	4		

## Objectives

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## Description of work and role of partners

Name of the infrastructure: French Taxonomic Facility FR TAF  
 Location: Paris, FR  
 Web site: [www.synthesys.info/frtaf.htm](http://www.synthesys.info/frtaf.htm)  
 Legal name of organisation operating the infrastructure: Museum national d'Histoire naturelle  
 Location of organisation: Paris, FR  
 Annual operating cost (excl. investment costs) of the infrastructure (€): 1,722,420

FR TAF at MNHN

Description of the Infrastructure:

**COLLECTIONS & EXPERTISE:** The collections of FR TAF are, quantitatively and qualitatively, in the top three in the world. They comprise an estimated 70 million specimens and house approximately 835,000 primary types and reference specimens. MNHN, with its unique national status, is also considered as the normal repository for all scientifically significant collections made by other French research bodies (e.g. IRD, CNRS, IFREMER).

Most of the collections are arranged in such way that desired specimens can easily be communicated and examined. The main strength is the number of types that are crucial for the modern taxonomist and a wealth of historical collections that are invaluable in investigations concerning the biodiversity changes during the last three centuries. This makes them invaluable for conservation management planning and a key research infrastructure to better document climate change and all new challenges emerging in the field of biodiversity. MNHN houses the only national library devoted exclusively to NH with online catalogue and access to major bibliographic databases.

FR TAF staff possess expert knowledge in a vast array of zoological, botanical and geological disciplines. In many cases, they are world-leading experts in their fields and/or represent unique or rare expertise in Europe.

FR TAF collections and libraries (mineralogy & geology, palaeontology, botany, vertebrates zoology, invertebrates zoology, arthropods, prehistory, anthropology, 83 living collections) are situated in different buildings located in three major areas in the centre of Paris described below:

1. Jardin des Plantes and the Buffon-Poliveau block: House the collections of zoology, botany, palaeontology, geology and mineralogy, biological resources. The gallery of mineralogy houses the reference specimens from the Paris Basin and the historical collection of minerals. The Zoothèque is a modern facility devoted exclusively to zoological collections and includes preparation and conditioning labs and study spaces for visiting scientists. Besides specialised libraries attached to research department, the main library holds most of the documentation and archives. Large instruments used to study collections (molecular biology labs, scanning electron microscopes, mass spectrometers) are also located on the Jardin des Plantes.
2. Musée de l'Homme: holds anthropology and part of the prehistory collections. It also houses a DNA lab and a library.
3. Institut de Paléontologie Humaine: houses Human palaeontology and Quaternary geology collections. On a worldwide basis, it houses a rich osteological sampling and the recent bone collections of the Comparative Anatomy and Mammalogy sections.

# WT3: Work package description

**SUPPORTING FACILITIES & SERVICES:** In addition to the collections, MNHN houses state-of-the-art equipment (see FR TAF annex), some of it unique in Europe; for example the karyotyping FISH (Fluorescence In Situ Hybridization) imaging workstations, mass spectrometry and RMN laboratories for natural products identification and an up-to-date morphometric laboratory.

**INFORMATION TECHNOLOGY & ACCESS:** Some collections (e.g. Fish) are entirely digitised; for the other collections, digitisation is still in progress with special interest in type specimens. The main digitisation program is in the herbarium, where the 10 million specimens will be digitised by 2013.

**Research supported by the infrastructure:** MNHN is one of the leading centres research in Europe in biology, earth sciences and human sciences. In addition, a series of other laboratories are devoted to ecology, biophysics and biochemistry, chemistry of natural substances, physical oceanography and comparative physiology. Together, they represent a research complex that enables multi-disciplinary research to be undertaken. MNHN acts as the French national agency for European programs and is the National Reference Centre for Biodiversity. Among its numerous research topics, the following ones have an important international impact.

**Phylogenetic systematics, involving morphological and molecular studies:** Contemporary approaches to phylogeny and classification are widely in use among MNHN staff. Important results in reconstructing the phylogenetic relationships have been obtained using a single system, by mixing palaeontological and recent information in the same data sets.

**Biodiversity variations through time:** Staff are involved together with prehistorians, climatologists and molecular biologists (specialists of ancient DNA and stable isotope analysis) on Late Tertiary and Quaternary biodiversity.

**Identification systems:** Together with the classical morphological analysis, new investigation methods are available – for example, chromosome analysis (banding techniques), which has been applied to discriminate different populations of shrews and African rodents.

**Biodiversity and Biogeographic studies:** For tropical Africa, Guiana, Madagascar and continental South-East Asia, collections and staff expertise are a fundamental resource for visiting scientists.

**Services currently on offer and Scientific Highlights:** Full access to the installations' collections, facilities and expertise are on offer as detailed above

## Person-Months per Participant

Participant number <sup>10</sup>	Participant short name <sup>11</sup>	Person-months per participant
4	MNHN	0.00
	Total	0.00

## List of deliverables

Deliverable Number <sup>61</sup>	Deliverable Title	Lead beneficiary number	Estimated indicative person-months	Nature <sup>62</sup>	Dissemination level <sup>63</sup>	Delivery date <sup>64</sup>
		Total	0.00			

## Description of deliverables

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# WT3: Work package description

## Schedule of relevant Milestones

Milestone number <sup>59</sup>	Milestone name	Lead beneficiary number	Delivery date from Annex I <sup>60</sup>	Comments
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# WT3: Work package description

Project Number <sup>1</sup>	312253	Project Acronym <sup>2</sup>	SYNTHEYS3
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## One form per Work Package

Work package number <sup>53</sup>	WP13	Type of activity <sup>54</sup>	COORD
Work package title	GB TAF		
Start month	1		
End month	48		
Lead beneficiary number <sup>55</sup>	1		

## Objectives

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## Description of work and role of partners

Name of the infrastructure: Great Britain Taxonomic Access Facility (GB TAF)

Location: London & Edinburgh, UK

Web site: [www.synthesys.info/gbtaf.htm](http://www.synthesys.info/gbtaf.htm)

Legal name of organisation operating the infrastructure: The Natural History Museum, London

Location of organisation: London, UK

Annual operating cost (excl. investment costs) of the infrastructure (€): 18,462,175.71 (NHM), 4,453,911.68 (RBGK) 2,525,158.80 (RBGE) = Total 25,441,246.19

Description of the Infrastructure: Globally, GB TAF is one of the most important single sources of systematics information, with over 80 million specimens including 1.5 million holotypes and paratypes housed in the three institutions.

GB TAF at NHM

**COLLECTIONS & EXPERTISE:** NHM houses a collection of 70 million NH specimens (incl. 800,000 types). The specimens are stored in secure storage units and well-organised in accordance with taxonomic groupings. This includes the Darwin Centre which provides state-of-the-art collections care for 43 million specimens and provide laboratories and workspaces to encourage the development of multidisciplinary approaches to scientific issues and offer greatly improved access to users. Frozen tissue and DNA collections, housed in the Molecular Collections Facility which opened in 2010. NHM's libraries form the largest NH reference collection in the world and house over one million volumes and 25,000 periodical titles.

NHM has an internationally-renowned skills base and staff working with the collections are located in laboratories and offices in close proximity to relevant elements of the collections. The staff provide the key expertise to train Users in specimen identification, the application of taxonomic skills and utilisation of state-of-the-art analytical facilities.

**SUPPORTING FACILITIES AND SERVICES:** Molecular Biology Unit (MBU) comprises top-of-the-range facilities consisting of three units; biomedical parasitology, molecular systematics and the DNA sequencing facility. The Wolfson Wellcome Biomedical Laboratories processes >75,000 samples per year using an Applied biosystems 3730xl DNA analyser. Technicians will help Users with DNA sequencing and fragment analysis applications and provide expert advice when troubleshooting any problem samples.

Analytical and Imaging Facility encompasses state-of-the-art analytical, high-resolution, low-voltage and environmental scanning electron microscopes; electron probe microanalysis; laser ablation with ICPMS; cathodoluminescence; confocal microscopy; atomic absorption, inductively coupled plasma atomic emission, inductively coupled plasma mass spectroscopy and infra-red spectroscopy; X-ray diffraction facilities. This facility enables visitors to conduct research on a diverse range of research questions including: microtaxonomy; water quality; pollution, bioindicators; mineral chemistry and structure; ore and rock genesis; meteoritics.

Sackler Biological Imaging Lab offers several imaging systems based on high quality macro lenses, stereo microscopes and compound microscopes and DSLR providing versatile solution for imaging any types of

# WT3: Work package description

biological specimens. All stations equipped with image acquisition and focus-stacking software. Variety of illumination types including dark field, sector ring, dome, oblique, phase contrast and DIC is available. SatScan collection scanner is designed to acquire high resolution low distortion images of larger areas very quickly. It also contains Alicona InfiniteFocus system indispensable for surface and roughness measurements as well as 3D surface reconstruction and non-contrast 3D Lased Scanner Digitiser allowing fast measurements and digitizing of 3-dimensional objects.

Palaeontology Conservation Unit (PCU) is one of the leading centres for museum conservation in the world and is unique in Europe. It prepares, maintains and undertakes remedial treatment on all NHM specimens, conducts research into new methods of conservation and can offer training in best practise to Users.

Ancient DNA (aDNA) Laboratory, a state-of-the-art installation with all facilities required for sampling and DNA extraction of fossil, subfossil and preserved modern material.

**INFORMATION TECHNOLOGY AND ACCESS:** NHM has a site license for the alignment programmes 'Sequencher' and 'Lasergene' and access can be provided to the programme 'GeneMapper' which is used for fragment analysis. Computing resources include a 30-node Beowulf cluster and phylogenetic software. The SBIL is a centralized facility to serve needs of the NHM scientists and visitors and is pivotal in the NHM digitization programme.

GB TAF at Royal Botanic Garden, Kew (RBGK)

**COLLECTIONS & EXPERTISE:** RBGK has the largest living reference collections in Europe and an extensive preserved collection of vascular plant material and fungi. Herbarium collections (8 million plant and fungi specimens); Spirit collection (73,000 databased); economic botany collection (85,000); Living collections (40,000 taxa); Botanical library (over 150,000 books, 200,000 botanical drawings and 4,000 journal titles; DNA Bank containing over 40,000 samples of plant genomic DNA and the Millennium Seed Bank (seeds of 26,500 species).

**SUPPORTING FACILITIES AND SERVICES:** RBGK facilities include a genome analysis and molecular systematics suite, including a 'state-of-the-art' genomic In-Situ Hybridisation capacity, and organic chemistry laboratories will be made available. At the Wakehurst place site there is access to seed processing laboratories (incl. digital X-ray analysis equipment), initial drying rooms, a germination laboratory (with 4 walk-in incubators, 40 germination incubators and a two-way thermogradient plate), seed research laboratories (containing HPLC, Fat Analyser, GCMS, DSC, Igasorb, Real-time PCR equipment, two cryo-microtomes and AxioCam Digital Camera Microscope plus cryopreservation facilities). The seed storage currently comprises four 50 m<sup>2</sup> cold rooms at -20°C accessed from a large (80 m<sup>2</sup>) final drying room.

**INFORMATION TECHNOLOGY AND ACCESS:** All of the living collections are databased and can be searched via the web. New herbarium specimen imaging and databasing instruments are now available which will be available to Users and details of almost 500,000 specimens are available online. RBGK has very significant plant databases available through ePIC (the electronic plant information centre) including the International Plant Names Index (1.3 million names). SEPASAL (the survey of economic plants from arid and semi arid lands), the DNA c-value database, Seed information Database, library catalogue, checklists including global geography of 150 plant families available on the web, vascular plant families and genera, world grass species and The Plant List.

GB TAF at Royal Botanic Garden, Edinburgh (RBGE)

**COLLECTIONS & EXPERTISE:** RBGE has the second largest collection of living plant species in Europe together with an extensive collection of preserved plant and fungal material. RBGE has strengths in vascular and cryptogamic plants, and fungi complement those at NHM and RBGK. Access will be provided to: Herbarium collections (>2 million plant and fungal specimens), including 50,000 type specimens; Living collections (66,500 plants of over 15,500 species); Botanical library (>80,000 books & 4,000 journal titles). The section on flowering and non-flowering plant systematics is of international importance.

**SUPPORTING FACILITIES AND SERVICES:** Includes the new Field Emission Gun SEM, Cytogenetic and Molecular Laboratories – offering the latest technology to facilitate phylogenetic and population genetic research. This includes the option for cytological study, or extraction and analysis of DNA using the extensive living collections.

# WT3: Work package description

**INFORMATION TECHNOLOGY AND ACCESS:** All of the living collections and c. 10% herbarium, including an increasing number of type specimens, are databased in BGBASE. The living collections database can be searched via the web. We have developed taxonomic databases for the floras of Bhutan, Nepal and Arabia, and the families Rosaceae, Umbelliferae and Zingiberaceae.

Research supported by the infrastructure: NHM science strategy has three arms: 1. Research: Generating new knowledge. 2. Scientific infrastructure: developing collections and information to meet current and future needs. 3. Knowledge Exchange: collaboration to enhance value, impact and capacities.

NHM research is then organised into six research foci: 1. What determines biological diversity in a changing world? 2. How do large-scale physical and biological processes and their interactions influence the evolution of the Earth and other planets? 3. The relationships between biodiversity and ecosystem functioning. 4. How do interactions between hosts and their parasites impact on disease epidemiology and control? 5. The diversity of phenotypes, genes and genomes and their relation to environment and evolution? 6. Assembling the Tree of Life.

RBGK has 7 strategies to fulfill its mission 1 Accelerating discovery and global access to plant and fungal diversity; 2 Identifying plant and fungal species and regions of the world most at risk of losing their wild diversity; 3. Helping implement global plant and fungal conservation programmes; 4 Identification and successful use of locally-appropriate plant species under changing climatic regimes on agricultural, urban and suburban lands. 5. Extending the Millennium Seed Bank's global partnership programmes to secure in safe storage 25% of the world's plant species by 2020; 6 Establishing a global network of partners in restoration ecology; and 7 Delivering enjoyable, inspiring experiences and horticultural displays that transform people's understanding of plant diversity and conservation and their relevance to environmental challenges worldwide.

RBGE has three major strategic objectives for research; conserving plant biodiversity in the face of global environmental change and mass extinction, Provision of baseline taxonomic/botanical data as a foundation science, and Understanding the evolutionary processes that have given rise to the world's botanical diversity. Within these there are four research programmes: Major Floras, Tropical Diversity, Cryptogamic Plants and Fungi, Genetics and Conservation

Relationship of the infrastructure: NHM, RBGK and RBGE will provide an opportunity for Users to access the three largest NH and living collections in the UK. In previous SYNTHESYS projects 33% of applications requested access to more than one of the installations within GB TAF demonstrating a good research relationship between the installations.

Services currently on offer and Scientific Highlights: Full access to all the installations' collections, facilities, services and expertise are on offer as detailed above.

## Person-Months per Participant

Participant number <sup>10</sup>	Participant short name <sup>11</sup>	Person-months per participant
1	NHM	0.00
2	RBGK	0.00
3	RBGE	0.00
Total		0.00

## List of deliverables

Deliverable Number <sup>61</sup>	Deliverable Title	Lead beneficiary number	Estimated indicative person-months	Nature <sup>62</sup>	Dissemination level <sup>63</sup>	Delivery date <sup>64</sup>
		Total	0.00			

## Description of deliverables

# WT3: Work package description

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## Schedule of relevant Milestones

Milestone number <sup>59</sup>	Milestone name	Lead beneficiary number	Delivery date from Annex I <sup>60</sup>	Comments
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# WT3: Work package description

Project Number <sup>1</sup>	312253	Project Acronym <sup>2</sup>	SYNTHESSYS3
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## One form per Work Package

Work package number <sup>53</sup>	WP14	Type of activity <sup>54</sup>	COORD
Work package title	HU TAF		
Start month	1		
End month	48		
Lead beneficiary number <sup>55</sup>	12		

## Objectives

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## Description of work and role of partners

Name of the infrastructure: Hungarian Taxonomic Facility (HU TAF)  
 Location: Budapest, Hungary  
 Web site: [www.nhmus.hu](http://www.nhmus.hu)  
 Legal name of organisation operating the infrastructure: Hungarian Natural History Museum  
 Location of organisation: Budapest, Hungary  
 Annual operating cost (excl. investment costs) of the infrastructure (€): 3,422,280

Description of the Infrastructure: HU TAF comprises six scientific units of the Hungarian Natural History Museum, Budapest (HNHM), founded in 1802. HNHM is the national research institute for NH and is one of the outstanding institutions of Hungarian cultural and scientific life.

HU TAF at HNHM

**COLLECTIONS & EXPERTISE:** The NH collections of HU TAF have global significance. It is one of the largest NH collections among the Central and Eastern European institutions, comprising more than ten million items, among them 200,000 type specimens including 44,110 primary types. These are considered extremely valuable as they hold the most important reference and historical collections for the entire Carpathian Basin, major portions of the Balkans, Central-, Eastern- and south eastern Asia.

In addition, HU TAF holds important historical collections; many of them are 200–300 years old. They provide ecological and genetic reference data for comparison with more recent materials. The best represented areas are the Palaearctic, Oriental and Ethiopian biogeographic regions, and in case of soil animals also the tropical part of America.

The collections are well organised so the desired specimens or taxa can easily be retrieved. The Bird, Mammal, Anthropological, Mineralogical, and parts of the Invertebrate collections were recently moved into state-of-the-art storage areas, which provide an excellent environment for preservation and improved the access to the collections.

The staff are leading experts in their fields thus represent rare or unique expertise in Europe, which is demonstrated by our involvement in establishing NATURA 2000 and other projects such as European fauna monographs (e.g. Diptera and oribatid mites of Switzerland; Noctuidae Europaeae). Consultation with phytosanitary and quarantine specialists is part of HU TAF's core work. There is an increasing demand for our staff expertise in solving conservational and human biological problems within the framework of national and international projects.

The library with more than 300,000 volumes is the nationally recognized centre for NH and it holds one of the most important archives for natural historians in Central and Eastern Europe.

**SUPPORTING FACILITIES AND SERVICES:** A scanning electron microscope and a very well-equipped DNA laboratory with up-to-date technology enable scientists to use molecular biological methods in taxonomy, phylogeography and population genetics. A special feature of this laboratory that carefully separated laboratory

# WT3: Work package description

space is devoted to ArcheDNA preparations where palaeontological and archaeological samples can also be handled safely.

**INFORMATION TECHNOLOGY AND ACCESS:** Full digital inventories are available in vertebrate and anthropological collections.

Research supported by the infrastructure: The staff expertise of HU TAF has a long-standing, taxonomic, systematic, and biogeography focus making it a leading European centre of biodiversity research for the Balkans, Carpathians, and Central-, Eastern-, and Southeastern Asia. HU TAF has eight major regional research themes that embrace a multidisciplinary approach:

- Exploration of the biota of the Carpathian Basin, the Balkan Peninsula, and Central-, Eastern-, and Southeastern Asia
- Exploration of the geologic evolution of the Carpathian Basin
- Studies of taxonomy, biostratigraphy, biogeography and evolution of fossil biotas preserved in the Carpathians and the Carpathian Basin
- Anthropological research on ancient and historical human populations in the Carpathian basin
- Ecological and coenological characteristics of the biota of the Carpathian Basin
- Biomonitoring of habitat changes due to human influence
- Nature conservation oriented researches, biodiversity monitoring programs
- Applied sciences – plant conservation, parasitology and quarantine

At the EU level, studies based on our unique collections are especially important to discover the biodiversity hotspots of the less explored SE part of Europe. Knowledge from this part of Europe is mostly based on vascular plants and vertebrates. Information now being gathered from the collections of less “attractive” groups like insects or cryptogamic plants and these may highlight additional centres of biodiversity. With the aid of novel technology certain populations will certainly reveal a level of genetic diversity that is greater than expected; this offers new dimensions especially for the Community Biodiversity Strategy implementation.

Services currently on offer and Scientific Highlights: Full access to all the installation's collections, facilities, services and expertise are on offer as detailed above.

## Person-Months per Participant

Participant number <sup>10</sup>	Participant short name <sup>11</sup>	Person-months per participant
12	HNHM	0.00
Total		0.00

## List of deliverables

Deliverable Number <sup>61</sup>	Deliverable Title	Lead beneficiary number	Estimated indicative person-months	Nature <sup>62</sup>	Dissemination level <sup>63</sup>	Delivery date <sup>64</sup>
			Total	0.00		

## Description of deliverables

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## Schedule of relevant Milestones

Milestone number <sup>59</sup>	Milestone name	Lead beneficiary number	Delivery date from Annex I <sup>60</sup>	Comments

# WT3: Work package description

Project Number <sup>1</sup>	312253	Project Acronym <sup>2</sup>	SYNTHESSYS3
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## One form per Work Package

Work package number <sup>53</sup>	WP15	Type of activity <sup>54</sup>	COORD
Work package title	NL TAF		
Start month	1		
End month	48		
Lead beneficiary number <sup>55</sup>	8		

## Objectives

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## Description of work and role of partners

Name of the infrastructure: Netherlands Taxonomic Facility (NL TAF)  
 Location : Leiden, NL and Wageningen, NL  
 Web site address: www.naturalis.nl  
 Legal name of organisation operating the infrastructure: Naturalis Biodiversity Centre  
 Location of organisation: Leiden, NL  
 Annual operating cost (excl. investment costs) of the infrastructure (€): 8,005,473.22

Description of the Infrastructure: NL TAF comprises the Naturalis Biodiversity Centre (NBC). NBC recently resulted from the merger of the Zoological Museum Amsterdam, National Museum of Natural History Naturalis, and the National Herbarium of the Netherlands. NL TAF contains the world's fifth largest specimen collection. NBC is based primarily in Leiden with one collection store in Wageningen, which will be transferred to Leiden in late 2013.

NL-TAF at NCBN

**COLLECTIONS & EXPERTISE:** NL TAF covers all major organismal branches of the Tree of Life, both past and present. NL TAF is based on large and well-documented scientific collections of zoological, botanical, palaeontological and geological specimens. They comprise more than 30 million specimens, containing 280,000 primary types. Unique is the extraordinary coverage of the Malesian region. The physical arrangement and accessibility of the collections are of the highest standards.

NL TAF scientists are at the forefront of a wide range of biodiversity assessment projects and biodiversity informatics developments and are experts in combining collection-based, observational, chronological, GIS and functional ecological data, having at hand several centuries-old records of detailed monitoring projects, comprising millions of records.

**SUPPORTING FACILITIES AND SERVICES:** Molecular facilities include three Laboratories with automated DNA sequencers, robotics for high throughput sequencing, recombinant DNA laboratories, micro-array and PCR lightcycler for rapid strain identifications.

DNA Barcoding Facility and Ancient DNA Laboratory include a versatile molecular lab with methods such as CTAB or silica-based DNA and RNA extraction, cloning and PCR including real-time PCR and high-resolution melting curves. In a separate building there is an ultra-clean ancient DNA lab for sensitive ancient DNA work.

Histological Laboratory with a full range of equipment for preparing histological preparations for light microscopic examination as well as for transmission electron microscopic studies (e.g. ultra-microtomes, freezing microtomes).

CT Scanning state-of-the-art micro-CT scanner enables high-resolution 3-dimensional studies and virtual reconstructions of the internal features from a wide range of palaeontological, zoological, entomological and botanical specimens.



# WT3: Work package description

**INFORMATION TECHNOLOGY AND ACCESS:** Through focused digitisation efforts many of the important groups in the collections are completely accessible digitally, e.g. types of many plants, fishes and several groups of vertebrates and invertebrates. Altogether, the databases add up to over 4 million records. Excluding entomology and molluscs, the databases cover almost 50% of the collections. Currently, NBC is digitizing its collections at a massive scale thanks to a large grant from the Dutch Government. A variety of other digital directories is also accessible for visiting researchers. In addition, the electronic publishing facilities are open to users and enable worldwide dissemination of scientific results.

**Research supported by the infrastructure:** At the heart of NL TAF research agenda is the collection-based research which aims to monitor, name and reconstruct selected taxa of the Tree of Life. Eight topics have been selected as focal research projects for the next five years. The subjects have been chosen because they have high potential for international collaboration and are relevant for society and industry. The eight topics are: 1) Phylogenetic morphology & character evolution, 2) Chirality or left-right-asymmetry, 3) Secondary woodiness, 4) Evolution of species interdependencies, 5) Diversity discovery, 6) Shifting ranges, 7) Human induced vs. Natural evolution, and 8) Phylogenetic diversity.

**Services currently on offer and Scientific Highlights:** Full access to all the installations' collections, facilities, services and expertise are on offer as detailed above.

## Person-Months per Participant

Participant number <sup>10</sup>	Participant short name <sup>11</sup>	Person-months per participant
8	Naturalis	0.00
	Total	0.00

## List of deliverables

Deliverable Number <sup>61</sup>	Deliverable Title	Lead beneficiary number	Estimated indicative person-months	Nature <sup>62</sup>	Dissemination level <sup>63</sup>	Delivery date <sup>64</sup>
		Total	0.00			

## Description of deliverables

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## Schedule of relevant Milestones

Milestone number <sup>59</sup>	Milestone name	Lead beneficiary number	Delivery date from Annex I <sup>60</sup>	Comments

# WT3: Work package description

Project Number <sup>1</sup>	312253	Project Acronym <sup>2</sup>	SYNTHESSYS3
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## One form per Work Package

Work package number <sup>53</sup>	WP16	Type of activity <sup>54</sup>	COORD
Work package title	SE TAF		
Start month	1		
End month	48		
Lead beneficiary number <sup>55</sup>	7		

## Objectives

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## Description of work and role of partners

Name of the infrastructure: Sweden Taxonomic Access Facility (SE-TAF)  
 Location: Stockholm, Sweden  
 Web site: <http://www.nrm.se>; [http://www.synthesys.info/se\\_taf.htm](http://www.synthesys.info/se_taf.htm)  
 Legal name of organisation operating the infrastructure: Naturhistoriska riksmuseet, NRM  
 Location of organisation: Stockholm, Sweden  
 Annual operating cost (excl. investment costs) of the infrastructure (€): 16,195,000

Description of the Infrastructure: SE-TAF comprises one institute, Naturhistoriska riksmuseet (NRM) that combines a venerable tradition with state-of-the-art working methods. NRM's collections of close to 10 million specimens constitute an archive of the natural world, and unique and irreplaceable reference material for research.

