

## **Appendix 2.** Methodology for the review of exploratory scenarios.

Appendix 2 outlines the steps of the formal review of future exploratory scenarios for Europe and Central Asia. The formal review was conducted using the Scopus database (<https://www.scopus.com>) and focused on studies published in peer-reviewed research journals before May 2017. The formal review was supported by an informal review of grey literature using the knowledge of the author team and the suggestions of external reviewers during the IPBES review process.

Step 1: The initial search applied combinations of keywords as listed in Table A2.1. We used the boolean