SE-TAF at NRM

**COLLECTIONS & EXPERTISE:** SE-TAFs collections of biological, palaeontological and geological specimens encompass not only diverse specimens but also broad taxonomic, temporal and spatial spans. They are characterised by several specific areas of strength: Rich collections from high-latitude, polar and tropical regions especially South America; Unique type and special-purpose collections (e.g. Linné Herbarium) and an Environmental Specimen Bank. The collections are organised into nine cores reflecting the primary scientific discipline, each core includes numerous type specimens of which 161,000 primary types have been identified, and many special collections, of which several are unique globally (e.g. Chinese Fossil Plant Collection).

SE-TAF scientists have expertise in a wide range of disciplines within the natural sciences and actively collaborate across departments in four research themes. An international expert panel recently assessed the scientific relevance of NRMs biodiversity research as outstanding.

SE-TAF has taken a prominent role in a variety of initiatives in Europe and globally, such as GBIF (Swedish Node) and CBOL. Other international responsibilities include, hosting and directing the NORDSIM facility, acting as the Swedish node for NordCEE, and active involvement in GEOTRACES, Morphbank, BioCold, WoRMS, Euring, and in ICZN.

**SUPPORTING FACILITIES AND SERVICES:** SE-TAFs dedicated research laboratory space covers almost 1,100 m<sup>2</sup>. Scientists using these facilities are supported by skilled technical staff. Facilities for biological and palaeontological research comprise a state-of-the-art DNA laboratory with an automated sequencer, equipped for sequencing and fragment analysis. The newly established ultra-clean ancientDNA laboratory allows genetic studies of fossil, subfossil and preserved modern material. Preparatory facilities for ultra structure studies of biological materials, modern transmission and scanning electron microscopes, excellent services for physical handling and x-ray investigation of zoological specimens, a laboratory for analysis of X-ray tomography data analyses.

Facilities for geological and geochemical research include a top of the range clean laboratory for low-level contamination chemical preparation of rock, sediment and water samples, a mineral synthesis laboratory,

# WT3: Work package description

an X-ray diffractometer, as well as equipment for Mössbauer and polarised single crystal micro-FTIR and micro-UV/VIS/NIR spectroscopy. SE-TAF has three advanced mass spectrometers for isotope analysis, plus a high mass-resolution ion microprobe (Cameca ims 1280; NORDSIM facility). This probe is one of only few such instruments in Europe, and the only one in the SYNTHESYS consortium. It is used for in-situ isotope and trace-element microanalysis. The SEM facility includes Cathodoluminescence detector and Backscatter electron detector.

**INFORMATION TECHNOLOGY AND ACCESS:** A steadily increasing proportion of currently ca 23% of SE-TAFs collections are digitized, about ¼ of these are available via the web. NRM is a member of the FishBase Consortium, a global information system on fishes, and hosts one of their servers. Computing resources beyond standard hardware and programs, include advanced phylogenetic software, GIS facilities, and X-ray tomography analyses software.

**Research supported by the infrastructure:** Research activities are focused into four themes - The Changing Earth. Traces the point of onset of life on earth are investigated applying high-resolution isotopic micro-analyses techniques on the best preserved early-Archean rocks in West Greenland. Other subjects include the occurrence of major water repositories in Earth's mantle and mineral chemistry at the atomic level.

**Ecosystems and Species History.** Understanding events in evolutionary time through analysis of ancient faunas and floras and their changes in space and time. Focal points are the origin and early evolution of animals, the phylogenetic diversification and ecological radiation of flowering plants and seed plants, and the evolution of modern mammals.

**The Diversity of Life.** Organismal relationships at all levels, the evolution of morphological and other traits and phylogeography, and survey, analyses and description of biodiversity at a global level and writing of faunas and floras.

**Man and the Environment.** SE-TAF leads national and international monitoring programmes that study environmental contaminants and their effects, both in terrestrial and marine environments. Studies are performed on the effects of exposure to pollutants on the reproductive and endocrine systems in large marine mammals, and linking these results to potential population level effects.

**Services currently on offer and Scientific Highlights:** SE-TAF offers access to all the installations' collections, facilities, services and expertise detailed above.

## Person-Months per Participant

Participant number <sup>10</sup>	Participant short name <sup>11</sup>	Person-months per participant
7	NRM	0.00
	Total	0.00

## List of deliverables

Deliverable Number <sup>61</sup>	Deliverable Title	Lead beneficiary number	Estimated indicative person-months	Nature <sup>62</sup>	Dissemination level <sup>63</sup>	Delivery date <sup>64</sup>
		Total	0.00			

## Description of deliverables

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# WT3: Work package description

## Schedule of relevant Milestones

Milestone number <sup>59</sup>	Milestone name	Lead beneficiary number	Delivery date from Annex I <sup>60</sup>	Comments
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# WT4: List of Milestones

Project Number <sup>1</sup>	312253	Project Acronym <sup>2</sup>	SYNTHESYS3
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## List and Schedule of Milestones

Milestone number <sup>59</sup>	Milestone name	WP number <sup>53</sup>	Lead beneficiary number	Delivery date from Annex I <sup>60</sup>	Comments
MS1	Kick off meeting	WP1	1	11	Minutes & actions circulated
MS2	AGM1	WP1	1	23	Minutes & actions circulated
MS3	AGM2	WP1	1	35	Minutes & actions circulated
MS4	NRSG teleconference	WP1	1	1	Minutes & actions circulated
MS5	NRSG teleconference	WP1	1	7	Minutes & actions circulated
MS6	NRSG teleconference	WP1	1	13	Minutes & actions circulated
MS7	NRSG teleconference	WP1	1	19	Minutes & actions circulated
MS8	NRSG teleconference	WP1	1	25	Minutes & actions circulated
MS9	NRSG teleconference	WP1	1	31	Minutes & actions circulated
MS10	NRSG teleconference	WP1	1	37	Minutes & actions circulated
MS11	NRSG teleconference	WP1	1	43	Minutes & actions circulated
MS12	Risk workshop	WP1	1	1	To create risk register and update countermeasures
MS13	Risk workshop	WP1	1	7	Revise risk register and update countermeasures
MS14	Risk workshop	WP1	1	13	Revise risk register and update countermeasures
MS15	Risk workshop	WP1	1	19	Revise risk register and update countermeasures
MS16	Risk workshop	WP1	1	25	Revise risk register and update countermeasures
MS17	Risk workshop	WP1	1	31	Revise risk register and update countermeasures
MS18	Risk workshop	WP1	1	36	Revise risk register and update countermeasures
MS19	Risk workshop	WP1	1	43	Revise risk register and update countermeasures
MS20	Launch Access Call	WP1	1	2	Open website

# WT4: List of Milestones

Milestone number <sup>59</sup>	Milestone name	WP number <sup>53</sup>	Lead beneficiary number	Delivery date from Annex I <sup>60</sup>	Comments
MS21	Launch Access Call	WP1	1	14	Open website
MS22	Launch Access Call	WP1	1	26	Open website
MS23	Launch Access Call	WP1	1	38	Open website
MS24	Allocation algorithm run	WP1	1	3	Calculate UD allocation based on demand from Call 1
MS25	Allocation algorithm run	WP1	1	15	Calculate UD allocation based on demand from Call 2
MS26	Allocation algorithm run	WP1	1	27	Calculate UD allocation based on demand from Call 3
MS27	Allocation algorithm run		1	39	
MS28	Network of DNA & tissue banks established	WP2	5	18	Remit of network agreed
MS29	CSAT utilisation	WP2	1	24	Minimum of 10 institutions have used CSAT
MS30	SAB meeting 1	WP3	1	1	
MS31	SAB meeting 2	WP3	1	11	
MS32	SAB meeting 3	WP3	1	23	
MS33	SAB meeting 4	WP3	1	35	
MS34	Crowdsourcing website launch	WP4	1	36	Website open for use
MS35	USPs Call 1	WP5	1	4	Applicants notified of USP outcome
MS36	USPs Call 2	WP5	1	16	Applicants notified of USP outcome
MS37	USPs Call 3	WP5	1	28	Applicants notified of USP outcome
MS38	USPs Call 4	WP5	1	40	Applicants notified of USP outcome

# WT5: Tentative schedule of Project Reviews

Project Number <sup>1</sup>	312253	Project Acronym <sup>2</sup>	SYNTHESYS3
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## Tentative schedule of Project Reviews

Review number <sup>65</sup>	Tentative timing	Planned venue of review	Comments, if any
RV 1	21	Berlin	In conjunction with General Meeting

## Project Effort by Beneficiary and Work Package

Project Number <sup>1</sup>	312253	Project Acronym <sup>2</sup>	SYNTHEsys3
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### Indicative efforts (man-months) per Beneficiary per Work Package

Beneficiary number and short-name	WP 1	WP 2	WP 3	WP 4	WP 5	WP 6	WP 7	WP 8	WP 9	WP 10	WP 11	WP 12	WP 13	WP 14	WP 15	WP 16	Total per Beneficiary
1 - NHM	208.00	19.00	10.00	16.00	13.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	266.00
2 - RBGK	0.00	12.00	5.00	7.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24.00
3 - RBGE	0.00	16.00	4.00	22.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	42.00
4 - MNHN	0.00	4.00	2.00	10.00	7.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	23.00
5 - UCPH	0.00	15.00	4.00	4.00	7.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	30.00
6 - CSIC	0.00	15.00	9.00	14.00	7.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	45.00
7 - NRM	0.00	4.00	2.00	0.00	7.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	13.00
8 - Naturalis	0.00	4.00	2.00	7.00	7.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	20.00
9 - FUB-BGBM	0.00	14.00	2.00	10.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	26.00
10 - MfN	0.00	32.00	5.00	14.00	7.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	58.00
11 - NHMW	0.00	3.00	2.00	5.00	7.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	17.00
12 - HNHM	0.00	0.00	2.00	6.00	7.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	15.00
13 - RBINS	0.00	5.00	0.00	7.00	7.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	19.00
14 - MRAC	0.00	6.00	4.00	3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	13.00
15 - NMP	0.00	13.00	11.00	12.00	7.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	43.00
16 - VIZZ	0.00	0.00	1.00	21.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	22.00
17 - VU	0.00	0.00	6.00	6.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	12.00
18 - HCMR	0.00	1.00	0.00	13.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	14.00
<b>Total</b>	<b>208.00</b>	<b>163.00</b>	<b>71.00</b>	<b>177.00</b>	<b>83.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>702.00</b>



## Project Effort by Activity type per Beneficiary

Project Number <sup>1</sup>	312253	Project Acronym <sup>2</sup>	SYNTHESESYS3
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### Indicative efforts per Activity Type per Beneficiary

Activity type	Part. 1 NHM	Part. 2 RBGK	Part. 3 RBGE	Part. 4 MNHN	Part. 5 UCPH	Part. 6 CSIC	Part. 7 NRM	Part. 8 Natural	Part. 9 FUB- BGB	Part. 10 MfN	Part. 11 NHMW	Part. 12 HNHM	Part. 13 RBINS	Part. 14 MRAC
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1. RTD/Innovation activities														
WP 4	16.00	7.00	22.00	10.00	4.00	14.00	0.00	7.00	10.00	14.00	5.00	6.00	7.00	3.00
<b>Total Research</b>	16.00	7.00	22.00	10.00	4.00	14.00	0.00	7.00	10.00	14.00	5.00	6.00	7.00	3.00

2. Demonstration activities														
<b>Total Demo</b>	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3. Consortium Management activities														
WP 1	208.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Total Management</b>	208.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Work Packages for Coordination activities														
WP 2	19.00	12.00	16.00	4.00	15.00	15.00	4.00	4.00	14.00	32.00	3.00	0.00	5.00	6.00
WP 3	10.00	5.00	4.00	2.00	4.00	9.00	2.00	2.00	2.00	5.00	2.00	2.00	0.00	4.00
WP 6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WP 7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WP 8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WP 9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WP 10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WP 11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WP 12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WP 13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

## Project Effort by Activity type per Beneficiary

Work Packages for Coordination activities														
WP 14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WP 15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WP 16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Total Coordination</b>	<b>29.00</b>	<b>17.00</b>	<b>20.00</b>	<b>6.00</b>	<b>19.00</b>	<b>24.00</b>	<b>6.00</b>	<b>6.00</b>	<b>16.00</b>	<b>37.00</b>	<b>5.00</b>	<b>2.00</b>	<b>5.00</b>	<b>10.00</b>

4. Other activities														
<b>Total other</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>

Work Packages for Support activities														
WP 5	13.00	0.00	0.00	7.00	7.00	7.00	7.00	7.00	0.00	7.00	7.00	7.00	7.00	0.00
<b>Total Support</b>	<b>13.00</b>	<b>0.00</b>	<b>0.00</b>	<b>7.00</b>	<b>7.00</b>	<b>7.00</b>	<b>7.00</b>	<b>7.00</b>	<b>0.00</b>	<b>7.00</b>	<b>7.00</b>	<b>7.00</b>	<b>7.00</b>	<b>0.00</b>

<b>Total</b>	<b>266.00</b>	<b>24.00</b>	<b>42.00</b>	<b>23.00</b>	<b>30.00</b>	<b>45.00</b>	<b>13.00</b>	<b>20.00</b>	<b>26.00</b>	<b>58.00</b>	<b>17.00</b>	<b>15.00</b>	<b>19.00</b>	<b>13.00</b>
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## Project Effort by Activity type per Beneficiary

Activity type	Part. 15 NMP	Part. 16 VIZZ	Part. 17 VU	Part. 18 HCMR	Total
<b>1. RTD/Innovation activities</b>					
WP 4	12.00	21.00	6.00	13.00	177.00
<b>Total Research</b>	<b>12.00</b>	<b>21.00</b>	<b>6.00</b>	<b>13.00</b>	<b>177.00</b>
<b>2. Demonstration activities</b>					
<b>Total Demo</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
<b>3. Consortium Management activities</b>					
WP 1	0.00	0.00	0.00	0.00	208.00
<b>Total Management</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>208.00</b>
<b>Work Packages for Coordination activities</b>					
WP 2	13.00	0.00	0.00	1.00	163.00
WP 3	11.00	1.00	6.00	0.00	71.00
WP 6	0.00	0.00	0.00	0.00	0.00
WP 7	0.00	0.00	0.00	0.00	0.00
WP 8	0.00	0.00	0.00	0.00	0.00
WP 9	0.00	0.00	0.00	0.00	0.00
WP 10	0.00	0.00	0.00	0.00	0.00
WP 11	0.00	0.00	0.00	0.00	0.00
WP 12	0.00	0.00	0.00	0.00	0.00
WP 13	0.00	0.00	0.00	0.00	0.00
WP 14	0.00	0.00	0.00	0.00	0.00
WP 15	0.00	0.00	0.00	0.00	0.00
WP 16	0.00	0.00	0.00	0.00	0.00

## Project Effort by Activity type per Beneficiary

Work Packages for Coordination activities					
Total Coordination	24.00	1.00	6.00	1.00	234.00
4. Other activities					
Total other	0.00	0.00	0.00	0.00	0.00
Work Packages for Support activities					
WP 5	7.00	0.00	0.00	0.00	83.00
Total Support	7.00	0.00	0.00	0.00	83.00
Total	43.00	22.00	12.00	14.00	702.00

# WT8: Project Effort and costs

Project Number <sup>1</sup>	312253	Project Acronym <sup>2</sup>	SYNTHEYS3
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## Project efforts and costs

Beneficiary number	Beneficiary short name	Estimated eligible costs (whole duration of the project)							Requested EU contribution (€)
		Effort (PM)	Personnel costs (€)	Subcontracting (€)	Other Direct costs (€)	Indirect costs OR lump sum, flat-rate or scale-of-unit (€)	Access costs (€)	Total costs	
1	NHM	266.00	533,167.00	15,000.00	435,609.00	1,404,726.00	635,335.10	3,023,837.10	2,029,972.91
2	RBGK	24.00	115,260.00	0.00	76,392.00	114,991.20	71,124.20	377,767.40	280,676.84
3	RBGE	42.00	250,800.00	2,000.00	108,791.00	215,754.60	92,620.08	669,965.68	496,685.45
4	MNHN	23.00	88,800.00	0.00	259,336.00	208,881.60	299,940.64	856,958.24	680,129.16
5	UCPH	30.00	142,200.00	2,000.00	100,482.00	145,609.20	183,714.00	574,005.20	448,776.74
6	CSIC	45.00	221,670.60	2,000.00	138,174.00	316,988.40	188,370.00	867,203.00	622,970.25
7	NRM	13.00	41,660.00	2,000.00	149,635.00	114,777.00	281,735.00	589,807.00	488,420.65
8	Naturalis	20.00	84,000.00	2,000.00	100,076.00	110,445.60	216,218.40	512,740.00	421,380.72
9	FUB-BGBM	26.00	138,050.00	0.00	26,549.00	98,759.40	35,029.74	298,388.14	218,209.67
10	MfN	58.00	280,920.00	2,000.00	94,605.00	225,315.00	102,547.68	705,387.68	517,812.43
11	NHMW	17.00	42,600.00	0.00	122,103.00	98,821.80	144,071.40	407,596.20	324,086.61
12	HNHM	15.00	48,000.00	0.00	86,542.00	80,725.00	137,231.84	352,498.84	285,754.78
13	RBINS	19.00	57,600.00	0.00	63,542.00	72,685.20	111,308.94	305,136.14	247,235.88
14	MRAC	13.00	67,760.00	0.00	48,011.00	69,462.60	87,632.49	272,866.09	213,595.26
15	NMP	43.00	205,800.00	2,000.00	86,157.00	58,391.40	121,770.66	474,119.06	423,975.65
16	VIZZ	22.00	132,000.00	0.00	3,000.00	81,000.00	0.00	216,000.00	160,713.00
17	VU	12.00	66,125.00	0.00	3,000.00	41,475.00	0.00	110,600.00	78,344.75
18	HCMR	14.00	44,560.00	0.00	2,000.00	36,094.00	0.00	82,654.00	61,259.25
<b>Total</b>		<b>702.00</b>	<b>2,560,972.60</b>	<b>29,000.00</b>	<b>1,904,004.00</b>	<b>3,494,903.00</b>	<b>2,708,650.17</b>	<b>10,697,529.77</b>	<b>8,000,000.00</b>

## Summary of transnational access / service provision per installation

Project Number <sup>1</sup>	312253	Project Acronym <sup>2</sup>	SYNTHESESYS3
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### Summary of transnational access / service provision per installation

Part. num.	Org. short name	Short name of infrastructure	Installation									
			Num.	Name	Operator country code	Unit of access	Total Estimated costs	Estimated unit cost	Min. quantity of access to be provided	Access costs charged to the GA	Est. num. of users	Est. num. of proj.
1	NHM	GB TAF	1	NHM Coll	United Kingdom	Day	76,273,920.28	247.89	2,375.00	588,738.75	238	238
			2	NHM AIF	United Kingdom	Day	2,744,191.77	461.35	101.00	46,596.35	20	20
2	RBGK	GB TAF	3	RBGK	United Kingdom	Day	19,062,741.97	141.40	503.00	71,124.20	31	31
3	RBGE	GB TAF	4	RBGE	United Kingdom	Day	10,566,184.06	129.72	714.00	92,620.08	32	32
4	MNHN	FR TAF	1	MNHN COL	France	Day	6,385,760.00	212.86	1,264.00	269,055.04	126	126
			2	MNHN AIF	France	Day	978,357.60	454.20	68.00	30,885.60	23	23
5	UCPH	DK TAF	1	UCPH	Denmark	Day	26,536,000.00	306.19	600.00	183,714.00	75	75
6	CSIC	ES TAF	1	CSIC	Spain	Day	13,122,653.41	241.50	780.00	188,370.00	60	60
7	NRM	SE TAF	1	NRM	Sweden	Day	48,406,236.59	335.00	841.00	281,735.00	70	70
8	Naturalis	NL TAF	1	NCB	Netherlands	Day	34,263,425.40	391.70	552.00	216,218.40	58	58
9	FUB-BGBM	DE TAF	1	BGBM Col	Germany	Day	11,647,095.52	181.73	78.00	14,174.94	7	7
			2	BGBM Lab	Germany	Day	2,854,920.50	347.58	60.00	20,854.80	12	12
10	MfN	DE TAF	3	MfN Col	Germany	Day	13,883,853.48	194.08	399.00	77,437.92	67	67
			4	MfN Lab	Germany	Day	8,233,162.08	321.92	78.00	25,109.76	13	13
11	NHMW	AT TAF	1	NHMW	Austria	Day	5,556,860.79	173.58	830.00	144,071.40	83	83
12	HNHM	HU TAF	1	HNHM Col	Hungary	Day	3,582,360.00	128.96	613.00	79,052.48	68	68
			2	HNHM Mol	Hungary	Day	317,918.40	317.92	183.00	58,179.36	18	18
13	RBINS	BE TAF	1	RBINS	Belgium	Day	7,096,137.59	282.51	394.00	111,308.94	44	44

## Summary of transnational access / service provision per installation

Part. num.	Org. short name	Short name of infrastructure	Installation									
			Num.	Name	Operator country code	Unit of access	Total Estimated costs	Estimated unit cost	Min. quantity of access to be provided	Access costs charged to the GA	Est. num. of users	Est. num. of proj.
14	MRAC	BE TAF	2	RMCA	Belgium	Day	5,188,751.58	274.71	319.00	87,632.49	33	33
15	NMP	CZ TAF	1	NMP	Czech Republic	Day	10,853,027.00	217.06	561.00	121,770.66	56	56
Grand Total							307,553,558.02			2,708,650.17		

### 1. Project number

The project number has been assigned by the Commission as the unique identifier for your project. It cannot be changed. The project number **should appear on each page of the grant agreement preparation documents (part A and part B)** to prevent errors during its handling.

### 2. Project acronym

Use the project acronym as given in the submitted proposal. It cannot be changed unless agreed so during the negotiations. The same acronym **should appear on each page of the grant agreement preparation documents (part A and part B)** to prevent errors during its handling.

### 53. Work Package number

Work package number: WP1, WP2, WP3, ..., WPn

### 54. Type of activity

For all FP7 projects each work package must relate to one (and only one) of the following possible types of activity (only if applicable for the chosen funding scheme – must correspond to the GPF Form Ax.v):

- **RTD/INNO** = Research and technological development including scientific coordination - applicable for Collaborative Projects and Networks of Excellence
- **DEM** = Demonstration - applicable for collaborative projects and Research for the Benefit of Specific Groups
- **MGT** = Management of the consortium - applicable for all funding schemes
- **OTHER** = Other specific activities, applicable for all funding schemes
- **COORD** = Coordination activities – applicable only for CAs
- **SUPP** = Support activities – applicable only for SAs

### 55. Lead beneficiary number

Number of the beneficiary leading the work in this work package.

### 56. Person-months per work package

The total number of person-months allocated to each work package.

### 57. Start month

Relative start date for the work in the specific work packages, month 1 marking the start date of the project, and all other start dates being relative to this start date.

### 58. End month

Relative end date, month 1 marking the start date of the project, and all end dates being relative to this start date.

### 59. Milestone number

Milestone number: MS1, MS2, ..., MSn

### 60. Delivery date for Milestone

Month in which the milestone will be achieved. Month 1 marking the start date of the project, and all delivery dates being relative to this start date.

### 61. Deliverable number

Deliverable numbers in order of delivery dates: D1 – Dn

### 62. Nature

Please indicate the nature of the deliverable using one of the following codes

**R** = Report, **P** = Prototype, **D** = Demonstrator, **O** = Other

### 63. Dissemination level

Please indicate the dissemination level using one of the following codes:

- **PU** = Public
- **PP** = Restricted to other programme participants (including the Commission Services)
- **RE** = Restricted to a group specified by the consortium (including the Commission Services)
- **CO** = Confidential, only for members of the consortium (including the Commission Services)



- **Restreint UE** = Classified with the classification level "Restreint UE" according to Commission Decision 2001/844 and amendments
- **Confidentiel UE** = Classified with the mention of the classification level "Confidentiel UE" according to Commission Decision 2001/844 and amendments
- **Secret UE** = Classified with the mention of the classification level "Secret UE" according to Commission Decision 2001/844 and amendments

**64. Delivery date for Deliverable**

Month in which the deliverables will be available. Month 1 marking the start date of the project, and all delivery dates being relative to this start date

**65. Review number**

Review number: RV1, RV2, ..., RVn

**66. Tentative timing of reviews**

Month after which the review will take place. Month 1 marking the start date of the project, and all delivery dates being relative to this start date.

**67. Person-months per Deliverable**

The total number of person-month allocated to each deliverable.

**SEVENTH FRAMEWORK PROGRAMME**  
**Capacities Specific Programme**  
**Research Infrastructures**

**Grant agreement for: Integrating Activity – Combination of Collaborative  
Project and Coordination and Support Action**

***Annex I – “Description of Work”***

Project acronym: SYNTHESYS3  
Project full title: Synthesis of Systematic Resources  
Grant agreement no.: 312253-CP-CSA-Infra

Date of preparation of Annex I (latest version); August 2012  
Date of approval of Annex I by Commission:

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## **B1 Concept and objectives, progress beyond the state-of-the-art, S/T methodology and workplan**

### **Concept and project objectives**

SYNTHESYS3 is designed to produce an accessible, integrated European resource for researchers primarily in the natural sciences, with a major aim of broadening the User Group by making the data held within collections more easily available and thus increasing their research potential. The Consortium will create a common, high quality approach to the management, preservation, and long-term access to Europe's major Natural History (NH) collections including *virtual collections* and *new physical collections*. This will be achieved by providing improved access to the physical collections within SYNTHESYS3 Consortium and also to the electronically stored data associated with these collections.

The overall scientific objective is to improve significantly the quality and flexibility of access to NH collections for the widest possible range of European researchers. Much has been achieved in the management and accessibility of *traditional* NH collections. As technologies have developed, new collections are growing within NH institutions in two forms: (1) *virtual collections* (e.g. digital, SEM & video images, metadata, DNA barcodes, CT scans and chemical analysis data) and (2) *new physical collections* (e.g. housing frozen tissue, DNA, RNA). Currently their management and accessibility are fragmented. SYNTHESYS3 aims to integrate these *new collections* in ways that will have a lasting effect on the landscape of the infrastructures, broaden the spectrum of research that can be carried out, and make information available over the web.

Recent advances in information technology and molecular research are already being implemented in NH research and collections management and SYNTHESYS3 will provide the framework for integration via the Joint Research Activity (JRA) and the Networking Activities (NA). The NAs will provide a coherent, integrated and sustainable management approach to *virtual* and *new physical collections* that will enable institutions to meet the demands of both current and future Users. Outputs will include collection management policies (M36), protocols (M24) and best practise guides (M32).

The JRA will, develop mechanisms that enable Beneficiaries with collections to enrich their digital media with metadata to increase their accessibility to a broad range of potential Users (M24). SYNTHESYS3 will support its NH institutions in their long-term goal of creating *virtual collections* and will contribute to the sustainability of these collections. The JRA will also evaluate the use of different types of digitisation techniques to meet the specialist needs that arise in different scientific fields in ways that can provide more effective remote access of key specimens (M36). Best practice in *virtual collection* development will be developed and promoted for adoption by Beneficiaries and other NH institutions within Europe and globally (M36).

A central element for SYNTHESYS3 is to deliver demand led physical access (via Transnational Access, TA) to over 340 million specimens housed by the Beneficiaries. The main beneficiaries of this ambitious integration process will be the European bioscience and geoscience research community. The NAs will create a roadmap for facilitating future Access to these collections (M34)

## Networking Activities (NAs)

### NA 1. Management

**Main Idea:** *To manage SYNTHESYS3 ensuring integration of the Work Packages, plus delivery of the programme of work in time and within budget in accordance with EC-GA requirements.*

NA1 will manage the SYNTHESYS3 Consortium, ensuring the effective implementation of the Work Packages on behalf of the EC, the project Beneficiaries and the Users.

### NA 2: Collections management of emerging/new collections

**Main Idea:** *To provide a coherent, integrated management approach that will enable NH collections to meet the expanding needs of Users, with particular focus on the development of and access to virtual and new physical collections.*

The tools, standards and training provided by SYNTHESYS1&2 NAs have proved successful in improving collections management of traditional European NH collections (e.g. alcohol-preserved specimens, desiccated plants and insects, bones and minerals). There is a demand from both NH institutions and the User community to move the focus from improving collections management of traditional collections to developing that for their growing *virtual* and *new physical collections*.

NA2 will meet the demand by developing collection management policies and strategic priorities for open and flexible access to *virtual* and *new physical collections*. To ensure the wider uptake of these policies outside the Consortium, NA2 will collaborate with other European and international initiatives such as the Collections Policy Board (CPB), LifeWatch, BioNET, IBOL, and International Society for Biological and Environmental Repositories (ISBER) on shared policy creation, promotion and implementation. The resultant recommendations and supporting documentation will be made openly available via EU-CoM (an online collection management handbook created by SYNTHESYS2).

NH institutions are generating increasing amounts of *virtual collections* data as NH institutions enter the realm of the systematics of morphologically indistinct micro-organisms. As for some organisms (e.g. some protists) a video of the specimen is considered the type, as the physical entity cannot be stored using conventional curatorial methods. Furthermore, *virtual collections* can add value to original specimens when a digital surrogate is enriched with analytical data. For example the mining and resources industry is interested in gaining access to the chemical analysis data associated with mineralogical collections. The policies created will ensure that these collections are as accessible as the traditional physical collections

DNA and tissue banks are areas of rapid development and contribute to the *CBD* by storing and providing access to material that is a key source for biological research. NH repositories are working in a disparate way making access difficult. NA2 will work with non-NH biological resource centres to create a network of DNA and tissue banks. This network will improve access to the materials stored within these banks by ensuring that collections are stored to agreed standards, comply with quality control measures and provide easy access with a single searchable database.

SYNTHESYS2 developed the Collections Self-Assessment Tool (CSAT) which allows institutions to assess whether the management of their collections meets the SYNTHESYS benchmarks. NA2 and NA3 will promote the wider use of the CSAT and continue to provide feedback reports with recommendations for improvement. Institutions will be encouraged to re-use the CSAT every 3-5 years to test whether their collections management is improving. The CSAT will be updated to include questions on management of *new physical* and *virtual* collections to assess uptake of the SYNTHESYS policies.

### NA 3: Innovation, Impact and Sustainability

**Main Idea:** *To ensure that SYNTHEYS3 produces sustainable deliverables, reaching the broadest possible audience and fulfil its potential impact on the ERA. The focus will include development and reinforcement of partnerships between NH institutions and industrial partners, plus ensuring the project remains innovative in light of future technological advances.*

Wide dissemination of the project's achievements is pivotal to ensuring that the impact of SYNTHEYS3 is maximised. The primary focus will be to ensure that the outputs and deliverables are well utilised inside Europe, plus there are a number of SYNTHEYS3 outputs that will be of great benefit to NH institutions outside of Europe, at no additional cost to the project. The latter will ensure that SYNTHEYS3 has a global impact on improving collections management thus also enabling greater access to global NH collections by researchers.

NA3 will work alongside the other Work Packages to ensure that their deliverables have longevity, for example by ensuring that new *virtual collections* or metadata generated by the JRA, and the common policies created by NA2 remain freely available on independently funded open-access portals (e.g. Europeana, GBIF and EU-CoM) after the project is completed.

The work will be fostered by NA3 with the engagement of the Scientific Advisory Board (SAB). The SAB will comprise external experts, bringing together innovation-focused researchers and end Users from outside of the SYNTHEYS3 Consortium. They will provide feedback on the work plans and progress from an independent perspective and will recommend modifications based on the changing face of research in both Europe and beyond.

Efforts to ensure long-term sustainability will not only focus on the Grant AGreement deliverables. NA3 will also assist European NH institutions in operating in a more sustainable manner by producing a roadmap for future priorities to meet the future needs of the research community. Once approved by the SYNTHEYS3 Consortium, in consultation with the SAB, it will be passed to CETAF for post project implementation.

The JRA aims to deliver commercially viable outputs. NA3 will be responsible for identifying industrial collaborators, protecting the IPR and for exploiting the commercial potential.

To complement the new digitisation developments within the JRA, NA3 will evaluate the current use of state-of-the-art digitisation equipment housed in the SYNTHEYS3 institutions to establish and publish guidelines for technicians and Users of NH collections. These will include recommendations on optimal systems for NH requirements and will support NH institutions considering their purchase and use. Evaluation results will optimise the use of existing technologies for creating surrogates of specimens for Access and will support the drafting of suggestions to digitising equipment manufacturers on technical improvements required by the NH community.

NA3 will also undertake a collaborative pilot action with the JRA to identify the optimal projects and Users for the JRA crowdsourcing developments. The results of the pilot study will be a potentially valuable tool for researchers, who require support in large-scale data gathering, and are also a highly productive way to increase active public engagement in science.

**JRA: Moving from physical to digital collections: extracting data from digitised NH specimens**

**Main Idea:** *To improve access to data stored digitally within NH Institutions by developing mechanisms that enable institutions to enrich digital media with metadata to increase their usability to a broad range of potential Users. The as yet untapped data will be fed directly into global and European initiatives including the Global Biodiversity Information Facility (GBIF) and will underpin the CBD's third Global Biodiversity Outlook (GBO-3) and the Aichi Biodiversity Targets.*

NH collections are still largely a physical database from which information can only be extracted by visiting the host institution. These traditional collections are now in a state of transition, with an increasing proportion of their specimens and metadata being digitised to facilitate new ways of accessing, integrating and using collections both in house and opening more flexible and effective access at a distance. This move towards *virtual collections* has the potential to create a more sustainable method of access by making it possible for digital surrogates and associated metadata to be sent rather than requiring expensive physical visits to collections or incurring the risks and expense of sending of valuable, fragile specimens via mail as a loan.

This JRA will overcome two major challenges with the provision of digital data. Until recently the cost of mass digitising has been prohibitive. SYNTHEYS3 will develop specific software which can work with industrial-scale digitisers; thus the costs of digitisation can be dramatically lowered and digitisation rates increased. Increasing the speed and scale of digitisation will only resolve the problem of inaccessible *virtual collections* if their storage, management and accessibility systems are also developed alongside the technological advances in digitisation. SYNTHEYS3 will develop a shared strategy to ensure common standards and the compatibility of the digitisation programmes that are funded from national sources.

In conjunction with NA3, JRA will undertake a series of pilot studies to identify which digitisation equipment and methodology is most appropriate for creating research quality surrogates.

Recent advances in micro-CT techniques have made it possible to reveal, for example, the complicated frond-like structure of the gold inside a sample, making the tool valuable to mineralogists in assessing the quality of ore bodies. Further development of this technique has the potential to further open up NH collections to industrial researchers.

The JRA will research new methods for 3D digitisation of NH collections that will provide high resolution 3D images that can be used by researchers in the same way as the actual specimen. For example, it can be rotated to view from all angles, magnified and the image will be an accurate colour.

JRA will establish criteria for enhancing the metadata associated with the digitised specimens, improve storage of digital images and metadata, and improved accessibility to both the digitised images and metadata. The JRA will link with NA2 and NA3 to ensure management and accessibility is developed alongside the technology, and product development concepts are channelled to the manufacturers.

The JRA will support the EU's *Digital Agenda for Europe*, notably point 2.2.1 – opening up the access to content, by increasing the amount of virtual data that exists and ensuring it is made readily accessible to both specialist Users and the wider public. This will be achieved by working alongside global and EU-funded initiatives such as OpenUp!, Europeana and GBIF. One of GBIF's main priorities is to address key geographic and taxonomic gaps within currently available digital data. The JRA will help to achieve this by increasing the amount of data supplied to GBIF by Beneficiaries and the TA Users in SYNTHEYS3. The objective will be to establish a sustainable e-Infrastructure.

In 2011, the European Commission adopted a 'Recommendation on digitization and Digital Preservation<sup>1</sup>' asking Member States to pool their resources and increase their capacity for digitizing cultural material and making it available through Europeana. The JRA will both improve existing and develop new methodologies that will increase the speed and efficiency of digitisation of NH collections. These sustainable methods will be used by European NH organisations after the life of the project and will help all Member and Associated States to implement this recommendation.

## Transnational Access (TA)

<sup>1</sup> [http://ec.europa.eu/information\\_society/activities/digital\\_libraries/index\\_en.htm](http://ec.europa.eu/information_society/activities/digital_libraries/index_en.htm)

**Main Idea:** *The TA will deliver a minimum of 11,313 User days of TA via a fully integrated online application and evaluation system which incorporates all the collections-holding Beneficiaries.*

Access to collections, their associated supporting expertise and specialised equipment is vital in the field of NH research. The demand for access is demonstrable: 3,575 eligible individual TA applications were submitted to the first SYNTHESYS project (2004–2009) and more than 1,100 were submitted to the second SYNTHESYS project (2009–2013) in the first 24 months – an increase of 5%. Users were pan-European, with applications received from 36 of the 40 eligible European States.

SYNTHESYS3 aims to provide a minimum of 11,313 User days through four annual open calls for proposals. The 15 collection holding Beneficiaries are organised into 11 Transnational Access Facilities (TAFs), each with its own TAF Leader who serves on the Access Steering Group to facilitate the effective delivery of the TA.

## **B1.2 Progress beyond the state of the art**

### **Networking Activities**

The greater integration that will result from Networking Activities will enhance the experience of TA Users, national and international researchers accessing the collections.

### **NA1: Management**

NA1 will manage the SYNTHESYS3 Consortium and will ensure the effective implementation of the two technical NAs, JRA, and TA, on behalf of the EC and the infrastructure Users.

### **NA2: Improving collections management, enhancing accessibility and conserving the unique value of European natural history collections**

Baseline: SYNTHESYS1&2 have succeeded in introducing significant improvements to the standard of management of *traditional* European NH collections (i.e. herbarium sheets, mounted insects, dried bones and skins). This was achieved by monitoring collections management against a set of SYNTHESYS benchmarks, developing policies and best practice guidance, the provision of training, and by establishing a transnational peer support network among collections managers. This has resulted in improved access to traditional collections. There is now a demand from both collections managers and the User community for a similar step-change in the way that *virtual* and *new physical collections* are managed.

NA2 will raise the standard of collections management for *virtual* and *new physical collections*. This will include the establishment of new collection management policies and protocols enabling NH institutions to maximise the use of their existing resources and to avoid duplication of effort within Europe. For example there will be strong integration with ISBER for biobanking policy and protocol development.

Baseline: SYNTHESYS2 developed the Collections Self-Assessment Tool (CSAT) which allows institutions to assess whether the management of their collections meets the SYNTHESYS benchmarks. Six institutions have completed the assessment (August 2012).

NA2 will continue to operate its Collections Self Assessment Tool (CSAT), enabling museums and herbaria to measure themselves against the set of collections management benchmarks established in SYNTHESYS1&2. During SYNTHESYS3 the benchmark will be further expanded to include aspects particular to *virtual* and *new physical collections*. The comprehensive collections status report (resulting from the consolidation of the SYNTHESYS3 and previous SYNTHESYS assessments) will be used to inform the development of the sustainable online collection management support portal EU-CoM.



### NA 3: Innovation, Impact and Sustainability

NA3 is tasked with ensuring SYNTHEYS3 is innovative in light of current global technological and research developments. This will be achieved by engaging with innovation focused European researchers and key stakeholders from outside of the SYNTHEYS Consortium. These people will form the SAB and will be responsible for commenting on the progress of SYNTHEYS3 and proposing modifications of the work plan to the Consortium and assisting with the leveraging of impact of the outputs.

SYNTHEYS3 will produce deliverables that will improve both hands-on and at-a-distance access to NH collections for researchers. NA3 will promote outputs both within and outside of Europe. It also aims to increase public engagement with research activities.

**Digitisation access pilot study:** In collaboration with the JRA, a pilot study will review operational aspects of access to new forms of digitised images. The pilot study will seek to identify which digitisation techniques and equipment provide digitised data that are most suitable to permit research on particular classes of specimens. This data will support Users and collection managers when requesting/accessing surrogate collections for their research needs. The pilot will be utilised by institutions when considering which new equipment to purchase for their infrastructure and which approaches to adopt.

**Crowdsourcing pilot study:** In collaboration with the JRA NA3 will establish the most appropriate target group and the most appropriate projects for crowdsourcing using NH collections as the focus. The results will feed in to the development of websites that the JRA will create and can be used by other NH organisations interested in using crowdsourcing as a way of increasing the amount of data associated with their digitised collections.

**Sustainability measures:** At a time when resources within European NH institutions are limited, it is vital that the outputs of SYNTHEYS3 are sustainable and of benefit to the User community after the project has ended. For example, by placing the *virtual collections* on portals, they will remain freely available long after the project has ceased. Creative commons licenses will be used for all Open Access products (<http://creativecommons.org>).

Physical access to collections has taken place for centuries and the move to using *virtual collections* as an increasing and additional means of access will require a period of adjustment. Here, the objective of SYNTHEYS3 is to ensure that the *virtual collections* are of sufficient quality for research purposes, that best practice for *virtual collections* provision is adopted across Europe and of NA3, in particular, to ensure they are easily accessible to Users. Key consideration will be given to the issues associated with the long-term hosting of data and its inherent risks.

NA3 also sets out to improve overall sustainability within European NH institutions by developing a road map that will help to meet the future demands of Users and optimise the opportunities created by new advances in technology for improving knowledge gains from both direct and at-a-distance access.

### Transnational Access (TA)

**Baseline:** NH collections across Europe have differing management structures. In some countries, the national collection is housed under one roof and managed as a single entity, such as in France and Hungary. In other countries the collections are split between two or more institutes, making coherent provision of access to the national collection more challenging. In other instances, such as Germany and Belgium, there is further disaggregation due to federal State structures.

In order to overcome the challenges posed by disaggregation, SYNTHESYS3 will promote the wider use of the system established under SYNTHESYS1&2 that operates on national TAFs. The TAFs comprise the best collections in each country and national User Selection Panels (USP) will be held to ensure in-country integration of the offer. The national TAFs are based on the largest and most comprehensive collections in Europe, supported by skilled curators and used by highly productive research departments.

A concerted promotional campaign will begin in M1, featuring all of the 15 collections-holding institutions and will draw the attention of potential new Users to the opportunity of the offer via SYNTHESYS3 of a single point of entry to apply for access to over 340 million specimens, related scientific expertise and associated analytical facilities.

### Joint Research Activity (JRA)

Baseline: The basic tools for connectivity of digital NH data already exist, largely created during previous SYNTHESYS NAs such as the BioCASE User interface; GBIF is now using and refining this interface. The E-Content Plus project, OpenUp! is taking development forward on portal development for multimedia content provision with specific biological and multilingual functionality to a wide audience through Europeana.

The overall objective of the JRA is to improve the quality of, and increase the access to, NH collections. The range of quantity of data associated with different groups makes biological data complex – a system that works for botanical specimens will not be compatible with mineralogical items. By developing and improving mechanisms that enable institutions to enrich the knowledge content, and therefore research potential, of their digital media with metadata, NH institutions will increase both the value and accessibility of *virtual collections* to a broad range of potential Users. The JRA will enrich *virtual collections* so that these collections can be used and accessed for research purposes, thus reducing the need for physical access to collections (and at the same time reducing travel costs and environmental impacts). By enabling large-scale manipulation and integration of the *virtual collection* data, the collections also become both more accessible and more useful for key EU research foci including climate change, food security and access to raw resources.

The outcomes from the JRA will not only benefit the research community, they will also enhance collection management activities, reduce the need to handle irreplaceable specimens and also support disaster management, as the *virtual collections* could be used should the traditional collection be damaged or destroyed.

The JRA will also support biodiversity legislation, including reinforcing the process of data repatriation, which is increasingly used by NH institutions as part of national and European activities supporting the 1992 Convention on Biological Diversity. NH institutions will be able to send their *virtual collections* to institutions in the country where the associated physical specimen was originally collected, thus ensuring the outputs of the JRA have global reach.

The data mobilised by the JRA will be fed directly into global and European initiatives including Europeana, INSPIRE the Global Biodiversity Information Facility (GBIF). This will achieve the aim of delivering an enhanced, integrated and sustainable data source on biological collections.

## B1.3 S/T Methodology and associated work plan

### B1.3.1 Overall strategy and general description

The SYNTHEYS3 work plan and methodology are linked in terms of both their scientific and operational objectives. The cross linkages between the three main activities are illustrated below.

**Integrating JRA with TA:** The improvements to the quality and amount of metadata associated with *virtual collections* as a result of the JRA will greatly improve the TA provision. Provision of digital systems will enable the potential visitor to make a better informed choice when planning more targeted, shorter visits. TA Users will be able to use the improved technologies developed in the JRA to digitise collections during their visits – copies of which will be stored by the NH institution for future Users both within and outside the institution. By the end of SYNTHEYS3, TA applicants will be able to request scans of specimens or access them on open access portals.

TA Users will be asked for their feedback on the development of the JRA outputs, for example on the functionality of the Digitisation on Demand (DoD) service and the usability of the new *virtual collections* for research purposes. This feedback will be used to refine the JRA outputs to better meet User demands.

**Integrating JRA with NA:** All the successful JRA outputs will be adopted by NA2 as best practice, and will be fed into the policies, procedures and CSAT. While best practice derived from the JRA will not be available for the collections management self-assessments carried out prior to the mid-term review of SYNTHEYS3, it will become part of the final revised methodology and made available for use by the wider collections management community by the end of SYNTHEYS3, ensuring a legacy.

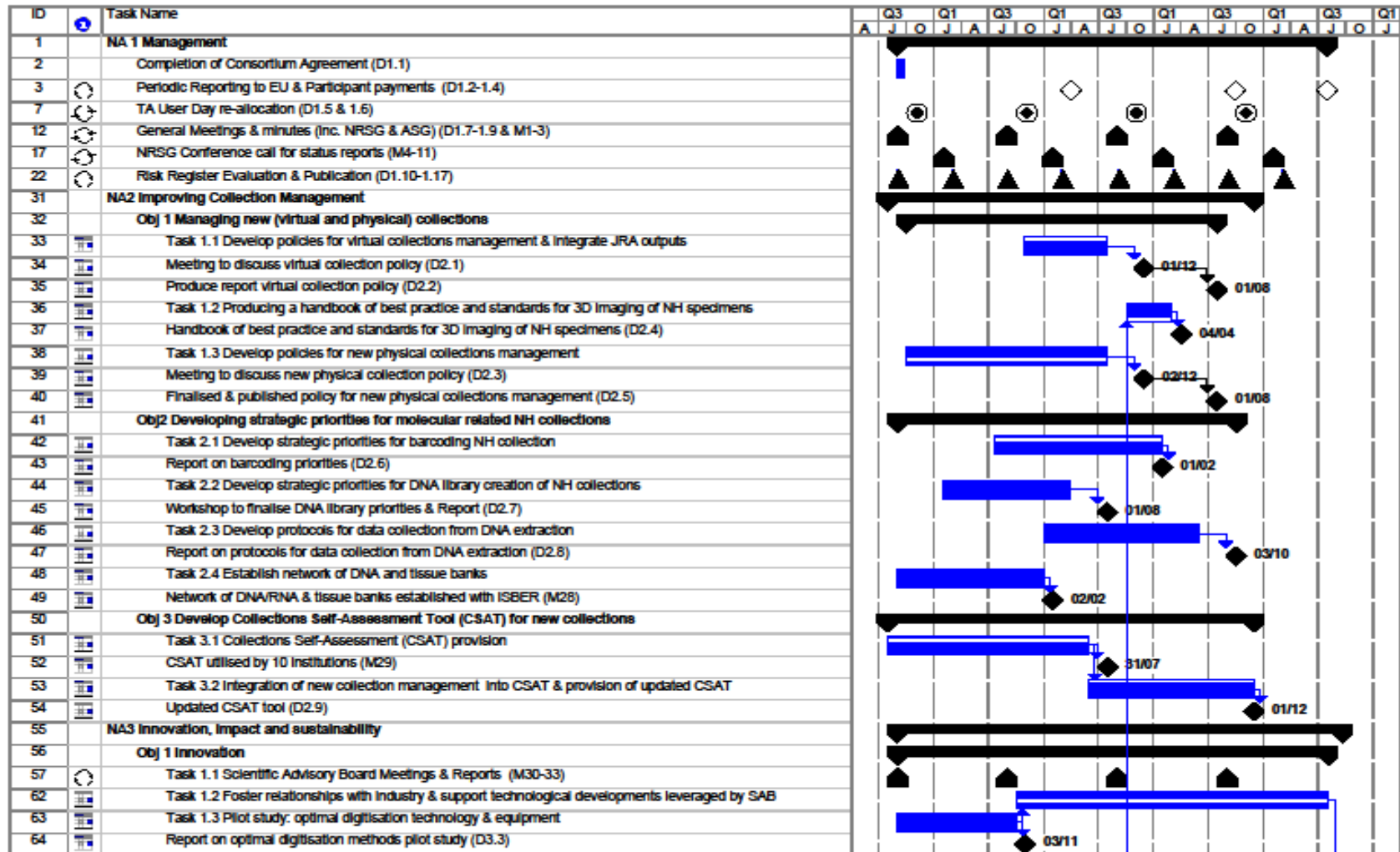
NA3 will initially work with the JRA in undertaking pilot studies to optimise the crowdsourcing and digitisation developments. JRA will share results on automated data capture and open access of metadata and crowdsourcing methodologies for integration into the policies and procedures of European NH institutions. Sharing best practice techniques will lead to the more efficient implementation of digitisation programmes and help identify biodiversity information gaps (both taxonomic and geographic). This task will be undertaken in conjunction with NA3 to ensure the data are disseminated appropriately. Focus will then shift to ensuring that all outcomes are suitably promoted to the broadest possible User community.

NA3 will also be responsible for ensuring that any potential industrial collaboration is exploited, and will assist JRA researchers in finding suitable industrial partners. NA3 will liaise with the JRA and SAB to ensure that the developments remain relevant and innovative.

**Integrating NA with TA:** The collection management policies developed by NA2 will raise the standards of preservation and accessibility, thus ensuring maximum accessibility by both current and future Users. In addition to these planned policies, NA2 will identify areas of unrealised weakness in the management of European collections through the continued use of the CSAT and via User feedback from the online system, quality of access at TAFs. NA2 will work with the collection management community to provide the tools (via EU-CoM) to overcome any weaknesses.

NA2 will develop protocols for capturing DNA extraction results from TA Users. TA Users will be made aware of these protocols via the application process and their clarity and usability will be beta-tested by project Beneficiaries and TA Users before being promoted to NH collections outside of the Consortium. NA3 will engage with the TA User community during the pilot studies into crowdsourcing. TA User representatives will be sought to attend the planned workshop on the future of NH collections.

### B1.3.2 Timing of work packages and their components



## B2 Implementation

### B2.1 Management structure and procedures

SYNTHESYS3 has three functionally distinct elements that have the unified aim of delivering to the User community enhanced access to the NH collections of the Beneficiaries. They are:

1. Transnational Access (TA): Physical access to 15 of the major collections-holding institutions in Europe; organised for SYNTHESYS as 11 national Transnational Access Facilities (TAFs).
2. Joint Research Activity (JRA): Developing new techniques to improve and enhance the creation of *virtual collections*.
3. Networking Activities (NA): Improving collections management of *new physical* and *virtual collections* and ensuring the impact, innovation and sustainability of the project.

#### Organisational structure

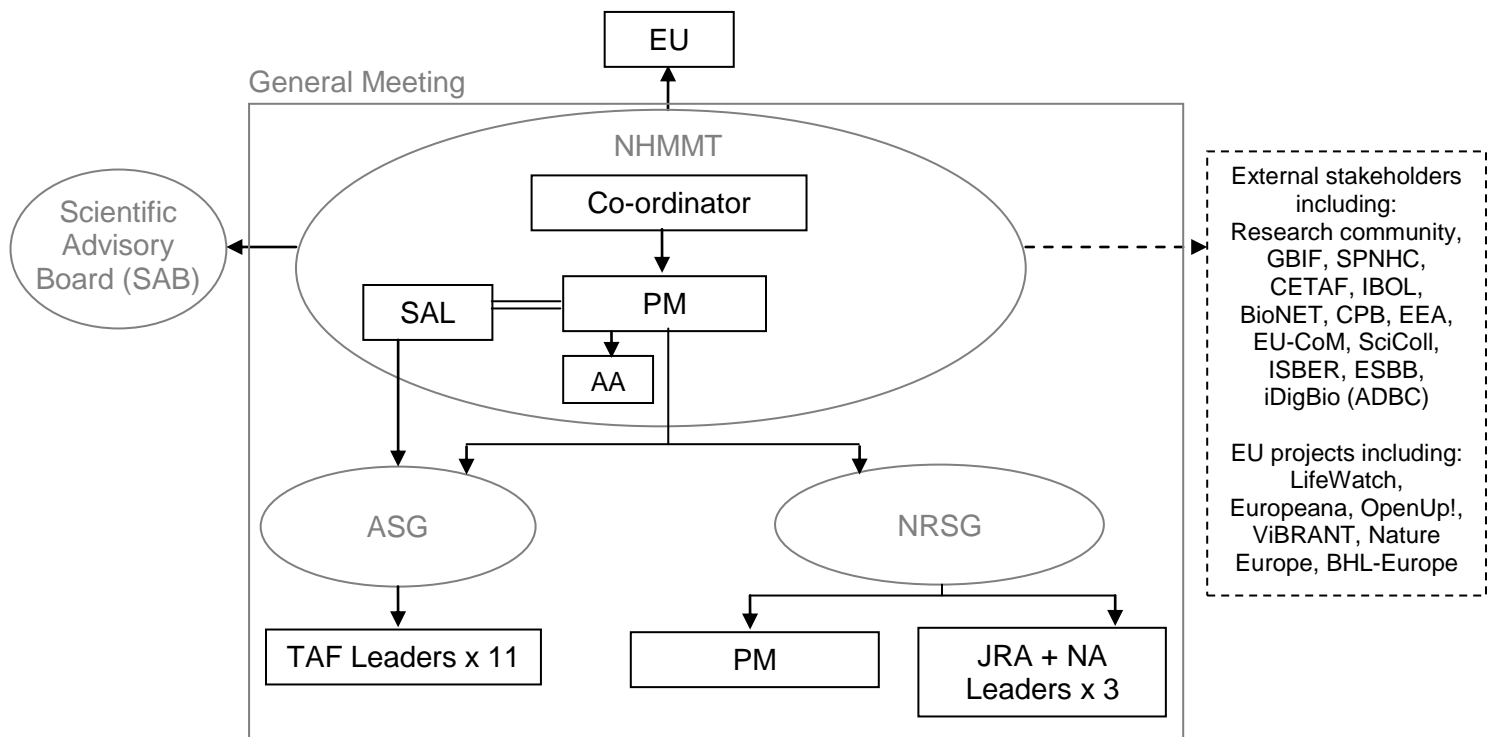
The three functionally distinct elements require a management model that enables the eleven TAF Leaders, JRA Leader and the two technical NA Leaders to exchange ideas and experiences while working towards deliverables. The SYNTHESYS3 Coordinator will use three management teams, namely: NHM Management Team (NHMMT), Access Steering Group (ASG) and Networking and Research Steering Group (NRSG) to ensure clear communication among WP Leaders. All three teams will meet at the end of RP1 & RP2 for a GM, which will set the scene for the coming period's work as well as report on the deliverables of the previous reporting period. The resultant outcomes will be promoted to the Consortium members, and subsequently to the whole User community.

The diagram overleaf gives an overview of the SYNTHESYS3 management structure. The SYNTHESYS3 Coordinator has the support of a Project Manager (PM) who will be the first point of contact for all WP matters. She will also act as SYNTHESYS Access Leader (SAL) and will manage the TA component of the project.

The PM and Administration Assistant (AA) will assist with the organisation of conferences, workshops and production/dissemination of publications resulting from the work of the project. The PM will be responsible for managing the project finances by coordinating the establishment of the financial reporting and audit procedures across the SYNTHESYS3 Consortium, in line with EU requirements.

NHMMT (comprising the SYNTHESYS3 Co-ordinator, PM and AA) monthly meetings will be the mechanism used to ensure that all the components are integrated and communicating effectively and to monitor risks to the Project. NHMMT will maintain an up-to-date Risk Register, which will serve to alert the Consortium to any slippage on deliverables and any under-performing Beneficiaries. The Risk Register will be circulated to Beneficiaries every six months.

NHMMT will also be responsible for ensuring that SYNTHESYS3 works in collaboration (and thus avoid duplication of effort) with relevant EU-funded initiatives, such as LifeWatch, and OpenUp! The diagram overleaf highlights projects that the SYNTHESYS3 Consortium has already identified as potential collaborators.



**Decision-making mechanisms**

NHMMT will develop a Consortium Agreement (CA), based on the DESCAs model (M1) which will include details of all decision-making mechanisms.

The NRSR will agree upon any changes to budgets within the NA and JRA budgets. The ASG will agree upon changes to TA budgets. The NRSR and ASG will both be required to approve movement of budgets from within the NA or JRA to the TA (or vice versa).

**Management within the Work Packages**

**NA & JRA**

WP Leaders will host a kick off and two subsequent annual meetings as a means of engaging Beneficiaries within their WP. Detailed work plans will be developed and progress will be monitored. Each Objective within the WPs has a leader and they will work with the WP Leader to ensure deliverables are met on time and within budget. The PM will attend all kick-off meetings, and annual meetings as required.

WP Leaders will be required to report to the NRSR (comprising the PM, JRA Leader and NA Leaders, which will act as to correct any deviations and mitigate against any risks identified. The meetings will ensure that links between the NAs and JRA are maintained. The WP Leaders will be required to present details of spend so that spend against budget can be monitored. The PM will ensure that budgets are distributed to match the demands of work being undertaken and will recommend budget.

Copies of any internal WP meeting minutes will be sent to the PM so that she is kept informed of progress. Any problems that may arise within the NAs or JRA will be reported by the relevant WP Leader to the PM who will assist in rectifying the problem.

**TA**

Local management of TA is devolved to the TAF Leaders, each of whom is supported by a TAF administrator. Their responsibilities include local promotion of the project, answering enquiries, arranging User visits and updating the SYNTHESYS database. All TAF Leaders are required to report to the ASG.

The ASG (comprising the 11 TAF Leaders and the SAL) will work to ensure that all TAFs are working to the same transparent standards, so that all Users are treated with equity. The ASG also has responsibility for promoting SYNTHESYS3 TA and ensure that the Users have the best possible experience during their TA visit, enabling new research publications to be delivered.

If a Beneficiary's User application rate for TA drops to a level considered unacceptable by the NHMMT, steps will be taken to stimulate further applications for the subsequent call and if that proves unachievable their involvement with TA will cease (the Consortium Agreement will include a mechanism for dealing with such a scenario).

The SAL will closely monitor application numbers of the Users funded by the TAFs. Revisions to the TAF budgets will take place after each call deadline using the allocation algorithm that was developed in the SYNTHESYS2. User days will be reallocated based on demand. This will ensure that the opportunity for each User to be funded is equal, based on demand regardless of the TAF applied to.

### **Advisory (collections and industry)**

The SAB will be the key advisory body for SYNTHESYS3. The SAB will comprise innovation focused researchers and project stakeholders from outside of the SYNTHESYS3 Consortium. They will review the progress and work plans of SYNTHESYS3 and will provide NA3 with recommendations on if/how the project needs to adapt in order to ensure the work undertaken stays relevant and utilises the most up-to-date technology.

In the interests of integration across EC-funded projects SYNTHESYS3 will report into LifeWatch, an EU funded project on the ESFRI roadmap. LifeWatch is expected to have a long-term structuring effect on the function of this research community, so synergy with this project is natural. SYNTHESYS3 will act as a provider of resources for LifeWatch, notably in the areas of crowdsourcing development (JRA Obj. 2) and access to open source data. Plus all report highlights will be shared. Care will be taken to ensure the work of SYNTHESYS3 and LifeWatch are complementary rather than co-dependent. Additionally, an annual report will be submitted to the Consortium of European Taxonomic Facilities.

## **B2.2 Beneficiaries**

### **2.2 Individual Beneficiaries**

#### **Beneficiary 1: Natural History Museum, London, UK (NHM)**

NHM is an international leader in the scientific study of the natural world. NHM has a strong track-record in European Commission-funded research and training. It has led the previous two SYNTHESYS Infrastructure projects so is best-placed to continue with the coordination. There is a dedicated grant administration team at NHM who assist with the delivery of projects including contractual/financial management and reporting.

#### **NHM Management Team [NA1]:**

- The SYNTHESYS3 Coordinator will be Prof. Phil Rainbow; his experience of international project management is extensive. He is Head of Life Sciences at NHM, a member of Science Group (which sets policy for all NHM Science) and Chair of the NHM Collections Committee which is responsible for the development of both new physical and virtual collections. He has coordinated the

SYNTHESYS2 project since the start of 2011. He is ideally-placed to oversee the Consortium and to implement NA1 and host the SAB and support NA3.

- Dr Kristina Gorman will be the Project Manager, and with five years experience in administering European Commission-funded projects, will ensure the smooth management of the project, financial management and audit. She will be SYNTHESYS Access Leader and Deputy GB TAF Leader.
- Harry Rousham will be GB TAF Leader and Administration Assistant for the Project. He has had the later role in the previous SYNTHESYS Project and has been greatly involved in GB TAF administration.
- Lucy Reeve will be the GB TAF Administrator.

#### **NHM Technical Team:**

- Dr Rob Huxley (Deputy NA2 WP leader) is a founding member of the CPB, works closely with the UK's Collection Trust and is a member of SPNHC. He has a central advisory role within NHM on the development of new collections. These roles will facilitate uptake of the best practice developed within SYNTHESYS3 to NHM and NH institutions throughout the UK, Europe, and North America.
- Dr Vince Smith is a Cybertaxonomist at the NHM and his primary research focus on the development of digital infrastructures supporting taxonomic research. He will contribute to JRA objectives 1 & 4 leveraging his experience from ViBRANT, for which he is Co-ordinator.
- Vladimir Blagderov is the manager of the Sackler Biodiversity Imaging Laboratory. He is an expert on Satscan machines which are used to create digital surrogates of collections holdings. He will be key in the delivery of the NA3 pilot study on optimal digitisation technologies and equipment, objective 1.
- John Tweddle, Head of the Angela Marmont Centre for Biodiversity will engage in the NA3, objective 1 pilot study on crowdsourcing - utilising his connections with amateur taxonomy societies.
- Jackie Mackenzie-Dodds is Head of the Molecular Collections Facility which is responsible for the storage of and access to material extracted from the biological collections, namely DNA/RNA extracts and tissue samples. She will be involved in NA2 objective 2 and components of NA2 objective 3.

#### **Beneficiary 2: Royal Botanic Gardens Kew, London, UK (RBGK)**

RBGK is a scientific, amenity and educational organisation devoted to increasing knowledge and public understanding of plant and fungal diversity. RBGK has made important contributions to increasing the understanding of the plant kingdom. Increasingly RBGK is broadening access to its collections by digitizing them and making them available over the Internet.

#### **RBGK Team:**

- Alan Paton, Assistant Keeper of the Herbarium Library, Art and Archives, manages the Biodiversity Information and Economic Botany Section, RBGK's plant names information resources, the digitisation unit and the GIS section of RBGK. He serves on the IUCN Red List Committee and Plant Conservation Sub-Committee, and the Coordination Mechanism for the Global Taxonomy Initiative under the CBD. He is involved in the EU-funded 4D4Life and OpenUp! for Europeana projects. He will be the liaison point for the SYNTHESYS3 Coordinator and GB TAF liaison point, plus will work on NA2 and NA3.
- Anna Saltmarsh is the Digital Collections Manager of the Herbarium at RBGK leading the digitization programme with responsibility for strategic development and senior project management. Anna has been part of the leadership team for the Global Plants Initiative and associated types digitisation projects since 2005, alongside involvement in internal projects to develop RBGK internal systems and technology for the digitization of botanical specimens and dissemination of this information. She will work on the JRA objective and NA3 objective 1.
- Félix Forest is Head of Molecular Systematics at RBGK's Jodrell Laboratory and responsible for the overall management and development of the DNA Bank and silica-gel collections, and associated activities such as DNA barcoding. He is a member of the bioGENESIS Scientific Committee, a core project of DIVERSITAS, and has participated in the writing of the implementation plan for the Group



on Earth Observations - Biodiversity Observation Network (GEO BON), as member of the Genetics/Phylogenetic Diversity working group. Dr Forest will work on NA2 objectives 1 and 2.

### **Beneficiary 3: Royal Botanic Garden Edinburgh, Edinburgh, UK (RBGE)**

The Royal Botanic Garden Edinburgh is an internationally renowned centre for botanical research and conservation work and holds one of the largest collections of living plant species in Europe, together with extensive collections of preserved plant and fungal material. It has one of the most important botanical libraries in the UK and has a fully functioning and highly productive molecular laboratory.

#### **RBGE Team:**

- Dr David Harris (Herbarium Curator and Deputy Director of Science) will be JRA Leader. He is working on several digitisation initiatives at RBGE (both internally and externally funded including OpenUp!) to increase the rate of digitisation and improve quality of data capture from images of herbarium specimens. He will use this experience to coordinate the JRA and develop indicators and best practice within herbaria and communities from outside of science. He will also contribute to NA2 objective 1, 2, NA3 objective 3.
- Dr Peter Wilkie (Head of Sapotaceae Taxonomic Research) will support the development of CSAT. He has undertaken collection management assessments across Europe as part of SYNTHESYS2 and will use his experience of this process and his 15+ years of working with collections in developed and developing countries to help develop an efficient and user-friendly assessment tool. He will contribute to NA2 objective 3 and NA3 objective 2.
- Dr Elspeth Haston (Deputy Herbarium Curator) will be JRA Deputy Leader. She is managing and developing protocols for image capture and processing at RBGE, including techniques such as OCR and geo-referencing tools. As an experienced herbarium curator she also has a deep understanding of collections and their care and management. She will contribute to NA2 objective 1 and JRA objective 1, 2 and 3.
- Dr Martin Pullan (Researcher) has coordinated Biodiversity Informatics at RBGE since 1998. He has developed Prometheus - A novel database system for classifying biodiversity. He will contribute to NA2 objective 1, NA3, objective 3, JRA objective 1 and 2.

### **Beneficiary 4: Museum National d'Histoire Naturelle, Paris, FR (MNHN)**

The MNHN plays a key role in the organisation of the French information system on biodiversity and landscape, being the scientific coordinator of this national project. It also hosts the European thematic centre for biodiversity of the European Environment Agency. The Service du Patrimoine Naturel coordinates the scientific inventories on biodiversity by providing taxonomic reference specimens and methodology for inventories and monitoring.

#### **MNHN Team:**

- Michel Guiraud (Head of Collections) will be the FR TAF Leader. He has been actively involved in SYNTHESYS1&2 on both NAs and TAFs. Dr Guiraud will be involved in the collections priority development in NA2 objective 2. He is a founding member of the CPB which makes him well placed to deliver on this objective. He was an active member of EDIT and was active in the review of taxonomy, he will use this experience to participate in NA3, objective 3.
- Vanessa Demanoff will be the Deputy FR TAF Leader. She was project manager for EDIT and assists with the management of all EU projects that MNHN engage with. She has an excellent network of contacts from EDIT that she will use to promote SYNTHESYS3. As such she will engage in NA3, objective 2.
- Marc Pignal is in charge of the collection network at MNHN and is project leader for the French national strategic plan, which includes the massive digitisation of collections (including 3D specimens), organising volunteer communities using web2.0 tools in order to document collections, and designing automatic recognition applications for taxonomic or label identification. He will use this experience in JRA objectives 1, 2 and 3.

**Beneficiary 5: The University of Copenhagen, DK (UCPH)**

UCPH involvement in SYNTHESYS3 is centred in the Natural History Museum of Denmark (NHMD), but also involves a number of associated biological and anthropological labs in other departments. The museum is host of the international secretariat and Danish node of GBIF and has a strong track-record in EC-funded infrastructure and research projects.

**UCPH Team:**

- The DK TAF leader will be Prof. Henrik Enghoff who has considerable experience with EC project management and was TAF Leader in SYNTHESYS1&2.
- Dr Giles Cuny will be deputy DK TAF Leader, having been a USP member for several TAFs in SYNTHESYS1&2.
- Dr Ole Seberg will engage in NA2 objective 2 and be directly responsible for liaison with ISBER and ESBB as Dr Seberg is on the Programme Committee for ISBER. He will also engage with NA3 objectives 2 and 3. He is a member of Scientific Committee of the Consortium for the Barcode of Life and of the steering committee of Global Genome Initiative. He has contributed to "ISBER Best Practices for Repositories. Collection, Storage, Retrieval and Distribution of Biological Materials for.
- Prof. Gitte Petersen, is a molecular systematist who has been involved in SYNTHESYS2 and in writing the "ISBER Best Practices for Repositories" document. She is instrumental in setting up the cryobank at NHMD. She will take part in NA3 objectives 2 and 3.

**Beneficiary 6: Consejo Superior de Investigaciones Científicas, Madrid, ES (CSIC)**

CSIC is the largest National Research Institution in Spain. Two organisations from within CSIC will take part in SYNTHESYS3: Museo Nacional de ciencias Naturales (MNCN) and Real Jardín Botánico (RJB), house Spain's largest Natural History collection, library and archives. Both together comprise the most competitive research groups in Spain working on biodiversity systematics, biogeographic modelling, palaeobiology, and conservation biology.

**CSIC Team:**

- Dr Marian Ramos will continue being the ES TAF Leader. She heads the Fauna Ibérica Project, and has had leading roles in several EU funded projects.
- Deputy ES TAF Leader will be Prof. Gonzalo Nieto (Director of RJB). He is a Council member of the IAPT and former president of the International Organization of Plant Biosystematists (IOPB).
- Isabel Rey, has wide experience in collection management and developed the DNA and tissue collections of MNCN as well as its Disaster Plan. She will contribute to NA2 Objectives 1, 2 & 3.
- Josefina Barreiro, with 25 years curation and management experience at MNCN and developer of best practice models, will further contribute to NA2 Objective 3 and JA Objective 3.
- Celia Santos, Curator of Invertebrates Palaeontology collection is exploring new tools of digital imaging to improve accessibility and usability of historical collections holdings. Her contribution to NA2 Objectives 1 & 3 as well as to JRA Objective 3 will be valuable.
- Patricia Pérez-Dios, curator of Palaeontology of Vertebrates collection will collaborate with her for NA2 Objective 3.
- Manuel Sánchez-Ruiz, bioinformatics and expert on Zoological Nomenclature, is developing the IBERFAUNA databank (Fauna Ibérica) as well as the WTaxa provider for the Catalogue of Life and collaborates with BHL-Europe on digitization and metadata capture. His collaboration with Javier Moralo, bioinformatics and expert on databases for biodiversity information to JRA Objectives 1 & 2 will be valuable. They will provide technical assistance on JRA Objective 1 & 3.
- Marisol Alonso, expert on multimedia services and leading the MNCN Mediateque and the CSIC Cianciatk, will contribute to JRA Objective 3.
- Dr Carlos Lado will represent it in Objective 1 of NA2. He will apply his experience of managing and improving collections accessibility through the use of digital resources.
- Dr. Mauricio Velayos, senior curator of the vascular plant collection at RJB and Ms. M<sup>a</sup> Rosario Noya assistant curator, and in charge of the digital cataloguing of collections. Both will be involved in JRA

Objective 3. They have extensive experience on these activities, being responsible for digitalizing all the specimens of RJB collections.

- CSIC contribution to NA3, Objectives 1, 2 & 3 will be by Dr. Mary Luz Peñacoba (MNCN Vice-Director of Collections), Dr. Aurelio Nieto (Responsible for MNCN Foreign Relationships) and Esther García (RJB) who have experience on innovation, dissemination and outreach.

### **Beneficiary 7: The Swedish Museum of Natural History (NRM)**

NRM is a major research institute that combines a venerable tradition with modern working methods. The collections have a broad taxonomic, temporal and spatial span and comprise many types and unique collections. State-of-the-art equipment and dedicated laboratories enable high-quality research on the collections and in related areas, including genetic analyses of ancient DNA in a newly established ultra-clean laboratory, and elaborate geological and geochemical analyses.

#### **NRM Team:**

- Dr Irene Bisang will continue in her roles as the SE TAF. She has extensive experience of EU framework funding. She will be deputised by Prof Stefan Claesson, who was SE TAF lead at the inception of SYNTHESYS1 and was work-package leader in LifeWatch. Dr Bisang will also be involved in NA3, Objective 2 and 3 in promoting SYNTHESYS3 outputs and a sustainable future of NH collections.
- Dr Pia Eldenäs, successfully managing the Molecular Systematics Laboratory, will be responsible for NRMs involvement in NA2, Objective 2. Dr Eldenäs has thorough experience of molecular systematics from both botanical and zoological research projects and many years of laboratory practice. She will be joined by Dr Martin Irestedt, with extensive scientific expertise and technical skills in preparation and analyses of DNA from museum collections, in particular bird skins.

### **Beneficiary 8: Naturalis Biodiversity Centres. Leiden, The Netherlands (NBC)**

NBC is the focal point for the national species register, houses offices of CITES and the Dutch branch of the European Invertebrate Survey.

#### **NBC Team:**

- Dr Ronald Sluys will be the NL TAF Leader continuing his role from SYNTHESYS2. He has greatly expanded the flatworm collections, now the largest collection of triclad flatworms in the world.
- Dr. René Dekker, Director of Collections was strongly involved in several national collection projects, and in SYNTHESYS2 as a WP Leader. Dr Dekker is a founding member and chairman of the CPB. He will use his knowledge and network contacts within NA2 objective 2 and NA3 objective 2.
- Dr. Leo Kriegsman will act as Deputy to Rene Dekker. He was WP Leader in SYNTHESYS2 and has held faculty positions in universities in Germany, Austria and Finland. He was acting Science Director for 2 years before becoming Head of the Geology Department at NCB in 2006.
- Dr. Freek Bakker has been working in molecular plant systematics since 1995. Working on angiosperms he produced one of the first large DNA-based phylogenetic trees. He is now Assistant professor at the Wageningen University Biosystematics Group, part of the NBC. He coordinates the Wageningen lab and chairs the SAB of the Consortium of the Barcode of Life (CBOL). He was WP Leader for a SYNTHESYS2 JRAs and will participate in NA2, objective 2.

### **Beneficiary 9: Freie Universität Berlin – Botanic Garden and Botanical Museum Berlin-Dahlem (BGBM)**

The BGBM with its extensive scientific plant collections and state-of-the-art molecular facilities offers excellent access to the entire range of resources that form the basis for plant-systematics research. With its engagement in international botanical research projects the BGBM is a centre of taxonomic research in Europe. The BGBM also spearheaded the role of NH institutions in the development and exploration of data collections, and decisively contributed to the new field of biodiversity informatics. The BGBM sustains a department of Biodiversity Informatics with presently 20 staff members and a

powerful IT infrastructure. It has been coordinating projects under the EC's FP3, 4, 5 and 6 which resulted in the European collection information system "BioCASE", a major contributor to GBIF. In this context, the BGBM also coordinates the DNA-Bank-Network, a consortium of DNA sample banks covering all groups of organisms.

#### **BGBM Team:**

- Prof. Dr. Walter G. Berendsohn, (Director, Dept. of Biodiversity Informatics and Laboratories) is currently chairing inter alia the coordinators group of GBIF-Germany and the Information Science and Technology Committee under CETAF. He is an expert in data processing in taxonomy and research collections. He will lead the task on extending the DNA Bank Network in NA2 which will be executed by G. Dröge, the developer for the DNA Bank Network, and Dr. Holger Zetzsche, the curator of the same. He will also contribute to NA3, objectives 2 and 3 using his coordinating role in EU projects like OpenUp!
- Dr. Regine Jahn (Senior Curator and Head of Laboratories) is to continue in her current role as Deputy DE TAF Leader. She is President of the Gesellschaft für Biologische Systematik and Coordinator of the German GBIF Node for Botany.
- Anton Güntsch (Information Scientist, Head of Biodiversity Informatics) is involved in a number of international and national projects that use information from NH collections (BioVeL, i4Life, OpenUp!) and will contribute to promote and integrate outputs in NA3. He will lead the task of channelling the outputs (feature recognition, handwriting author identification, etc.) of the 5 year project "Herbar Digital" into the JRA tasks 1.1 and 1.2. He will be supported by Dominik Röpert, Head of IT and responsible for the BGBM's collection digitisation technology.

#### **Beneficiary 10: Museum für Naturkunde der Humboldt-Universität zu Berlin, Berlin, DE (MfN)**

MfN is the largest natural history museum in Germany housing some 30 million specimens. The MfN has been partnering with and contributing significantly to national and international biodiversity informatics initiatives, such as the GBIF, the Catalogue of Life, and PalaeoBase. Staff members of the MfN are involved and play leading roles in several international networks such as SciColl and SPNHC. The MfN is the home institution of the CETAF chair and secretariat.

#### **MfN Team:**

- Dr Carsten Lüter (curator of marine invertebrates and head of the invertebrate section) will be DE TAF Leader. Dr Lüter was involved in SYNTHESYS 1 and 2 as DE TAF leader.
- Professor Wolfgang Kiessling (MfN) will serve as DE TAF Deputy Leader, a position he held throughout SYNTHESYS 2.
- Dr Thomas von Rintelen will be NA2 WP leader. Dr von Rintelen heads the MfN's molecular genetics laboratory and DNA collection. He is an expert on molecular systematics and he has been WP leader of JRA5 in SYNTHESYS2. He has been responsible for developing the MfN's DNA collection and setting up guidelines for its use and general handling of DNA sampling. He has also 10+ years of experience in using classic museum collections and is well acquainted with the associated difficulties. He has also more than five years of experience in national and international project management, which will help to coordinate the various WPs of NA2.
- Dr Christiane Quaiser will be Deputy NA3 WP Leader and will contribute to NA2 objective 1 and NA3 objective 3. Dr Quaiser works as International Scientific Liaison Officer at the MfN. She was involved in the creation of the CPB which she is now coordinating as Executive Secretary. Furthermore, she has helped develop EU-CoM and runs the CETAF secretariat at the MfN. In SYNTHESYS3, she will act as liaison to these groups; will contribute to the development of policy and strategic documents and will help ensuring the sustainability of SYNTHESYS3 outputs.
- Alexander Kroupa will drive the work on JRA objective 2 and will contribute to NA2 objective 1. He works currently as coordinator for GBIF-D at the MfN. He was also involved in testing and improving field-based digital recording tools and techniques for biodiversity inventorying and monitoring programmes within the EU project EDIT. In SYNTHESYS3, he will coordinate the development of a handbook of best practice and contribute to testing and optimizing of high quality 3D techniques.

- Landscape ecologist and programmer Falko Glöckler will contribute to JRA objective 2. Currently he is employed as programmer in the project GBIF-D. Before, he worked for the biggest floristic database in Germany. He is a member of the steering committee of the Global Index of Vegetation-Plot Databases (GIVD) and responsible for the technical realization. His background and experiences in ecological studies in combination with informatics will help him to contribute to programming routines for optimisation and rendering 3D objects from an interdisciplinary view.

#### **Beneficiary 11: Naturhistorisches Museum Wien, AT (NHMW)**

Founded more than 250 years ago NHMW is the principal institution for biodiversity research in Austria. The collections comprise more than 35 million specimens.

#### **NHMW Team:**

- Dr Ernst Vitek (Director of the Department of Botany) will continue in his role as AT TAF Leader. Dr Vitek will also have a role in NA2 objective 3.
- The AT TAF Deputy Leader will be Karin Wiltshcke (Curator of Anthropology). She undertook the SYNTHESYS2 'train the trainer' course so that she can train collections managers in Austria using the SYNTHESYS2 best practise models. She will continue involvement via NA2 objective 1 and 2.
- Dr. Elisabeth Haring (Leader of the Molecular Lab at NHMW) established and supervises the NHMW database on molecular and tissue cultures. She will contribute to NA2 objectives 1 and 2, and NA3 objective 3.
- Heimo Rainer (Taxonomist) helped develop the online database management system "JACQ" for virtual curation of herbarium collection, which is currently used by 11 institutions in Europe. He participates in 4D4Life, BHL-Europe and OpenUp! projects providing data via Open Access portals. Via JRA he will integrate an online annotation system including possibilities for citizen scientists to interact with the digitized material. He will also provide of extended support and maintenance of existing services through NA3 objective 3.

#### **Beneficiary 12: Hungarian Natural History Museum, Budapest, HU (HNHM)**

HNHM is the national research institute for NH. It has one of the largest NH collections among the Central, Eastern European institutions. The HNHM started to better integrate research and collection policies with the longstanding EU countries via cooperation within EU funded projects (e.g. Fauna Europaea; ENBI; BioCASE; EDIT, SYNTHESYS and BHL).

#### **HNHM Team:**

- Dr. Beáta Papp will be the HU TAF WP Leader. She has over 20 years of experience in botany, conservation of plants and collection management. She has been the principal investigator of several national and international research projects.
- Dr. László Lőkös will be the HU TAF Deputy Leader. He has more than two decades experience in botany (especially lichens) and collection management. He participated in the preparation and management of several national and international research projects.
- Dr. Miklós Rajczy is the manager of the documentation and knowledge library. He is an expert on database management. He will participate in the JRA.

#### **Beneficiary 13: Royal Belgian Institute of Natural Sciences, Brussels, BE (RBINS)**

RBINS houses a diverse and exceptionally rich zoological collection, palaeoanthropology, prehistoric items and a diverse mineral collection. The RBINS has participated in 28 European projects, notably 6 projects in FP7 Infrastructures (EUROFLEETS, SYNTHESYS, SEADATANET I and II, VIBRANT and JERICO).

#### **RBINS Technical Team:**

- Patrick Grootaert is BE TAF Leader. He has been Director the Department of Entomology, RBINS for nearly 20 years and is in the directional board of RBINS and Royal Belgian Entomological

Society for 25 years. He is partner in many international projects mainly in Southeast Asia and directed many national programmes on site quality assessments using insects as bio-indicators.

- Carole Paleco is BE TAF Deputy. Ms Paleco has been working as assistant on European projects since 2002 within the RBINS International relations service. She has been working as access deputy leader for BE TAF on SYNTHESYS1&2.
- Dr Patrick Semal (Head of Section, Laboratory of Anthropology, Archeozoology and Prehistory) will be Task leader in the JRA on the automatic processing of 3D digital objects. His research interests lie in the digitization of anthropological collections using Medical CT, cone beam CT, Surface scanning, and the use of the virtual models in biomechanical studies. His main area of expertise is in the field of collection management through the application of high level digital technologies. He is involved in developing collaborative digital platforms based on Open Source technology, as well as the integration of multimedia data in internet databases. He is a member of the “Collection group” of RBINS and in charge of scientific coordination of the digitization programs of the RBINS collections.
- Dr. Annelise Folie is in charge of palaeontology collection management, with emphasis on use of collections for research and exhibition loans and collection management training. She is member of the “Collection Group” of RBINS and participates to the development of the “RBINS Collection Rules”. She is also involved in several national and international research projects for managing collections or samples collected on the field. She will participate in NA2.
- Dr. Marleen De Ceukelaire is Database Manager and responsible for the organization of digital data and managing geological collection. She will participate in JRA.
- Dr. Georges Lenglet - Head of Section Recent Vertebrates, is involved in all the procedures concerning the collections, in particular the writing and implementation of the “Rules of Collections” and security issues. He is a senior member of the Collection Group of the RBINS, of NatSCA and CPB. He will participate in NA2.
- Dr. Wouter Dekoninck works as a curator of databases and collections in Entomology Department of RBINS. He will participate in JRA.

#### **Beneficiary 14: Royal Museum for Central Africa, Tervuren, NL (MRAC)**

MRAC is a leading multidisciplinary research institute and knowledge centre on the cultural and natural heritage in Africa, particularly in Central Africa. It develops interest and understanding for African heritage in the scientific communities and the public.

##### **MRAC Technical Team:**

- Dr. Patricia Mergen is Head of the Biodiversity Information and cyber-taxonomy services. She will be MRAC liaison point for SYNTHESYS3 Coordinator.
- Garin Cael, Collection Manager in Herpetology and contributor to SYNTHESYS1&2, will participate in NA2 objectives 1 and 2
- Dr Danny Meirte, Curator of Herpetology, has been involved in several projects (e.g. SYNTHESYS2, BHL-Europe, OpenUp!) and will contribute to NA2 objective 2 and JRA objectives 1 and 3.
- Dr Emmanuel Gilissen, involved in previous EU projects dealing with Digital imaging (including 3D scanning and CT scanning) will contribute to NA3 objective.1 and JRA objective 2.

#### **Beneficiary 15: National Museum, Prague, Czech Republic (NMP)**

NMP is currently engaged in five EU projects. It leads several work packages in BHL-Europe, OpenUp! and 4D4Life. There is a working grant administration team at NMP which assists with the delivery of projects including contractual/financial management and reporting.

##### **NMP Team:**

- Dr. Jiří Kvaček will be NA3 WP Leader and CZ TAF Leader. He has experience in international project management. He is a Head of the Palaeontology Department at NMP and a member of Science Group (which sets policy for all NMP Science). He participates in the BHL-Europe and 4D4Life EU funded projects. He will also engage with NA2.
- Jiřina Dašková will support Dr Kaček. She will participate in JRA objectives 1, 3 and 4.

- Dr Kamil Zágoršek is a palaeontologist and an expert in digital infrastructures. He is WP leader in the OpenUp! project, where he is in charge of dissemination activities. He will be involved in the JRA objectives 1, 3 and 4 and NA3.
- Petr Daneš is an IT specialist, involved in 4D4Life project and works for OpenUp! project. He will be involved in the JRA objective 1.
- Valéria Vaškaninová has experience as a collection manager and has excellent computer skills, she will participate in NA2, objective 1 and 2.

#### **Beneficiary 16: Vizzuality, Madrid, Spain (VIZZ)**

Vizzuality is a company dedicated to development of analysis and visualization tools for biodiversity and conservation. VIZZ has worked with multiple organisations, like GBIF, UNEP-World Conservation Monitoring Centre and EoL, helping them to visualise and mix their datasets with other sources of data. VIZZ employees participate in international organisations such as TDWG working on the definition of standards and procedures to share biodiversity data. VIZZ is also active in defining the future of the Geoweb participating in multiple conferences in geospatial data sharing.

#### **VIZZ Team:**

- Javier de la Torre (Vizzuality founder) has been working in the field of Biodiversity Informatics for over 10 years. He gained strong experience in the social and technical aspects of data sharing while setting up the European Biological Collections Access Services (biocase.org). He is the co-author of several standards created with the Biodiversity Information Standards, and has worked within the Geospatial Interest Group. He will lead JRA objective 3 and participate in NA3 objective 1.
- Sergio Alvarez (Vizzuality founder) has an education in Informatics Engineer and has spent years bridging the designer-developer divide. He specialises in Interaction Design and Visual Design. He will participate in JRA objective 3 and NA3 objective 1.

#### **Beneficiary 17: Vrije Universiteit, Amsterdam, Netherlands (VU)**

The VU is a broad-based academic institution with top ranking research departments. It hosts several interdisciplinary research institutes. The research group of Organization Sciences, involved in ViBRANT, concentrates on subjects related to the performance, structure, and dynamics of organisations while building on disciplines like Sociology, Communication and Political Sciences. The department has specific expertise on the interaction between social processes and the organisation and innovation in science.

#### **VU Team:**

- Prof. P. van den Besselaar is professor of organization sciences. His research interests are the dynamics of science, technology and innovation; research evaluation; the development and change of the science system; science and innovation policy; (ICT based) research infrastructures; and the relationship between science and technology and social change. He will be involved in NA3 objective 1 and JRA objective 3.

#### **Beneficiary 18: Hellenic Centre for Marine Research, Crete, Greece (HCMR)**

HCMR conducts research in the fields of biodiversity, structure and dynamics of the ecosystem, ecosystem management and genetics of marine organisms. HCMR has a track record in innovative and improved services and products in all of the above areas of research and has recently been accredited an EU excellence status from an independent committee. HCMR has led several EU-funded and National projects and sit in the steering committees or are representative members of the European NoE MarBEF and MGE. HCMR is currently heading the national node of LifeWatch.

#### **HCMR Team:**

- Dr Christos Arvanitidis is a senior researcher and head of the HCMR marine biodiversity section. He is a member of the Society for the Marine European Biodiversity Data and MarBEF steering committee. He will be involved in JRA objective 2.

- Sarah Faulwetter is a software developer / biodiversity data manager. After the development of the MedOBIS and EI-Net platforms, her expertise in biodiversity informatics and taxonomic names management has led to collaborations with EoL and is working currently on the development of UNION, the EOL's names-based cyber infrastructure. She currently works on several web-based applications for the management of biodiversity information under the umbrella of a Virtual Biodiversity Toolbox. She will participate in JRA objective 2.

## B2.3 Consortium as a whole

All of the Beneficiaries (excluding the four new Beneficiaries 15-18) were contractors under the SYNTHESYS1&2. All have been retained for this bid due, in part, to the fact that there is high demand from Users for TA at their institutes; plus, they are actively engaged in NAs and/or JRA.

Four new Beneficiaries have joined the Consortium.

Beneficiary 15, NMP has been brought in as the collections are complementary to those already available via the TA, are well managed and are in demand among European researchers. Beneficiary 16, VIZZ are an SME with strengths in developing IT tools; they currently work with NH institutions on the EU-funded ViBRANT project, so are already familiar with the needs of the User community. Ms D. Duin is a sociologist working at VU (Beneficiary 17). She has been engaged in NH projects in EU-funded EDIT and ViBRANT projects. Her understanding of NH collections combined with her sociological training make her ideal for leading on the crowdsourcing pilot study (NA 3, Task 1.4). HCMR are engaged in research on the use of micro-CT, and will provide invaluable research capability to the JRA. HCMR are also the national node for LifeWatch in Greece so will assist with the dissemination of results between the two projects.

Beneficiary 1 has successfully managed the two previous SYNTHESYS contracts so is well-placed to continue in this role. One of the great strengths of the project is that Beneficiaries know each other and have worked extensively with each other and the *NHMMT* in the past. The Consortium is mature and appropriately structured to deliver SYNTHESYS3.

The SYNTHESYS3 Consortium comprises some of the largest and most diverse biological collections in the world. These collections comprise a vast range of taxa and materials, from bone to spirit-conserved tissue, and the overlay of electronic data associated with these collections. The long-term experience of managing collections on this scale ideally positions the Beneficiaries to assay standards, create benchmarks and offer advice to collections-holding institutions on how to improve their management, accessibility and long-term preservation.

The network established in SYNTHESYS1&2 has formed the platform for the development of NA2 and will continue to expand in SYNTHESYS3 with the engagement of further additional Beneficiaries. All of the Beneficiaries will contribute to NA3 (2 as in-kind staff input) assisting in the broad impact of SYNTHESYS3. Their engagement will include delivery of specific tasks, such as the pilot activities. All Beneficiaries will disseminate the outputs of the project within their institution and amongst colleagues in their country.

All of the 16 collections-holding SYNTHESYS3 Beneficiaries are in the process of digitising their collections and have a variety of equipment and techniques. In order to achieve all the aims of the JRA a commercial technology partner need was identified. VIZZ (a SME) will help deliver the software needed to address the currently intractable problem of extracting data from digital images, plus, optimising crowdsourcing models.

When combined the 340 million-strong collections of the Beneficiaries (representing more than half of the World's NH specimens) are truly global in coverage. When ranked in terms of both relative magnitude and taxonomic diversity European collections are among the best globally. A track record in providing high quality TA can be demonstrated: of more than 2,100 Users who completed User



Feedback reports for SYNTHEYS1&2 91% stated that the collections visited were either excellent or very good and 90% wished to return to the institution in order to make further use of the collections for their research.

### **Sub-contracting:**

**WP1:** Beneficiary 1 has a draw down contract with the Legal company Farrer & Co. to represent its interests in IP exploitation and technology transfer. If exploitable IP is generated by SYNTHEYS3, Farrer & Co. will be sub-contracted by NHM to provide advice to the originators of the IP on the most appropriate route to market, be it via a licensing arrangement or patent registration. The cost will not exceed 15,000€

Beneficiaries 2, 5,6,7,8, 10 and 15 will need to use external contractors to undertake certificate of financial statements. A maximum of 2,000€ will be reimbursed per Beneficiary.

Beneficiaries 1 and 4 have Public Competent Officers that will undertake the certificate of financial statements – there is no cost to the project.

### **Third parties**

KNAW will be a third party making their resources available to Beneficiary 17 (VU) (special case 3: case of resources working for a university but whose salaries/costs are paid by the Government). This is to facilitate payment of researcher Peter van den Besselaar. Prof van den Besselaar works at the VU University, but is paid by the KNAW (Government). Beneficiary 17 (VU) will get the entire budget of 78,344.75€ and will claim the costs for Prof van den Besselaar in their Form C. In terms of staff time, Prof. van den Besselaar will contribute 2 months, and the hired researcher at VU University will contribute 10 months.

Prof van den Besselaar will provide intellectual support and input into the sociological components of the project (Crowdsourcing pilot study –NA3 task 1.4 and JRA task 3.2).

### **Funding for beneficiaries from third countries**

None planned.

### **Additional beneficiaries:**

There are a significant number of collections-based institutions that are not part of the SYNTHEYS3 Consortium which have smaller, but in some instances, high quality collections of widespread interest under TA to potential Users. The previous SYNTHEYS project derived a procedure for including these collections into the SYNTHEYS3 Consortium. This is as follows:

1. Complete a SYNTHEYS collections management self-assessment (to demonstrate the collections are well-managed and accessible) and have results audited.
2. Show demand for Access from European researchers outside of the SYNTHEYS3 Consortium.
3. When 1&2 are completed, ASG to vote on whether to accept the Institution as an Access provider
4. If approved by ASG, calculate User Fee.
5. A budget will be allocated as part of the TA budget reallocation after Call 2, 3 or 4.

## **B2.4 Resources to be committed**

The resources of 8 million Euros will be managed by the NHM Management Team (*NHMMT*) on behalf of the Beneficiaries.

**Management: 776,709€**

A substantial cost saving will be made as SYNTHESYS3 will utilise the online systems for TA and consortium management website developed during the previous SYNTHESYS project. There may be some required adaptation to fit with differing EC reporting requirements. Notwithstanding such reprogramming requirements the system is ready for use.

The majority of costs will be personnel costs. NHM will charge a significantly reduced overhead (100% rather than the actual rate of 277%) to minimise management costs. There is no charge for the management of the Access provision. This is all provided in kind.

The *NHMMT* will monitor the rate of User Day awards per TAF at each Call and work with the *ASG* and *NRSG* to ensure resources are appropriately allocated. The *NHMMT* will receive 6 monthly reports from the *PM* on estimated rates of expenditure by on TA, NA and JRA. Any major deviance from plan will be flagged in the risk register and tracked accordingly.

**Beneficiary 1 will contribute in-kind staff support of an additional 12PM. The WP Leaders will provide an additional 6PM in-kind support.**

**Coordination; 2,574,433.80€**

Each NA Leader will manage their NA budget and will be responsible for providing the PM with six monthly spend reports. Any divergence from planned spend or requests to significantly modify the budgets will be discussed at the NRSG.

The majority of spend will be on staff time, with some funds allocated to T&S to allow the Beneficiaries to meet and agree policies and collection management recommendations. Staff invited to attend meeting from outside of the SYNTHESYS3 Consortium will fund themselves. There are two exceptions 1) the SYNTHESYS2 WP Leaders who will present their JRA outputs in NA2 Task 2.2 and 2) the SAB who will receive a per diem to cover travel and accommodation costs associated with their participation. All NA2 and NA3 Beneficiaries will contribute varying amounts of in-kind staff time. A large portion of this in-kind support will be in the dissemination of the project locally.

NHM will charge a significantly reduced overhead (145% rather than the actual rate of 277%) to reduce costs.

**Additional in-kind staff time to be invested by all NA2&3 core staff is estimated to be 57 PM**

**RTD: 1,770,162€**

The majority of the costs for the JRA are for staff time engaged in the development of the new technologies. There will be a small requirement for consumables such as IT software. There will also be a small travel and subsistence allocation to allow developers to meet and refine the outputs although day to day communications will be via Skype to limit meeting costs to a minimum. No major equipment will be purchased.

NHM will charge a significantly reduced overhead (145% rather than the actual rate of 277%) to reduce costs.

**Additional in-kind staff time will be invested by all JRA core staff. This is estimated to be 28PM**

**TAF; 5,576,234.97€**

Each TAF will provide an in-kind staff time contribution for the *TAF Leader* and *Deputy* plus general administration and financial support. This includes managing the USP meetings, serving the non-technical support needs of the Users and attending the AGM. These costs are *not* included into the

direct costs of the TA User Fees. Beneficiaries also contribute in-kind staff time as USP members; estimated as a minimum of 3-4 days per Call.

A User Day rate has been calculated per TAF installation. A User Day relates to one working day (Monday to Friday). The length of the day is dependent on institutional operational hours.

The distribution of the TA budget per TAF has been calculated based on the actual demand from applicants. Hence the variability in the number of User days allocated per TAF and per installation. Only one installation User Fee is being charged at 100% and on **average there is a 30% in-kind contribution per User Day** which represents value for money and demonstrates the Beneficiaries commitment to SYNTHESYS3.

*TAF Leaders* secured discount rates for Users at local hotels during SYNTHESYS1&2, capping the cost for the duration of the contract; this practice will be repeated for the new contract. User visits are booked as far in advance as possible to guarantee lowest-cost apex fares. TAFs will have their own travel and subsistence rates based on actual costs and any fluctuations will be accounted for during the reallocation of TA budgets.

**The in-kind contribution for the USP Beneficiaries, TAF administration, Leaders and Deputies is approximately 12PM.**

Beneficiary		Personnel			Indirects		Direct costs*	
		€	Person months	Description	€	Description	€	Description
1	NHM	291,436.35	208	Management activities	291,436.35	Actual indirect costs 145%	42,750.00	Includes travel + subsistence for NRSRG, ASG; project monitoring. Dissemination costs. Audit costs
		175,330.00	29	Co-ordination (NA2 + NA3) activities	15,101.10		40,400.00	includes Travel + Subsistence for NA2 and NA3, and consumables for NA3
		-	5	Co-ordination activities for access provision	24,147.11		980,293.88	includes costs for Travel + Subsistence for Users, User Fees, and User selection panel meetings
		101,400.00	16	JRA (RTD) activities	149,205.00		1,500.00	includes Travel + Subsistence costs for JRA
		-	6	Support activities	-		-	includes costs for management of Access provision
2	RBGK	82,260.00	17	Co-ordination (NA2 + NA3) activities	6,178.20	Flat rate 60%	6,000.00	includes Travel + Subsistence for NA2 and NA3
		-	1	Co-ordination activities for access provision	4,822.45		140,016.39	includes costs for Travel + Subsistence for Users, User Fees, and User selection panel meetings
		33,000.00	7	JRA (RTD) activities	20,700.00		1,500.00	includes Travel + Subsistence costs for JRA
3	RBGE	121,200.00	20	Co-ordination (NA2 + NA3) activities	9,009.00	Flat rate 60%	7,500.00	includes Travel + Subsistence for NA2 and NA3
		-	1	Co-ordination activities for access provision	6,845.39		190,411.38	includes costs for Travel + Subsistence for Users, User Fees, and User selection panel meetings
		129,600.00	22	JRA (RTD) activities	79,860.00		3,500.00	includes Travel + Subsistence and Consumables costs for JRA
4	MNHN	31,200.00	6	Co-ordination (NA2 + NA3) activities	2,499.00	Flat rate 60%	4,500.00	includes Travel + Subsistence for NA2 and NA3
		-	7	Co-ordination activities for access provision	17,733.55		553,277.08	includes costs for Travel + Subsistence for Users, User Fees, and User selection panel meetings
		57,600.00	10	JRA (RTD) activities	35,460.00		1,500.00	includes Travel + Subsistence costs for JRA
		-	1	Support activities	-		-	includes costs for management of Access provision
5	UCPH	117,600.00	19	Co-ordination (NA2 + NA3) activities	8,722.00	Flat rate 60%	7,000.00	includes Travel + Subsistence for NA2 and NA3
		-	7	Co-ordination activities for access provision	6,438.71		275,695.52	includes costs for Travel + Subsistence for Users, User Fees, and User selection panel meetings
		24,600.00	4	JRA (RTD) activities	15,660.00		1,500.00	includes Travel + Subsistence costs for JRA
		-	1	Support activities	-		-	includes costs for management of Access provision
6	CSIC	145,488.39	24	Co-ordination (NA2 + NA3) activities	10,202.96	Actual indirect costs 143% on personnel	8,500.00	includes Travel + Subsistence for NA2 and NA3
		-	7	Co-ordination activities for access provision	-		316,544.00	includes costs for Travel + Subsistence for Users, User Fees, and User selection panel meetings
		76,182.00	14	JRA (RTD) activities	108,940.26		1,500.00	includes Travel + Subsistence costs for JRA
		-	1	Support activities	-		-	includes costs for management of Access provision

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7	NRM	41,660.00	6	Co-ordination (NA2 + NA3) activities	3,266.20	Flat rate 60%	5,000.00	includes Travel + Subsistence for NA2 and NA3
		-	7	Co-ordination activities for access provision	10,124.43		426,369.69	includes costs for Travel + Subsistence for Users, User Fees, and User selection panel meetings
		-	1	Support activities	-		-	includes costs for management of Access provision
8	Naturalis	37,800.00	6	Co-ordination (NA2 + NA3) activities	2,926.00	Flat rate 60%	4,000.00	includes Travel + Subsistence for NA2 and NA3
		-	7	Co-ordination activities for access provision	6,620.29		310,793.97	includes costs for Travel + Subsistence for Users, User Fees, and User selection panel meetings
		46,200.00	7	JRA (RTD) activities	28,620.00		1,500.00	includes Travel + Subsistence costs for JRA
		-	1	Support activities	-		-	includes costs for management of Access provision
9	BGBM	85,250.00	16	Co-ordination (NA2 + NA3) activities	6,527.50	Flat rate 60%	8,000.00	includes Travel + Subsistence for NA2 and NA3
		-	5	Co-ordination activities for access provision	1,193.41		52,078.39	includes costs for Travel + Subsistence for Users, User Fees, and User selection panel meetings
		52,800.00	10	JRA (RTD) activities	32,580.00		1,500.00	includes Travel + Subsistence costs for JRA
10	MfN	196,320.00	37	Co-ordination (NA2 + NA3) activities	15,738.66	Flat rate 60%	28,518.00	includes Travel + Subsistence for NA2 and NA3, and consumables for NA2
		-	2	Co-ordination activities for access provision	4,381.10		165,134.83	includes costs for Travel + Subsistence for Users, User Fees, and User selection panel meetings
		84,600.00	14	JRA (RTD) activities	52,860.00		3,500.00	includes Travel + Subsistence and Consumables costs for JRA
		-	1	Support activities	-		-	includes costs for management of Access provision for DE-TAF.
11	NHMW	15,000.00	5	Co-ordination (NA2 + NA3) activities	1,330.00	Flat rate 60%	4,000.00	includes Travel + Subsistence for NA2 and NA3
		-	7	Co-ordination activities for access provision	8,162.19		260,674.12	includes costs for Travel + Subsistence for Users, User Fees, and User selection panel meetings
		27,600.00	5	JRA (RTD) activities	17,460.00		1,500.00	includes Travel + Subsistence costs for JRA
		-	1	Support activities	-		-	includes costs for management of Access provision
12	HNHM	14,400.00	2	Co-ordination (NA3) activities	1,113.00	Actual indirect costs 60%	1,500.00	includes Travel + Subsistence for NA3
		-	7	Co-ordination activities for access provision	5,847.97		220,774.24	includes costs for Travel + Subsistence for Users, User Fees, and User selection panel meetings
		33,600.00	6	JRA (RTD) activities	21,060.00		1,500.00	includes Travel + Subsistence costs for JRA
		-	1	Support activities	-		-	includes costs for management of Access provision
13	RBINS	15,600.00	5	Co-ordination (NA2) activities	1,232.00	Flat rate 60%	2,000.00	includes Travel + Subsistence for NA2
		-	4	Co-ordination activities for access provision	3,852.91		166,350.56	includes costs for Travel + Subsistence for Users, User Fees, and User selection panel meetings
		42,000.00	7	JRA (RTD) activities	29,100.00		6,500.00	includes Travel + Subsistence and Consumables costs for JRA

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		-	1	Support activities	-		-	includes costs for management of Access provision
14	MRAC	53,200.00	10	Co-ordination (NA2 + NA3) activities	4,074.00	Flat rate 60%	5,000.00	includes Travel + Subsistence for NA2 and NA3
		-	3	Co-ordination activities for access provision	2,905.76		129,143.28	includes costs for Travel + Subsistence for Users, User Fees, and User selection panel meetings
		14,560.00	3	JRA (RTD) activities	9,636.00		1,500.00	includes Travel + Subsistence costs for JRA
15	NMP	135,600.00	24	Co-ordination (NA2 + NA3) activities	10,157.00	Flat rate 60%	9,500.00	includes Travel + Subsistence for NA2 and NA3, and consumables for NA3
		-	7	Co-ordination activities for access provision	5,261.00		196,927.86	includes costs for Travel + Subsistence for Users, User Fees, and User selection panel meetings
		70,200.00	12	JRA (RTD) activities	14,340.00		1,500.00	includes Travel + Subsistence costs for JRA
		-	1	Support activities	-		-	includes costs for management of Access provision
16	Vizz	8,400.00	1	Co-ordination (NA3) activities	693.00	Flat rate 60%	1,500.00	includes Travel + Subsistence for NA3
		123,600.00	21	JRA (RTD) activities	75,060.00		1,500.00	includes Travel + Subsistence costs for JRA
17	VU	33,925.00	6	Co-ordination (NA3) activities	2,479.75	Flat rate 60%	1,500.00	includes Travel + Subsistence for NA3
		32,200.00	6	JRA (RTD) activities	20,220.00		1,500.00	includes Travel + Subsistence costs for JRA
18	HCMR	3,100.00	1	Co-ordination (NA2) activities	252.00	Actual indirect costs 81% on personnel; 7% on direct costs	500.00	includes Travel + Subsistence for NA2
		41,460.00	13	JRA (RTD) activities	33,582.60		1,500.00	includes Travel + Subsistence costs for JRA

\*Direct costs include Access provision. No major equipment purchases are planned.

## User Fee Calculations

<b>Participant number</b>	1	<b>Organisation short name</b>		NHM	
<b>Short name of Infrastructure</b>	GB-TAF	<b>Installation number</b>	1	<b>Short name of Installation</b>	NHM COL&LAB
<b>Name of Installation</b>	Collections & Laboratory			<b>Unit of access</b>	DAY

<b>A. Estimated direct eligible costs of providing access within the project life-time excluding personnel costs</b>	Describe the direct eligible costs for providing access to the installation over the project life-time (e.g. maintenance, utilities, consumable costs). All contributions to capital investments of the infrastructure are not eligible .		<b>Eligible Costs (€)</b>	
	BOTANY: servicing & maintenance of existing equipt, utilities & consumables**		585,607.63	
	ENTOM: servicing & maintenance of existing equipt, utilities & consumables**		1,031,195.38	
	MINERALOGY: servicing & maintenance of existing equipt, utilities & consum.**		1,273,415.60	
	PALAEO: servicing & maintenance of existing equipt, utilities & consumables**		1,004,827.13	
	ZOOLOGY: servicing & maintenance of existing equipt, utilities & consumables**		2,441,575.84	
	LIBRARY & ARCHIVES: collections and IT development, digital & data services		8,286,147.79	
	SCIENCE DIRECTORATE: digital collections and collections enhancement		442,327.13	
	**e.g. IT software, IT equipment <£5k, subscriptions, fixtures & fittings, collection cabinets, conservation, health & safety, travel, conferences, printing, stationery, publications, acquisitions, couriers, curatorial supplies, gases, alcohol, lab consumables			
	<b>Total A</b>		<b>15,065,096.50</b>	
<i>of which subcontracting (A')</i>				
<b>B. Estimated personnel direct eligible costs needed to provide access within the project life-time</b>	<b>Category of staff</b>		<b>Person-Months</b>	<b>Personnel Costs (€)</b>
	Researchers*		1274	26,713,129.65
	Curators*		1204	21,683,025.05
	Technicians (including librarians)*		530	7,822,786.44
* these are overall figures that factor in pay increment.				
<b>Total B</b>		<b>56,218,941.14</b>		
C. Indirect eligible costs $\leq 7\% \times ([A-A'] + B)$ <sup>[1]</sup>			<b>max 4989882.635</b>	4,989,882.63
D. Total estimated access eligible costs = A+B+C				76,273,920.28
E. Total estimated quantity of access provided to all normal users of the infrastructure (i.e. both internal and external) within the project life-time				261,539
F. Fraction of the Unit cost to be charged to the project <sup>[2]</sup>				85.0%
G. <b>Estimated Unit cost charged to the project</b> = F x (D/E)				<b>247.89</b>
H. Quantity of access offered under the project (over the whole duration of the project)				2,375
I. <b>Access Cost charged to the project</b> <sup>[3][4]</sup> = G x H				<b>588,738.75</b>

<b>Participant number</b>	1	<b>Organisation short name</b>		<b>NHM</b>	
<b>Short name of Infrastructure</b>	GB-TAF	<b>Installation number</b>	2	<b>Short name of Installation</b>	NHM AIF
<b>Name of Installation</b>	Analytical & Imaging Facilities			<b>Unit of access</b>	DAY

<b>A. Estimated direct eligible costs of providing access within the project life-time excluding personnel costs</b>	Describe the direct eligible costs for providing access to the installation over the project life-time (e.g. maintenance, utilities, consumable costs). All contributions to capital investments of the infrastructure are not eligible .		<b>Eligible Costs (€)</b>
	Running costs of maintaining and servicing existing equipment		382,704.48
	Consumables for operating of existing equipment (e.g. IT equipment <£5k, courier, publications, gases, furniture and fittings <£5k, IT software, other laboratory consumables e.g. carbon films + discs, network cabling, lenses, tweezers, weighing scales, pipettes, tubes, filters, saws)		209,264.23
	<b>Total A</b>		<b>591,968.71</b>
	<i>of which subcontracting (A')</i>		
<b>B. Estimated personnel direct eligible costs needed to provide access within the project life-time</b>	<b>Category of staff</b>	<b>Person-Months</b>	<b>Personnel Costs (€)</b>
	Eleven technical staff responsible for managing and providing support for Users on Analytical and Imaging Facilities for 48 months	376.80	1,972,696.50
	<b>Total B</b>		<b>1,972,696.50</b>
	C. Indirect eligible costs $\leq 7\% \times ([A-A'] + B)^{[1]}$		<b>max 179526.5646</b>
D. Total estimated access eligible costs = A+B+C			2,744,191.77
E. Total estimated quantity of access provided to all normal users of the infrastructure (i.e. both internal and external) within the project life-time			5,056
F. Fraction of the Unit cost to be charged to the project <sup>[2]</sup>			85.0%
G. <b>Estimated Unit cost charged to the project = F x (D/E)</b>			<b>461.35</b>
H. Quantity of access offered under the project (over the whole duration of the project)			101
I. <b>Access Cost charged to the project <sup>[3][4]</sup> = G x H</b>			<b>46,596.35</b>



Participant number	2	Organisation short name		RBGK	
Short name of Infrastructure	GB-TAF	Installation number	3	Short name of Installation	KEW
Name of Installation	Royal Botanic Garden, Kew			Unit of access	DAY

A. Estimated direct eligible costs of providing access within the project life-time excluding personnel costs	Describe the direct eligible costs for providing access to the installation over the project life-time (e.g. maintenance, utilities, consumable costs). All contributions to capital investments of the infrastructure are not eligible .		<b>Eligible Costs (€)</b>	
	Consumables: laboratory consumables such as chemicals used for PCR or DNA sequencing; glassware; seed physiology experiments		1,487,958.00	
	Equipment & maintenance: light and electron microscope servicing; servicing of analytical equipment		542,466.30	
	Curation material: digitisation consumables such as barcodes, readers, specimen mounting and re-curation materials arising from curatorial activity including species and genus covers; spirit collection bottles.		1,042,998.00	
	Printing: publications and dissemination of research results; training materials		215,331.70	
	Stationery: including paper for drying of field collections, boxes for collections for safe storage		100,272.70	
	<b>Total A</b>		<b>3,389,026.70</b>	
	<b>of which subcontracting (A')</b>		<b>0.00</b>	
	B. Estimated personnel direct eligible costs needed to provide access within the project life-time	<b>Category of staff</b>	<b>Person-Months</b>	<b>Personnel Costs (€)</b>
		Band A (under graduate)	566	1,252,217.00
Band B (graduate)		1747.2	4,357,197.00	
Band C (graduate with experience)		1056	3,407,563.00	
Band D (post graduate)		691.2	2,719,708.00	
Band E (post graduate with experience)		230.4	1,112,818.00	
Band F (research team leader)		230.4	1,577,117.00	
<b>Total B</b>		<b>14,426,620.00</b>		
C. Indirect eligible costs $\leq 7\% \times ([A-A'] + B)^{[1]}$		<b>max 1247095.269</b>	1,247,095.27	
D. Total estimated access eligible costs = A+B+C			19,062,741.97	
E. Total estimated quantity of access provided to all normal users of the infrastructure (i.e. both internal and external) within the project life-time			107,852	
F. Fraction of the Unit cost to be charged to the project <sup>[2]</sup>			80.0%	
G. <b>Estimated Unit cost charged to the project = F x (D/E)</b>			<b>141.4</b>	
H. Quantity of access offered under the project (over the whole duration of the project)			503	
I. <b>Access Cost charged to the project <sup>[3][4]</sup> = G x H</b>			<b>71,124.20</b>	

Participant number	3	Organisation short name	EDIN
Short name of Infrastructure	GB-TAF	Installation number	4
Name of Installation	Royal Botanic Garden Edinburgh	Short name of Installation	EDIN
		Unit of access	DAY

A. Estimated direct eligible costs of providing access within the project life-time excluding personnel costs	Describe the direct eligible costs for providing access to the installation over the project life-time (e.g. maintenance, utilities, consumable costs). All contributions to capital investments of the infrastructure are not eligible .		<b>Eligible Costs (€)</b>
	Maintenance (buildings maintenance, plumbing, decorating etc.)		870,467.94
	Utilities (gas, electric, water)		1,118,805.99
	Consumables and direct costs (cleaning, computer consumables, books etc.)		1,460,663.12
	<b>Total A</b>		<b>3,449,937.05</b>
	<i>of which subcontracting (A')</i>		
B. Estimated personnel direct eligible costs needed to provide access within the project life-time	<b>Category of staff</b>	<b>Person-Months</b>	<b>Personnel Costs (€)</b>
	Herbarium	528	1,948,665.59
	Library	264	1,081,337.22
	Science technical	180	762,374.49
	Edinburgh horticulture indoors	446	1,689,326.68
	Edinburgh horticulture outdoors	332	1,168,994.15
<b>Total B</b>		<b>6,650,698.13</b>	
C. Indirect eligible costs $\leq 7\% \times ([A-A'] + B)^{[1]}$		<b>max 707044.4631</b>	465,548.87
D. Total estimated access eligible costs = A+B+C			10,566,184.06
E. Total estimated quantity of access provided to all normal users of the infrastructure (i.e. both internal and external) within the project life-time			69,236
F. Fraction of the Unit cost to be charged to the project <sup>[2]</sup>			85.0%
G. <b>Estimated Unit cost charged to the project = F x (D/E)</b>			<b>129.72</b>
H. Quantity of access offered under the project (over the whole duration of the project)			714
I. <b>Access Cost charged to the project <sup>[3][4]</sup> = G x H</b>			<b>92,620.08</b>

<b>Participant number</b>	4	<b>Organisation short name</b>		<b>MNHN</b>	
<b>Short name of Infrastructure</b>	FR-TAF	<b>Installation number</b>	5	<b>Short name of Installation</b>	MNHN COL
<b>Name of Installation</b>	Collections			<b>Unit of access</b>	DAY

<b>A. Estimated direct eligible costs of providing access within the project life-time excluding personnel costs</b>	Describe the direct eligible costs for providing access to the installation over the project life-time (e.g. maintenance, utilities, consumable costs). All contributions to capital investments of the infrastructure are not eligible .		<b>Eligible Costs (€)</b>
	Consumables (<800€/unit) including:		44,000.00
	safety: gloves, suits, glasses		
	handling: stool, cart, rolling skate		
	cleaning: sponge, rubber, vacuum cleaner		
	oil for microscopic observation, scales, lamp bulbs		
	stationery (paper, ink)		
	Maintenance of optical microscopes and lenses		8,000.00
	<b>Total A</b>		<b>52,000.00</b>
	<i>of which subcontracting (A')</i>		
<b>B. Estimated personnel direct eligible costs needed to provide access within the project life-time</b>	<b>Category of staff</b>	<b>Person-Months</b>	<b>Personnel Costs (€)</b>
	Technical staff (technicians and engineers) 72/4 FTE	792	2,110,000.00
	Scientific staff (lecturers and professors) 50/2 FTE	733	3,550,000.00
	Support staff (visitor assistance 2FTE)	88	256,000.00
	<b>Total B</b>		<b>5,916,000.00</b>
C. Indirect eligible costs $\leq 7\% \times ([A-A'] + B)^{[1]}$		<b>max 417760</b>	417,760.00
D. Total estimated access eligible costs = A+B+C			6,385,760.00
E. Total estimated quantity of access provided to all normal users of the infrastructure (i.e. both internal and external) within the project life-time			30,000
F. Fraction of the Unit cost to be charged to the project <sup>[2]</sup>			100.0%
G. <b>Estimated Unit cost charged to the project = F x (D/E)</b>			<b>212.86</b>
H. Quantity of access offered under the project (over the whole duration of the project)			1,264
I. <b>Access Cost charged to the project <sup>[3][4]</sup> = G x H</b>			<b>269,055.04</b>

Participant number	4	Organisation short name		MNHN	
Short name of Infrastructure	FR-TAF	Installation number	6	Short name of Installation	MNHN AIF
Name of Installation	MNHN Analytical Facilities			Unit of access	DAY

A. Estimated direct eligible costs of providing access within the project life-time excluding personnel costs	Describe the direct eligible costs for providing access to the installation over the project life-time (e.g. maintenance, utilities, consumable costs). All contributions to capital investments of the infrastructure are not eligible .		<b>Eligible Costs (€)</b>
	SEM consumables (W wire, C-coated section, Al sample carrier, cleaning tools and chemicals)		9,200.00
	Maintenance contract for SEM		44,000.00
	SEM training (training of equipment manager in connection with updating of equipment and software)		4,800.00
	TEM consumables (grids, thin sections, antibodies, cutters, resin, chemicals)		80,000.00
	Maintenance contract for TEM		68,000.00
	<b>Total A</b>		<b>206,000.00</b>
	<i>of which subcontracting (A')</i>		<b>112,000.00</b>
B. Estimated personnel direct eligible costs needed to provide access within the project life-time	<b>Category of staff</b>	<b>Person-Months</b>	<b>Personnel Costs (€)</b>
	technical staff (engineer junior) 2FTE	88	370,000.00
	technical staff (TEM) 1 FTE	44	158,400.00
	scientific staff (SEM) 0,5 FTP	22	134,400.00
	administrative technical staff 0,1 FTP	4.4	16,000.00
	manager, professor 0,1 FTP	4.4	36,880.00
	<b>Total B</b>		<b>715,680.00</b>
C. Indirect eligible costs $\leq 7\% \times ([A-A'] + B)^{[1]}$		<b>max 56677.6</b>	56,677.60
D. Total estimated access eligible costs = A+B+C			978,357.60
E. Total estimated quantity of access provided to all normal users of the infrastructure (i.e. both internal and external) within the project life-time			1,600
F. Fraction of the Unit cost to be charged to the project <sup>[2]</sup>			74.3%
G. <b>Estimated Unit cost charged to the project = F x (D/E)</b>			<b>454.2</b>
H. Quantity of access offered under the project (over the whole duration of the project)			68
I. <b>Access Cost charged to the project <sup>[3][4]</sup> = G x H</b>			<b>30,885.60</b>

<b>Participant number</b>	5	<b>Organisation short name</b>		UCPH	
<b>Short name of Infrastructure</b>	DK-TAF	<b>Installation number</b>	7	<b>Short name of Installation</b>	UCPH
<b>Name of Installation</b>	Collections & facilities			<b>Unit of access</b>	DAY

<b>A. Estimated direct eligible costs of providing access within the project life-time excluding personnel costs</b>	Describe the direct eligible costs for providing access to the installation over the project life-time (e.g. maintenance, utilities, consumable costs). All contributions to capital investments of the infrastructure are not eligible .		<b>Eligible Costs (€)</b>	
	Specialised consumables (glassware; containers for storage of specimens; alcohol for preservation and storage; chemicals for electron microscopy, staining, mounting, DNA labs)		2,800,000.00	
	Maintenance of scientific equipment		4,000,000.00	
	<b>Total A</b>		<b>6,800,000.00</b>	
	<i>of which subcontracting (A')</i>		<i>0.00</i>	
<b>B. Estimated personnel direct eligible costs needed to provide access within the project life-time</b>	<b>Category of staff</b>		<b>Person-Months</b>	<b>Personnel Costs (€)</b>
	Scientists		970	7,000,000.00
	Technical staff (collection staff, lab technicians)		2300	11,000,000.00
	<b>Total B</b>			<b>18,000,000.00</b>
C. Indirect eligible costs $\leq 7\% \times ([A-A'] + B)^{[1]}$		<b>max 1736000</b>	1,736,000.00	
D. Total estimated access eligible costs = A+B+C			26,536,000.00	
E. Total estimated quantity of access provided to all normal users of the infrastructure (i.e. both internal and external) within the project life-time			52,000	
F. Fraction of the Unit cost to be charged to the project <sup>[2]</sup>			60.0%	
G. <b>Estimated Unit cost charged to the project = F x (D/E)</b>			<b>306.19</b>	
H. Quantity of access offered under the project (over the whole duration of the project)			600	
I. <b>Access Cost charged to the project <sup>[3][4]</sup> = G x H</b>			<b>183,714.00</b>	

<b>Participant number</b>	6	<b>Organisation short name</b>		<b>CSIC</b>	
<b>Short name of Infrastructure</b>	ES-TAF	<b>Installation number</b>	8	<b>Short name of Installation</b>	<b>CSIC</b>
<b>Name of Installation</b>	<b>CSIC</b>			<b>Unit of access</b>	<b>DAY</b>

<b>A. Estimated direct eligible costs of providing access within the project life-time excluding personnel costs</b>	Describe the direct eligible costs for providing access to the installation over the project life-time (e.g. maintenance, utilities, consumable costs). All contributions to capital investments of the infrastructure are not eligible .		<b>Eligible Costs (€)</b>	
	Specialised consumables e.g. chemicals, glassware and other consumables		3,450,000	
	& maintenance of scientific equipment including spare parts			
	<b>Total A</b>		<b>3,450,000.00</b>	
	<i>of which subcontracting (A')</i>			
<b>B. Estimated personnel direct eligible costs needed to provide access within the project life-time</b>	<b>Category of staff</b>		<b>Person-Months</b>	<b>Personnel Costs (€)</b>
	Scientific		83	5,074,557.00
	Technical: technicians of laboratories (i.e. Molecular, SEM, GIS) & technicians of collections		116	3,965,306.00
	<b>Total B</b>			<b>9,039,863.00</b>
C. Indirect eligible costs $\leq 7\% \times ([A-A'] + B)^{[1]}$		<b>max 874290.41</b>	632,790.41	
D. Total estimated access eligible costs = A+B+C			13,122,653.41	
E. Total estimated quantity of access provided to all normal users of the infrastructure (i.e. both internal and external) within the project life-time			22,135	
F. Fraction of the Unit cost to be charged to the project <sup>[2]</sup>			40.7%	
G. <b>Estimated Unit cost charged to the project = F x (D/E)</b>			<b>241.5</b>	
H. Quantity of access offered under the project (over the whole duration of the project)			780	
I. <b>Access Cost charged to the project <sup>[3][4]</sup> = G x H</b>			<b>188,370.00</b>	

Participant number	7	Organisation short name		NRM	
Short name of Infrastructure	SE-TAF	Installation number	9	Short name of Installation	NRM
Name of Installation	Naturhistoriska riksmuseet			Unit of access	DAY

A. Estimated direct eligible costs of providing access within the project life-time excluding personnel costs	Describe the direct eligible costs for providing access to the installation over the project life-time (e.g. maintenance, utilities, consumable costs). All contributions to capital investments of the infrastructure are not eligible .		<b>Eligible Costs (€)</b>	
	Maintenance related to the ion microprobe CAMECA IMS 1280		143,219.60	
	Maintenance of Isotope Geology and Mineralogy (6 spectrometers, clean lab)		1,269,463.28	
	Maintenance for Contaminant Research & Environmental Specimen Bank		1,283,549.62	
	Maintenance, service, lab utilities, consumables (e.g. reagents for PCR and sequencing) at the Molecular Systematics Lab		661,248.01	
	Maintenance for TEM, SEM, curatorial supplies, lab utilities and consumables		2,751,649.22	
	Computers and computer programs devoted to research including computers, portable computers, printers, associated software and licenses (e.g. F-Secure, MS Office, Filemaker) as well as dedicated software, that are used by employees of the research division RD at NRM.		368,681.32	
	<b>Total A</b>		<b>6,477,811.05</b>	
	<i>of which subcontracting (A')</i>			
	B. Estimated personnel direct eligible costs needed to provide access within the project life-time	<b>Category of staff</b>	<b>Person-Months</b>	<b>Personnel Costs (€)</b>
Technical and support staff including collection managers, facility managers, technicians and administrative staff necessary for access provision.		4520	22,045,798.40	
Scientific staff		2705	16,715,864.00	
<b>Total B</b>		<b>38,761,662.40</b>		
C. Indirect eligible costs $\leq 7\% \times ([A-A'] + B)^{[1]}$		<b>max 3166763.142</b>	3,166,763.14	
D. Total estimated access eligible costs = A+B+C			48,406,236.59	
E. Total estimated quantity of access provided to all normal users of the infrastructure (i.e. both internal and external) within the project life-time			56,946	
F. Fraction of the Unit cost to be charged to the project <sup>[2]</sup>			39.4%	
G. <b>Estimated Unit cost charged to the project = F x (D/E)</b>			<b>335</b>	
H. Quantity of access offered under the project (over the whole duration of the project)			841	
I. <b>Access Cost charged to the project <sup>[3][4]</sup> = G x H</b>			<b>281,735.00</b>	

<b>Participant number</b>	8	<b>Organisation short name</b>		<b>NCB</b>	
<b>Short name of Infrastructure</b>	NL-TAF	<b>Installation number</b>	10	<b>Short name of Installation</b>	NCB
<b>Name of Installation</b>	NCB Naturalis			<b>Unit of access</b>	DAY

<b>A. Estimated direct eligible costs of providing access within the project life-time excluding personnel costs</b>	Describe the direct eligible costs for providing access to the installation over the project life-time (e.g. maintenance, utilities, consumable costs). All contributions to capital investments of the infrastructure are not eligible .		<b>Eligible Costs (€)</b>	
	ENTOMOLOGY-curatorial supplies (e.g. storage units, mounting materials), servicing and maintenance of existing equipment (ICT, microscopes, binoculars), lab consumables (e.g. chemicals), pest control and outsourcing sequencing		729,366.57	
	GEOLOGY-curatorial supplies (e.g. storage units, mounting materials), servicing and maintenance of existing equipment, lab consumables and utilities		588,275.02	
	ZOOLOGY-curatorial supplies (e.g. storage units, mounting materials), servicing and maintenance of existing equipment (ICT, microscopes), lab consumables (e.g. alcohol), pest control and outsourcing sequencing		843,510.89	
	BOTANY - curatorial supplies (e.g. storage units, mounting materials), servicing + maintenance of existing equipment (ICT, microscopes), pest control + outsourcing sequencing		769,448.45	
	<b>Total A</b>		<b>2,930,600.93</b>	
	<i>of which subcontracting (A')</i>			
	<b>B. Estimated personnel direct eligible costs needed to provide access within the project life-time</b>	<b>Category of staff</b>	<b>Person-Months</b>	<b>Personnel Costs (€)</b>
		Scientific	1,371	13,976,404.08
		Technical (includes collection managers, taxidermists and conservation staff)	1,802	15,114,887.88
<b>Total B</b>		<b>29,091,291.96</b>		
C. Indirect eligible costs $\leq 7\% \times ([A-A'] + B)^{[1]}$		<b>max 2241532.503</b>	2,241,532.50	
D. Total estimated access eligible costs = A+B+C			34,263,425.40	
E. Total estimated quantity of access provided to all normal users of the infrastructure (i.e. both internal and external) within the project life-time			71,116	
F. Fraction of the Unit cost to be charged to the project <sup>[2]</sup>			81.3%	
G. <b>Estimated Unit cost charged to the project</b> = F x (D/E)			<b>391.7</b>	
H. Quantity of access offered under the project (over the whole duration of the project)			552	
I. <b>Access Cost charged to the project</b> <sup>[3][4]</sup> = G x H			<b>216,218.40</b>	



<b>Participant number</b>	9	<b>Organisation short name</b>		<b>BGBM</b>	
<b>Short name of Infrastructure</b>	DE-TAF	<b>Installation number</b>	11	<b>Short name of Installation</b>	BGBM COL
<b>Name of Installation</b>	BGBM Collections			<b>Unit of access</b>	DAY

<b>A. Estimated direct eligible costs of providing access within the project life-time excluding personnel costs</b>	Describe the direct eligible costs for providing access to the installation over the project life-time (e.g. maintenance, utilities, consumable costs). All contributions to capital investments of the infrastructure are not eligible .		<b>Eligible Costs (€)</b>	
	Maintenance and consumable costs of collections		6,978,000	
	e.g. working materials, operating expenses of equipment, greenhouses, garden vehicles, instruments, horticultural consumables, materials for preparation of herbarium samples			
	<b>Total A</b>		<b>6,978,000.00</b>	
	<i>of which subcontracting (A')</i>			
<b>B. Estimated personnel direct eligible costs needed to provide access within the project life-time</b>	<b>Category of staff</b>		<b>Person-Months</b>	<b>Personnel Costs (€)</b>
	Scientific		504	2,825,700.00
	Technical (excluding gardeners, includes biological technical assistants, IT engineers)		240	1,081,436.00
	<b>Total B</b>			<b>3,907,136.00</b>
C. Indirect eligible costs $\leq 7\% \times ([A-A'] + B)$ <sup>[1]</sup>		<b>max 761959.52</b>	761,959.52	
D. Total estimated access eligible costs = A+B+C			11,647,095.52	
E. Total estimated quantity of access provided to all normal users of the infrastructure (i.e. both internal and external) within the project life-time			14,100	
F. Fraction of the Unit cost to be charged to the project <sup>[2]</sup>			22.0%	
G. <b>Estimated Unit cost charged to the project</b> = F x (D/E)			<b>181.73</b>	
H. Quantity of access offered under the project (over the whole duration of the project)			78	
I. <b>Access Cost charged to the project</b> <sup>[3][4]</sup> = G x H			<b>14,174.94</b>	

<b>Participant number</b>	9	<b>Organisation short name</b>		<b>BGBM</b>	
<b>Short name of Infrastructure</b>	DE-TAF	<b>Installation number</b>	12	<b>Short name of Installation</b>	BGBM LAB
<b>Name of Installation</b>	BGBM Laboratories			<b>Unit of access</b>	DAY

<b>A. Estimated direct eligible costs of providing access within the project life-time excluding personnel costs</b>	Describe the direct eligible costs for providing access to the installation over the project life-time (e.g. maintenance, utilities, consumable costs). All contributions to capital investments of the infrastructure are not eligible .		<b>Eligible Costs (€)</b>	
	Maintenance and consumables costs of laboratories:		722,000	
	e.g. maintenance and servicing of equipment and instruments, consumables for sample supply, operating expenses for analyses			
	<b>Total A</b>		<b>722,000.00</b>	
	<i>of which subcontracting (A')</i>			
	<b>B. Estimated personnel direct eligible costs needed to provide access within the project life-time</b>	<b>Category of staff</b>	<b>Person-Months</b>	<b>Personnel Costs (€)</b>
Scientific		156	873,150.00	
Technical (includes biological technical assistants, lab assistants, IT engineers, lab engineers)		240	1,073,000.00	
<b>Total B</b>		<b>1,946,150.00</b>		
C. Indirect eligible costs $\leq 7\% \times ([A-A'] + B)^{[1]}$		<b>max 186770.5</b>	186,770.50	
D. Total estimated access eligible costs = A+B+C			2,854,920.50	
E. Total estimated quantity of access provided to all normal users of the infrastructure (i.e. both internal and external) within the project life-time			5,840	
F. Fraction of the Unit cost to be charged to the project <sup>[2]</sup>			71.1%	
G. <b>Estimated Unit cost charged to the project = F x (D/E)</b>			<b>347.58</b>	
H. Quantity of access offered under the project (over the whole duration of the project)			60	
I. <b>Access Cost charged to the project <sup>[3][4]</sup> = G x H</b>			<b>20,854.80</b>	

<b>Participant number</b>	10	<b>Organisation short name</b>		<b>MfN</b>	
<b>Short name of Infrastructure</b>	DE-TAF	<b>Installation number</b>	13	<b>Short name of Installation</b>	MfN COL
<b>Name of Installation</b>	MfN Collections			<b>Unit of access</b>	DAY

<b>A. Estimated direct eligible costs of providing access within the project life-time excluding personnel costs</b>	Describe the direct eligible costs for providing access to the installation over the project life-time (e.g. maintenance, utilities, consumable costs). All contributions to capital investments of the infrastructure are not eligible .		<b>Eligible Costs (€)</b>
	Consumables: stationery, print costs, telephone, laundry, service clothing		160,588.00
	Utilities: laboratory costs, workshop costs		522,352.00
	Maintenance: e.g. heating, cleansing, waste management, water, pest management, maintenance area and building, insurances etc.		2,160,000.00
	(All sums calculated as collection area per total square metres of the building)		
	<b>Total A</b>		<b>2,842,940.00</b>
	<i>of which subcontracting (A')</i>		
<b>B. Estimated personnel direct eligible costs needed to provide access within the project life-time</b>	<b>Category of staff</b>	<b>Person-Months</b>	<b>Personnel Costs (€)</b>
	MfN Scientific personnel (researchers, curators)	1296	5,294,868.00
	MfN Technicians (collection conservators, Preparators, taxidermists)	1824	4,837,756.00
	<b>Total B</b>		<b>10,132,624.00</b>
C. Indirect eligible costs $\leq 7\% \times ([A-A'] + B)^{[1]}$		<b>max 908289.48</b>	908,289.48
D. Total estimated access eligible costs = A+B+C			13,883,853.48
E. Total estimated quantity of access provided to all normal users of the infrastructure (i.e. both internal and external) within the project life-time			46,500
F. Fraction of the Unit cost to be charged to the project <sup>[2]</sup>			65.0%
G. <b>Estimated Unit cost charged to the project = F x (D/E)</b>			<b>194.08</b>
H. Quantity of access offered under the project (over the whole duration of the project)			399
I. <b>Access Cost charged to the project <sup>[3][4]</sup> = G x H</b>			<b>77,437.92</b>

<b>Participant number</b>	10	<b>Organisation short name</b>		<b>MfN</b>	
<b>Short name of Infrastructure</b>	DE-TAF	<b>Installation number</b>	14	<b>Short name of Installation</b>	MfN LAB
<b>Name of Installation</b>	MfN Laboratories			<b>Unit of access</b>	DAY

<b>A. Estimated direct eligible costs of providing access within the project life-time excluding personnel costs</b>	Describe the direct eligible costs for providing access to the installation over the project life-time (e.g. maintenance, utilities, consumable costs). All contributions to capital investments of the infrastructure are not eligible .		<b>Eligible Costs (€)</b>
	Consumables: stationery, print costs, telephone, laundry, service clothing		64,235.00
	Utilities: laboratory costs, workshop costs		208,941.00
	Maintenance: e.g. heating, cleansing, waste management, water, pest management, maintenance area and building, insurances etc.		864,000.00
	(All sums calculated as lab area per total square metres of the building)		
	<b>Total A</b>		<b>1,137,176.00</b>
	<i>of which subcontracting (A')</i>		
<b>B. Estimated personnel direct eligible costs needed to provide access within the project life-time</b>	<b>Category of staff</b>		<b>Person-Months</b>
	MfN Scientific personnel (researchers)		816
	MfN Technicians (technical assistants running laboratories and/or large facilities, i.e. TEM, SEM etc.)		1104
	<b>Total B</b>		<b>6,557,368.00</b>
C. Indirect eligible costs $\leq 7\% \times ([A-A'] + B)^{[1]}$		<b>max 538618.08</b>	538,618.08
D. Total estimated access eligible costs = A+B+C			8,233,162.08
E. Total estimated quantity of access provided to all normal users of the infrastructure (i.e. both internal and external) within the project life-time			12,500
F. Fraction of the Unit cost to be charged to the project <sup>[2]</sup>			48.9%
G. <b>Estimated Unit cost charged to the project = F x (D/E)</b>			<b>321.92</b>
H. Quantity of access offered under the project (over the whole duration of the project)			78
I. <b>Access Cost charged to the project <sup>[3][4]</sup> = G x H</b>			<b>25,109.76</b>

Participant number	11	Organisation short name		NHMW	
Short name of Infrastructure	NHMW	Installation number	15	Short name of Installation	AT TAF
Name of Installation	Naturhistorisches Museum Wien			Unit of access	DAY

A. Estimated direct eligible costs of providing access within the project life-time excluding personnel costs	Describe the direct eligible costs for providing access to the installation over the project life-time (e.g. maintenance, utilities, consumable costs). All contributions to capital investments of the infrastructure are not eligible .		<b>Eligible Costs (€)</b>
	Maintenance of scientific and IT infrastructure (EDV-hardware, instruments and service of scientific instruments)		218,892.09
	Consumables research (EDV service, chemicals, office material, net connections, literature)		234,119.26
	Consumable collections (EDV service, collections materials e.g. chemicals, paper for herbarium, boxes, needles etc., web connection, literature)		277,012.49
		<b>Total A</b>	<b>730,023.84</b>
		<i>of which subcontracting (A')</i>	<i>0.00</i>
B. Estimated personnel direct eligible costs needed to provide access within the project life-time	<b>Category of staff</b>	<b>Person-Months</b>	<b>Personnel Costs (€)</b>
	Scientific	552	2,990,184.00
	Technical (technicians, excluding exhibition)	360	1,473,120.00
		<b>Total B</b>	<b>4,463,304.00</b>
C. Indirect eligible costs $\leq 7\% \times ([A-A'] + B)^{[1]}$		<b>max 363532.9488</b>	363,532.95
D. Total estimated access eligible costs = A+B+C			5,556,860.79
E. Total estimated quantity of access provided to all normal users of the infrastructure (i.e. both internal and external) within the project life-time			16,776
F. Fraction of the Unit cost to be charged to the project <sup>[2]</sup>			52.4%
G. <b>Estimated Unit cost charged to the project</b> = F x (D/E)			<b>173.58</b>
H. Quantity of access offered under the project (over the whole duration of the project)			830
I. <b>Access Cost charged to the project</b> <sup>[3][4]</sup> = G x H			<b>144,071.40</b>

<b>Participant number</b>	12	<b>Organisation short name</b>		HNHM	
<b>Short name of Infrastructure</b>	HU-TAF	<b>Installation number</b>	16	<b>Short name of Installation</b>	HU COL
<b>Name of Installation</b>	Collections and SEM			<b>Unit of access</b>	DAY

<b>A. Estimated direct eligible costs of providing access within the project life-time excluding personnel costs</b>	Describe the direct eligible costs for providing access to the installation over the project life-time (e.g. maintenance, utilities, consumable costs). All contributions to capital investments of the infrastructure are not eligible .		<b>Eligible Costs (€)</b>	
	Anthropology-servicing and maintenance, consumables (boxes, tape, prep. chemicals)		116,160.00	
	Botany-servicing + maintenance, consumables (glassware, chemicals, desiccant, insect repellent, primers, gold-paladium target for SEM, chemicals for SEM preparatum, fumigating material)		348,480.00	
	Mineralogy-servicing + maintenance, consumables (paper, glassware, glue, acids)		77,440.00	
	Palaeontology-servicing + maintenance, consumables (e.g. chemicals, silicon, antifungicides, antibacterials, rubber for making copies, SEM prep chemicals)		135,520.00	
	Zoology-servicing + maintenance, consumables (boxes, glassware, insect pins chemicals, tanning materials, insect repellents, fumigating material, primers)		484,000.00	
	Library + info services-servicing + maintenance (telecoms + and reprographics), conservation consumables (e.g. archive paper) + utilities		290,400.00	
	<b>Total A</b>		<b>1,452,000.00</b>	
	<i>of which subcontracting (A')</i>			
	<b>B. Estimated personnel direct eligible costs needed to provide access within the project life-time</b>	<b>Category of staff</b>		<b>Person-Months</b>
Scientific		750	1,344,000.00	
Technician (Collection technicians, librarians, IT specialists)		750	552,000.00	
<b>Total B</b>			<b>1,896,000.00</b>	
C. Indirect eligible costs $\leq 7\% \times ([A-A'] + B)^{[1]}$		<b>max 234360</b>	234,360.00	
D. Total estimated access eligible costs = A+B+C			3,582,360.00	
E. Total estimated quantity of access provided to all normal users of the infrastructure (i.e. both internal and external) within the project life-time			15,000	
F. Fraction of the Unit cost to be charged to the project <sup>[2]</sup>			54.0%	
G. <b>Estimated Unit cost charged to the project = F x (D/E)</b>			<b>128.96</b>	
H. Quantity of access offered under the project (over the whole duration of the project)			613	
I. <b>Access Cost charged to the project <sup>[3][4]</sup> = G x H</b>			<b>79,052.48</b>	

<b>Participant number</b>	12	<b>Organisation short name</b>		HNHM	
<b>Short name of Infrastructure</b>	HU-TAF	<b>Installation number</b>	17	<b>Short name of Installation</b>	HU LAB
<b>Name of Installation</b>	DNA laboratory			<b>Unit of access</b>	DAY

<b>A. Estimated direct eligible costs of providing access within the project life-time excluding personnel costs</b>	Describe the direct eligible costs for providing access to the installation over the project life-time (e.g. maintenance, utilities, consumable costs). All contributions to capital investments of the infrastructure are not eligible .		<b>Eligible Costs (€)</b>	
	Total direct operating costs including maintenance, utilities and consumable costs (PCR kit, DNA extraction kit, PCR purification kit, sequencing kit, sequencing purification kit, chemicals for electrophoresis, chemicals for ABI genetic analyser; buffers, polymers)		196,000.00	
	<b>Total A</b>		<b>196,000.00</b>	
	<i>of which subcontracting (A')</i>			
	<b>B. Estimated personnel direct eligible costs needed to provide access within the project life-time</b>	<b>Category of staff</b>		<b>Person-Months</b>
Scientific		40	71,680.00	
Technician (DNA lab technician)		40	29,440.00	
<b>Total B</b>			<b>101,120.00</b>	
C. Indirect eligible costs $\leq 7\% \times ([A-A'] + B)^{[1]}$ <b>max 20798.4</b>			20,798.40	
D. Total estimated access eligible costs = A+B+C			317,918.40	
E. Total estimated quantity of access provided to all normal users of the infrastructure (i.e. both internal and external) within the project life-time			800	
F. Fraction of the Unit cost to be charged to the project <sup>[2]</sup>			80.0%	
G. <b>Estimated Unit cost charged to the project = F x (D/E)</b>			<b>317.92</b>	
H. Quantity of access offered under the project (over the whole duration of the project)			183	
I. <b>Access Cost charged to the project <sup>[3][4]</sup> = G x H</b>			<b>58,179.36</b>	

<b>Participant number</b>	13	<b>Organisation short name</b>		<b>RBINS</b>	
<b>Short name of Infrastructure</b>	BE-TAF	<b>Installation number</b>	18	<b>Short name of Installation</b>	RBINS
<b>Name of Installation</b>	Royal Belgian Institute of Natural Sciences			<b>Unit of access</b>	DAY

<b>A. Estimated direct eligible costs of providing access within the project life-time excluding personnel costs</b>	Describe the direct eligible costs for providing access to the installation over the project life-time (e.g. maintenance, utilities, consumable costs). All contributions to capital investments of the infrastructure are not eligible .		<b>Eligible Costs (€)</b>
	General operation costs		
	IT peripherals		264,193.64
	Consumables, alcohol, chemicals, small boxes, label, collection material etc.		2,225,112.83
	Energy		468,634.75
	Binocular, microscope, slides, plastic/wood boxes, including library		2,236,163.07
	<b>Total A</b>		<b>5,194,104.29</b>
	<i>of which subcontracting (A')</i>		<i>0.00</i>
<b>B. Estimated personnel direct eligible costs needed to provide access within the project life-time</b>	<b>Category of staff</b>	<b>Person-Months</b>	<b>Personnel Costs (€)</b>
	Scientific	1793	1,064,000.00
	Technicians supporting scientific staff in the collections	561	373,800.00
<b>Total B</b>		<b>1,437,800.00</b>	
C. Indirect eligible costs $\leq 7\% \times ([A-A'] + B)^{[1]}$		<b>max 464233.3003</b>	464,233.30
D. Total estimated access eligible costs = A+B+C			7,096,137.59
E. Total estimated quantity of access provided to all normal users of the infrastructure (i.e. both internal and external) within the project life-time			16,892
F. Fraction of the Unit cost to be charged to the project <sup>[2]</sup>			67.3%
G. <b>Estimated Unit cost charged to the project = F x (D/E)</b>			<b>282.51</b>
H. Quantity of access offered under the project (over the whole duration of the project)			394
I. <b>Access Cost charged to the project <sup>[3][4]</sup> = G x H</b>			<b>111,308.94</b>



<b>Participant number</b>	14	<b>Organisation short name</b>	MRAC		
<b>Short name of Infrastructure</b>	BE-TAF	<b>Installation number</b>	19	<b>Short name of Installation</b>	MRAC
<b>Name of Installation</b>	Royal Museum for Central Africa			<b>Unit of access</b>	DAY

<b>A. Estimated direct eligible costs of providing access within the project life-time excluding personnel costs</b>	Describe the direct eligible costs for providing access to the installation over the project life-time (e.g. maintenance, utilities, consumable costs). All contributions to capital investments of the infrastructure are not eligible .		<b>Eligible Costs (€)</b>
	Collection management:		
	Specific equipment		800,300.54
	Equipment		1,000,000.00
	Functioning		700,000.00
	Specific functioning		1,439,000.00
	<b>Total A</b>		<b>3,939,300.54</b>
	<i>of which subcontracting (A')</i>		<i>0.00</i>
<b>B. Estimated personnel direct eligible costs needed to provide access within the project life-time</b>	<b>Category of staff</b>	<b>Person-Months</b>	<b>Personnel Costs (€)</b>
	Scientific	660	840,000.00
	Technical (IT and Collection Management staff)	110	70,000.00
	<b>Total B</b>		<b>910,000.00</b>
C. Indirect eligible costs $\leq 7\% \times ([A-A'] + B)$ <sup>[1]</sup>		<b>max 339451.0378</b>	339,451.04
D. Total estimated access eligible costs = A+B+C			5,188,751.58
E. Total estimated quantity of access provided to all normal users of the infrastructure (i.e. both internal and external) within the project life-time			16,892
F. Fraction of the Unit cost to be charged to the project <sup>[2]</sup>			89.4%
G. <b>Estimated Unit cost charged to the project</b> = F x (D/E)			<b>274.71</b>
H. Quantity of access offered under the project (over the whole duration of the project)			319
<b>I. Access Cost charged to the project</b> <sup>[3][4]</sup> = G x H			<b>87,632.49</b>

<b>Participant number</b>	15	<b>Organisation short name</b>		NMP	
<b>Short name of Infrastructure</b>	CZ-TAF	<b>Installation number</b>	20	<b>Short name of Installation</b>	NHMP
<b>Name of Installation</b>	Collections & Laboratory			<b>Unit of access</b>	DAY

<b>A. Estimated direct eligible costs of providing access within the project life-time excluding personnel costs</b>	Describe the direct eligible costs for providing access to the installation over the project life-time (e.g. maintenance, utilities, consumable costs). All contributions to capital investments of the infrastructure are not eligible .		<b>Eligible Costs (€)</b>
	Running costs for maintenance lab utilities and consumables for SEM		1,300,000.00
	Optical microscopes with photo equipment: lab utilities and consumables		700,000.00
	Other (small) laboratory equipment: lab utilities and consumables		500,000.00
	Spattering equipment: lab utilities and consumables		800,000.00
	DNA Molecular Lab: lab utilities and consumables		800,000.00
	Ion microprobe CAMECA: lab utilities and consumables		2,000,000.00
	Curatorial supplies (e.g. storage units and mounting materials)		3,200,000.00
	Service of maintaining existing equipment		200,000.00
	<b>Total A</b>		<b>9,500,000.00</b>
<i>of which subcontracting (A')</i>		<i>200,000.00</i>	
<b>B. Estimated personnel direct eligible costs needed to provide access within the project life-time</b>	<b>Category of staff</b>	<b>Person-Months</b>	<b>Personnel Costs (€)</b>
	Technical and support staff: providing preparation of collections, laboratory work, documentation and analysis using special techniques (SEM, DNA laboratory, digital microscopy, 3D scanner, x-ray etc.)	108	131,220.00
	Scientific staff	324	524,880.00
	<b>Total B</b>		<b>656,100.00</b>
C. Indirect eligible costs $\leq 7\% \times ([A-A'] + B)$ <sup>[1]</sup>		<b>max 696927</b>	696,927.00
D. Total estimated access eligible costs = A+B+C			10,853,027.00
E. Total estimated quantity of access provided to all normal users of the infrastructure (i.e. both internal and external) within the project life-time			40,000
F. Fraction of the Unit cost to be charged to the project <sup>[2]</sup>			80.0%
G. <b>Estimated Unit cost charged to the project</b> = F x (D/E)			<b>217.06</b>
H. Quantity of access offered under the project (over the whole duration of the project)			561
I. <b>Access Cost charged to the project</b> <sup>[3][4]</sup> = G x H			<b>121,770.66</b>

## B3 Impact

### B3.1 Strategic impact

#### How is SYNTHESYS3 operating at a European rather than a national level?

The NH collections held within the museums and herbaria of Europe are world-class in terms of their magnitude and geographic, temporal and taxonomic coverage. Because of the long history of NH science in Europe, the NH institutions represented by SYNTHESYS3 hold a disproportionately large fraction of the type specimens, thus making them of critical importance to the global research community. The international, cross-boundary nature of the collections means that innovative research can only be undertaken using the set as an integrated whole; digital integration and strategic standard-setting accomplished by NAs and JRA will allow this whole to be used on a European and global level.

NH collections represent a resource unique in Europe as a model of the diversity of life and minerals on Earth and are an irreplaceable physical dataset enabling Users to research, for example, how human activity (including climate change) is having an increasingly negative impact on the diversity and distribution of biodiversity, which is threatening the continued provision of ecosystem services essential to human well-being. They provide baseline data with which the research community addresses global challenges such as food security, biodiversity loss and raw materials.

All twelve of the Beneficiary nations are signatories to the UN Convention on Biological Diversity (CBD), as is the European Commission itself. Signatories have an obligation to share data originating from their NH collections, and in particular, with the countries from which these items originate. The Consortium therefore operates at a European rather than national level as responsibility is shared by all and the highly complementary geographic coverage of the holdings makes collaboration an absolute necessity. Data sharing and dissemination as implemented through the activities of SYNTHESYS3 NAs and JRA will be important for achieving the CBD's Aichi Biodiversity Targets and individual National Biodiversity Strategies and Action Plans (NBSAPs, <http://www.cbd.int/nbsap/>).

Digitally available data produced via the JRA will add value to modelling work on species distributions and the development of new hypotheses concerned with change in biodiversity over time and with human impact. The outputs of such work inform national and regional Biodiversity Action Planning activity including the establishment of protected areas and other conservation activities. New standards set for the provision of digital data will establish European leadership in this rapidly moving field.

These global and national priorities give SYNTHESYS3 a powerful mandate to digitise, network and disseminate collections information for the benefit of both the European and global research communities. The JRA, in conjunction with the NAs, is striving to make this a reality through the provision of tools maximising the amount and accessibility of data made available digitally. Through SYNTHESYS3 the global User community will have far greater access to a critical mass of relevant NH specimen records incorporating the maximum amount of verified information

The crowdsourcing activities will contribute to the establishment of a European public engaged in science directly through individual participation. By integrating this activity Europe-wide, SYNTHESYS3 will foster public engagement across Europe, rather than limiting it to national level activities. An informed and participatory European citizenry will better be able to influence and contribute to environmental initiatives across Europe in the future.

#### How will operators of infrastructures develop synergies and complementary capabilities in such a way as to offer an improved access to researchers and to develop their innovation potential?

SYNTHESYS3 is a distributed infrastructure and complementarity of the physical collections is synergistic making the integrated total more effective than the sum of the parts. Provision of *virtual*

*collections* will enhance this synergy by allowing European NH institutions to undertake gap analysis and increase data provision to a global community. Joint strategic planning and horizon scanning by Beneficiaries as part of NA2 and NA3 will enhance complementary collections development in Europe.

By focusing the JRA on increasing the amount of, and access to, *virtual collections*, SYNTHESYS3 will, in the mid-term, increase the opportunities for those Users unable to make a personal visit to the physical collections to exploit the resource represented by European NH collections comprising over 340 million specimens. Digital objects are not always a substitute for the physical objects, but through JRA work on DoD and NA3 work on new methods of visualisation, new protocols will be established to implement workflows to facilitate better access even for these specimens.

Through working with industrial partners in the JRA, SYNTHESYS3 will be scoping the future needs for digitisation tools and thus contribute to the development of new tools for use not just by NH collections but also by other cultural operators, including art galleries, libraries and archives striving to reach a broader online audience for both peer-to-peer scientific work and the public at large.

The JRA will provide the tools for not only increasing the number of *virtual collections* but also for making the data associated with these collections sufficiently detailed to allow their use in innovative research. Use of digital data inspires virtual collaborative working; tools developed in SYNTHESYS3 will be critical for the emergence of virtual research communities both in Europe and globally using European material.

The work of the JRA will be leveraged via NA2 to create best practice with respect to collections management of emerging types of data associated with NH collections within both European and global NH collections communities. Presentations at national, regional and international conferences, such as SPNHC, CPB, CETAF and LifeWatch, will disseminate SYNTHESYS3 results to global audiences. Use of social media both by scientists and the public participating in the JRA crowdsourcing activities will promulgate best practice to new communities.

NA3 will ensure the *virtual collections* are available via Open Access portals such as Europeana and GBIF and promote their existence to the broad User community in order to stimulate new innovative research on the NH collections held in SYNTHESYS3 Beneficiaries' institutions.

In addition to the *virtual collections*, NA2 will also focus on improving the management and accessibility of *new physical collections*, including DNA, RNA and tissue. These *new physical collections* are in their infancy and currently used only by researchers working in their home institutions. Their potential for use by the broader User community is considerable, but requires the networking of facilities. For example, geneticists interested in accessing the DNA, RNA and expressed proteins held within NH collections will have far greater access to this resource as a result of SYNTHESYS3 activities networking Molecular Collections Facilities. Through networks established in NA2, the assets and services associated with these *new physical collections* will be more easily and efficiently accessed by the research community, and the common provision of protocols for extraction in NA2 will promote innovation and avoid duplication of effort.

The collections assessments that were undertaken during the previous SYNTHESYS project proved very successful in improving collection management within Europe. Hence, there is a high degree of confidence that the expanded CSAT be delivered by NA2 with extra elements covering both *virtual* and *new physical collections*, including additional benchmarks, will add further value. CSAT will be promoted to further improve management of collections internationally. Synergies will arise through institutions working towards the CSAT benchmarks.

### **How does SYNTHESYS3 take account of international research activities?**

Physical Users of the collections (via TA) will address global research issues related to the collections. The UN's Convention on Biological Diversity is supported by the FP7 Cooperation Work Programme 2012: Environment (including climate change). For example, [ENV.2012.6.2-2 Assessing global biological resources: the European contribution to the Global Earth Observation Biodiversity Observation Network10 \(GEO BON\)](#) *WHERE* there is specific reference to the need for:

*“Comprehensive and standardized biodiversity datasets, biological knowledge and filling out of taxonomic gaps at different scales using remotely-sensed, in-situ and collection based observations will be delivered”.*

It is the taxonomic User community that will be providing important data points that establish knowledge on species diversity and global distribution across all ecosystems. These data will contribute to the increased robustness of subsequent models for predicting the biological impact of climate change and other environmental perturbations.

TAF Beneficiaries have specialists in all groups of soil organisms (micro-organisms, fungi, arthropods and other invertebrates) and via hosting Users will contribute to soil biodiversity research, which has been identified as issue in the Thematic Strategy for Soil Protection COM(20006)321final which states in 4.2.1:

*“Not enough is known about soil biodiversity. This will be addressed in the Seventh Framework Programme with a view to gaining better understanding of the function of biodiversity as an environmental service.”*

In addition, SYNTHESYS3 will be able to help deliver the European Platform for Biodiversity Research Strategy 2010-2020 by supporting the assertion that:

*“New methods and tools in taxonomic, genetic and molecular research, new modelling approaches, improved data collection techniques and new infrastructure relying on innovative e-technology have boosted the ability of basic research to contribute to this area.”*

The Millennium Ecosystem Assessment (MEA) Synthesis Reports ([www.millenniumassessment.org](http://www.millenniumassessment.org)) explicitly makes the link between biodiversity and sustainable provision of ecosystem services necessary for continued human well-being. Improving our understanding of marine, freshwater and terrestrial ecosystem functioning is urgent and is dependent on the provision of quality-assured taxonomic data on living organisms and their changing distributions. The MEA's Biodiversity Synthesis Report specifically highlighted the need for taxonomic knowledge on a wide variety of organisms; this knowledge can only be generated efficiently with the contribution of data derived from NH collections.

Food security policy development is, in part, dependent upon taxonomists working alongside climate change modellers when mapping the predictive spread of agricultural pests, especially invasive alien species. The complex nature of crops and their wild relatives is underpinned by knowledge of species distributions through time; new research in mapping the current availability of germplasm resources against known wild relative distribution suffers from lack of high-quality digital datasets of objects held in NH institutions. SYNTHESYS3 will materially add to the baseline data usable by those concerned with food security by not only providing new *virtual collections*, but by linking the data from these and *new physical collections* in open networks.

The work of SYNTHESYS3 will add value via data provision to other instruments including, but not limited to, the EU Habitats Directive, the Global Strategy for Plant Conservation and the EU Water Framework Directive.

SYNTHESYS3 will deliver new and improved baseline biodiversity data via TA, working with expert Hosts to generate and add value to existing collections objects. These new data will then be made available to the broader User community via the JRA and NA3. New skills acquired by Users as part of TAF visits are an integral part of improving the research capability of both European researchers and their wider international collaborators; the broadening of the User community in SYNTHESYS3 will increase the reach of these new skill sets.

SYNTHESYS3 Users are also addressing the geological research agenda. In its communication of 2 February 2011 the Commission proposed a new integrated strategy which outlines actions in the area of non-energy, non-agricultural raw materials it further pursues and reinforces the 3 pillar-based approach of the Raw Materials Initiative, <http://ec.europa.eu/enterprise/policies/raw-materials>

The tangible contribution that our User community can make using geological data from NH institutions and collections is in predicting with greater reliability where new (or alternative) mineral deposits may be found, building on the wealth of knowledge currently not digitally accessible regarding the distribution of minerals across the world. A case in point is the urgent need to appreciate the distribution and accessibility of rare earth elements required in increasing quantities by modern technological products in for example the electronics industry.

Many marine/freshwater/terrestrial invertebrates and micro-organisms pose a serious challenge for morphological taxonomic studies and hence researchers are increasingly turning to molecular studies. This transition has been aided by the dramatic reduction in DNA and RNA sequencing costs and the newly available tools for extracting useable DNA/RNA from both fresh and stored specimens. Many NH institutions are now acquiring or already have access to Next Generation sequencing (NGS) tools. Beneficiaries in NA2 will be ensuring institutions receive all data for subsequent Users.

High resolution film/video sequences of some organisms are used as type specimens for entities that cannot be preserved in a conventional manner, however digital preservation is possible. For many of these organisms mode of movement is used as the key identifying characteristic, for example, the ciliates that are vital component of water treatment works are currently identified by their swimming patterns. Strategies developed by SYNTHESYS3 NAs will ensure these digital objects will be curated as integral elements of NH collections and thus not lost to future researchers.

SYNTHESYS3 is mindful that it can learn from and contribute to the activities of existing networks. In particular for NA2 will work with ISBER and its recently established chapter ESBB which is primarily focused on human resources and thus aimed at the medical research community. Though policies and best practice procedures for the management of molecular collections have been developed by ISBER many problems are particular to NH institutions. Current focus in NH institutions is on storing DNA, but the lesson learned from environmental genebanks points at a much wider and increasing use of genome-quality tissue samples, not merely the extracted molecules. The European DNA Bank Network ([www.dnabank-network.org](http://www.dnabank-network.org)) with its high quality of online documentation, including, the place of voucher deposits, information about DNA quality, digital images of vouchers, and links to where published molecular data available, may act as a model for a wider European and ultimately global network for the benefit of many areas of biology and biotechnology; this will be explored as part of NA2.

The US National Science Foundation's ADBC Initiative (est. 2010) is designed to promote the use of infrastructure to advance science and to promote cyberinfrastructural development for US collections. The ADBC is organised around Thematic Collections Networks (TCNs) whose work is coordinated by a central hub, iDigBio. Emphasis in ADBC is on digitising collections around a scientific theme (e.g. climate change), rather than integrating standards and protocols across a network, thus the work of SYNTHESYS3 is highly complementary to that being undertaken across the TCNs. SYNTHESYS3 and ADBC add value to one another, and will together enable global integration of NH collections. Themes addressed by the groups in the TCNs depend upon collections held in European NH institutions, and new *virtual collections* generated by SYNTHESYS3 will become part of these efforts. *NHMMT* will actively coordinate with this initiative through the *SAB* to ensure complementarity and that project outputs remain innovative and cutting edge.

### **How will SYNTHESYS3 have a structuring effect on the way infrastructures operate, evolve and interact with similar facilities and with their Users?**

SYNTHESYS3 will have a structuring effect on the ERA by supporting the delivery of a European resource through the creation an accessible, integrated infrastructure for researchers in the natural history sciences (biology and geology) in Europe and globally. A range of new services will be provided to a broad range of scientific Users (from biological and geological related disciplines, including beyond taxonomy) in a consistent and more easily accessible way. The outputs to be developed and disseminated will give Users the chance to pursue new avenues of independent and innovative research at the leading edge of biodiversity and environmental research.



SYNTHEYS3 draws together the most important NH collections in Europe and as there is one single operating system for the delivery of TA, established in SYNTHEYS1&2, a structuring effect has already been partly achieved.

TA will operate across the NH collections-holding Beneficiaries, on a unified platform, using one common online application and USP evaluation process. This will provide Users the opportunity to apply simultaneously for TA at more than one installation and to stage the visits sequentially in order to complete important taxonomic revisionary studies with increased efficiency. This is required as many type specimens cannot be loaned (e.g. mammals and birds due to CITES conventions) and they are widely distributed around Europe; ability for a researcher to justify multiple visits will not only help them, but will aid the TAFs visited by up-to-date annotation and identification of specimens.

The impact of the TA will be measurable by the number of Users accessing the installations via SYNTHEYS3 and by the resultant publications which will be profiled on [www.SYNTHEYS.info](http://www.SYNTHEYS.info). TA Users will also have a direct input into optimising TA for future Users as their completed User Feedback questionnaires will be used by the ASG to highlight any weaknesses within TAFs. This information will be used to implement changes to the TA provision.

Many Users will learn new skills during the TAF visit which will be transferred to their home institutions. All this will lead to an increase in the quality and quantity of European collections-based research. This positive effect is self-reinforcing, since Users having access to the collections will increase the quality of the collections, e.g. by identifying previously unidentified specimens, updating nomenclature. Furthermore, Users will create new information which will be incorporated in the collections databases. Thus, increased use of these assets will lead to enhanced value in the collections.

One of the main drivers of NA2 is promote best practice and standards in collections management across Europe so Users receive a similar high level of support at each infrastructure. NA2 deliverables will give collections managers the tools to assess and benchmark the quality of their own collections management and User access provision. Advice will be provided on how to mitigate against weaknesses via EU-CoM, thus, delivering the required synergies and complementary capabilities.

NA2 will achieve a future structuring effect through working with the Biological Resources Centres to establish a network of DNA and tissue banks in Europe that will include NH institutions. Working alongside our IBOL representative on the SAB, SYNTHEYS3 will create a common strategy for prioritising the DNA-barcoding of NH collections in Europe and will encourage the use of networked DNA libraries as a viable way of ensuring continued access to DNA from NH institutions. Through the CPB, national NH networks and via conference presentations, SYNTHEYS3 will recruit new institutions outside of the SYNTHEYS3 Consortium to adopt these strategies. To avoid duplication of effort advice is being sought from existing seed and germplasm banks and groups such as ESBB that have dealt with common management aspects of these sorts of networks.

The JRA will lead to an increase in the amount of *virtual collections* available and work in NA3 with 3D imaging technologies will ensure the level of detail (resolution, colour, texture, etc) is of sufficient quality to allow them to be used for innovative research in a wide variety of fields, not only for taxonomic purposes. This expansion of the infrastructure into the digital domain will increase the number of Users who can utilise the collections, thereby increasing the research output. It will also allow for research on collections without the need for physical access to the infrastructure.

Complementary and value-added interaction with the NSF's ADBC initiative will facilitate impact on how similar structures in the United States evolve and interact both with each other and with European NH institutions. Standards set as part of NA2 will coordinate institutional involvement with ADBC TCNs, and the value added by the two complementary activities will channel the evolution of NH institutions in the future.

The activities of SYNTHEYS3 will significantly increase the quality of Beneficiaries' collections: collection management standards will be elevated, electronic data capture and processing will be enhanced, and as a result, TA to the collections will be much enhanced and improved.

## Assumptions

There is growing demand from the broad biological and geological science community for access to unique European collections of SYNTHESYS3. Our experience with SYNTHESYS1&2 indicates that there is still substantial demand, and that it is not decreasing. With the increased focus on climate change, food security and geo- and biodiversity studies – to support policy development and international legislation – we expect the value of the resource the collections represent to be more widely recognised and that demand for access to grow, since they act a repository of extinct as well as living species, and as a model of the changing distribution of geo- and biodiversity on our planet.

Thanks to the current rate of technological innovation in the digitisation arena and the reducing costs for high specification equipment, it is anticipated that through the life of SYNTHESYS3 more data storage and an increasing number of NH institutions will be able to upgrade their existing scanning facilities. The speed of technological advancement in this domain and the breadth of expertise in SYNTHESYS3 Beneficiaries will make the aim of delivery of *virtual collections* achievable within the mid-term of SYNTHESYS3 possible where 10 years ago it would have been a distant aspiration.

## B3.2 Spreading excellence, exploiting results, disseminating knowledge

The *SYNTHESYS Coordinator* will be responsible for ensuring that the overall success of SYNTHESYS3 is fully disseminated and will oversee the management of the intellectual property (IP). He will be supported by the *NHMMT* and NA3.

### Mechanisms for Communication

In the event of major findings of public interest from any aspect of SYNTHESYS3 the Press Offices of the relevant Beneficiaries will be contacted and publicity sought to foster public engagement with the science resulting from SYNTHESYS3.

Unlike many other infrastructures, NH institutions already have a huge visitor audience. For example, the coordinating Beneficiary public offer includes direct access to the researchers and their work via the Darwin Centre which provides daily events. These include popular Nature Live talks which take place in the Attenborough Studio about all aspects of life on Earth, the physical structure of the solar system and scientific discovery.

17 of the 18 SYNTHESYS3 Beneficiaries are able to offer a forum for engagement with the public and media reaching in total over 12 million physical visitors per annum. The only exception is the SME (VIZZ) whose outputs are currently focused at the research community rather than the general public.

In the last three years the coordinating Beneficiary has hosted highly successful Researchers Night events <http://ec.europa.eu/research/researchersnight/>. It is planned that similar events will run during the tenure of SYNTHESYS3 and will be used as an additional route to portray a positive image of science as a career (especially for women) and changing the perceptions of research and the outputs of research. This is a powerful tool for reaching out to both the media and to the public at large

Furthermore, the crowdsourcing pilot study in NA3 will lead to a deeper, more focussed public engagement with NH institutions. The crowdsourcing Beneficiaries will be leveraged from both scientific peers and the public, as appropriate for the required tasks. SYNTHESYS3 can tap into its extensive database of over 2,000 individuals who have engaged with the TA component of the programme since its outset. They include the applicants for TA themselves, plus the researchers who have provided references for those applicants and Beneficiaries in the USPs. As the NH institutions already have an increasing scientifically literate public following, which is growing significantly each year, Beneficiaries are delivering via social media including Facebook and Twitter. SYNTHESYS3 will be able to harness these pre-existing followers and use a promotional campaign and recruit additional followers.



The SAB will be used to leverage contacts into the international policy arena and special interest groups. The members collectively represent key bodies including the European Environment Agency, SPNHC, GBIF, IBOL all of whom are either important stakeholders in the collections management or Users of research and data generated by NH institutions.

### **IP Management**

IP issues will be considered as a standing item on the agenda of the AGM; actions raised will subsequently be brought to the *NHMMT* for action by the *SYNTHESYS3 Coordinator* (who chairs both fora). The *NHMMT* will, in consultation with the EC Desk Officer, re-purpose project budgets to facilitate the exploitation of IP. Beneficiary 1 contracts the well-established legal company, Farrer & Co. to represent its interests in IP exploitation. As required, Farrer & Co. will be sub-contracted to provide advice to the originators of any exploitable IP.

The Consortium Agreement will specify protocols for dealing with ownership, protection, use and access rights to Beneficiaries' *Foreground*. The *modus operandi* for IP exploitation will be ratified at the first General Meeting.

The anticipated source of any new, potential commercially-exploitable know-how will come from the JRA. In order to ensure that the JRA will remain innovative and relevant to the broader User community, the SAB will review progress and recommend changes to the work plan as required.

### **Dissemination of freely available NA and JRA project results**

IP resulting from the two technical NAs and the JRA will be developed on an Open Access basis; documentation and software will be freely available to Users and licensed through the Creative Commons. While outputs are in their developmental stages they will be partially restricted within SYNTHESYS3, and will be made available via the following routes to Users on completion.

High impact journals: Most JRA deliverables will be published in the scientific literature to encourage adoption by collections/laboratory managers, in addition to future Users of DNA and other molecular data from *new physical collections*.

Best practice awareness: There will be several meetings in NA2 and NA3 that will promote the uptake of best practise in collections management. One of these will focus on how to utilise the deliverables of the five JRAs from the previous SYNTHESYS project, and how these new techniques for DNA extraction can be used to prioritise future DNA library development. NA2 and NA3 will deliver best practice guidance and lobby for community-wide uptake of standards in Europe and globally via CETAF, SPNHC and other collection management fora.

Cooperation will be sought from NH institutions in Third Countries in developing best practice and standards for collection management and access on a global basis. Beneficiaries have good links with international networks and will promote the results via projects and agencies. Collaboration with portals such as GBIF and Europeana will ensure data reach the widest possible audiences.

Web-based publication: All project outputs will be published on the SYNTHESYS3 Web site ([www.synthesys.info](http://www.synthesys.info)) upon completion. The NA2 CSAT will be available to use by any institution, along with clear guidelines on how to complete an assessment. The SYNTHESYS3 website will be actively promoted to European and global researchers and access to the site will be monitored. This will enable *NHMMT* to target publicity at any relevant sectors found not be using the site.

Additionally, SYNTHESYS3 will make its outputs available on web interfaces that will exist beyond the life of SYNTHESYS. For example, collection management policy information will be made available on EU-CoM and the new *virtual collections* that are generated as a result of improved digitisation methodologies created in the JRA will be made available via the GBIF and Europeana data portals.

Email communication: SYNTHESYS3 has a database of more than 2,000 contacts who have expressed an interest in the work of SYNTHESYS. These individuals will be informed of the results of the NAs and JRAs as they are completed.

Conferences: Beneficiaries will present their outputs at relevant conferences, such as TDWG and SPNHC annual conference or national collection management events. SYNTHESYS3 will also host its own workshop (e.g. on DNA library creation) as a means of dissemination.

Technology Transfer: By working with our industrial partner we will ensure that any near market innovations have a route to adoption. In the event that our SME is not in a position to exploit the know-how directly we will work with our solicitors to protect the IP and then work with the industrial representative on the SAB to advise on potential routes to market.

### **Dissemination of TA project results**

TA Users are given access to SYNTHESYS3 as a direct result of their own personal research proposals. Hence, any new discovery made will be owned by the TA User and not by SYNTHESYS3 Beneficiaries. A situation could arise where the Host is also a collaborator in the TA User's research and hence will have shared rights on the IP. When a TA User accesses the collections the *TAF Leader* will require the TA User and Host to sign a joint declaration which outlines the conditions under which access is given that corresponds with the EU's Grant Agreement, the statutory requirements under the operating Law of the TAF, restrictions on use of biological material that result from the UN Convention on Biological Diversity and the SYNTHESYS3 IP exploitation policy which will be developed by the *NHMMT* in consultation with the Consortium at the GM and legal support.

All TA Users are actively supported by their Hosts and *TAF Leaders* to produce scientific papers and other outputs (e.g. conference posters, publicly-available databases, and training materials) after their visits have concluded. A critical part of the application evaluation by the USP is to consider the quality and the impact of the research being performed along with the plans for result publication. SYNTHESYS2 developed an online tool for collecting all outputs details; Users are reminded annually to update the information online. Subsequently the updated listing of all publications is posted onto the public-facing side of the SYNTHESYS3 Website. All Users will be encouraged to give seminar presentations of their work whilst at the TAF of their visit.

All scientific papers (and other outputs) will acknowledge financial contributions made to support the research by the European Commission via a standardised acknowledgement format available on the SYNTHESYS3 website.

## **B4 Ethical**

The proposed work of SYNTHESYS3 does not raise any sensitive ethical questions related to human beings, human biological samples, personal data (whether identified by name or not), genetic information, and animals. However, if they do arise in the course of the studies any institutional or national guidelines will be applied where appropriate.

## **B5 Gender aspects**

SYNTHESYS3 will promote gender equality and actively encourage the participation of women in line with Article 2 and 3 of the Treaty on European Union. SYNTHESYS1&2 have actively promoted gender equality by encouraging women scientists within the participation, evaluation, consultation and implementation of the project; these practices will be perpetuated.

SYNTHESYS3 will strive to further improve on the User applications (35% female in SYNTHESYS2) rate by encouraging greater female participation mentoring of younger women Users by Hosts. Conversely, female Hosts for younger male Users will also be encouraged in order to further develop a gender equal culture in SYNTHESYS3-enabled science. Where appropriate, specific consideration will

be given by *TAF Leaders* and Hosts to pastoral needs when planning User visits (i.e. timing visit to allow delays in visits for maternity leave). The *ASG* will also be required to report to the *SYNTHESYS3 Coordinator* the gender split in all TAF applications and Users.

Women are well represented in the SYNTHESYS3 project management. Half of the *NHMMT* and 43% of the WP Leaders and deputies are females. Women are also prevalent in the technical delivery of the WPs. This is all evidence of our gender-neutral position. The choice of Beneficiaries was made on merit and not gender.

When the advertisements for any positions are announced it will be made clear that all SYNTHESYS3 institutions are equal opportunities employers. SYNTHESYS3 will not to discriminate in any way in its recruitment procedures; this will contribute to a positive gender balance in both the project and in the community at large.

It is our aim to further ascertain that equal opportunities are maintained in all SYNTHESYS3 activities and that scientists of both genders are treated fairly. We will assure that all members of every team receive the necessary support to balance career and life, particularly for e.g. researchers with young families.

## Glossary of Acronyms

<b>AA</b>	Administration Assistant
<b>AGM</b>	Annual General Meeting
<b>ASG</b>	Access Steering Group
<b>BioCASE</b>	Biological Collection Access Service for Europe. <a href="http://www.biocase.org">www.biocase.org</a>
<b>CBD</b>	Convention on Biological Diversity. <a href="http://www.cbd.int">www.cbd.int</a>
<b>CETAF</b>	Consortium of Taxonomic Access Facilities. <a href="http://www.cetaf.org">www.cetaf.org</a>
<b>CM</b>	collections management
<b>CPB</b>	Collections Policy Board
<b>CSAT</b>	Collections Self-Assessment Tool
<b>DoD</b>	Digitisation on demand
<b>EDIT</b>	The European Distributed Institute of Taxonomy. <a href="http://www.e-taxonomy.eu">www.e-taxonomy.eu</a>
<b>ENHSIN</b>	ENHSIN is a Thematic Network (EU funded) Improving Human Potential Programme.
<b>ESBB</b>	European, middle eastern and African Society for Biopreserving and Biobanking. <a href="http://www.esbb.org">www.esbb.org</a>
<b>GBIF</b>	Biodiversity Information Facility. <a href="http://www.gbif.org">www.gbif.org</a>
<b>IBOL</b>	International Barcode of Life project. <a href="http://www.ibol.org">www.ibol.org</a>
<b>ISBER</b>	International Society for Biological and Environmental Repositories. <a href="http://www.isber.org">www.isber.org</a>
<b>IP</b>	Intellectual Property
<b>JRA</b>	Joint Research Activity
<b>MEA</b>	Millennium Ecosystem Assessment. <a href="http://www.maweb.org">www.maweb.org</a>
<b>NA</b>	Network Activity
<b>NH</b>	Natural history
<b>NHMMT</b>	NHM Management Team
<b>NRSB</b>	Network & Research Steering Group
<b>NoE</b>	Network of Excellence
<b>OCR</b>	Optical character recognition
<b>PM</b>	Person Month
<b>SAB</b>	Scientific Advisory Board
<b>SAL</b>	SYNTHESYS Access Leader
<b>SPNCH</b>	Society for the Preservation of Natural History Collections. <a href="http://www.spnhc.org">www.spnhc.org</a>
<b>TA</b>	Transnational Access
<b>TAF</b>	Transnational Access Facilities
<b>TDWG</b>	Taxonomic Database Working Group. <a href="http://www.tdwg.org">www.tdwg.org</a>
<b>UD</b>	User Day – unit of TA. Relates to one working day (Monday to Friday, institutional work hours)
<b>USP</b>	User Selection Panel – the group of researchers who assess TAF applications.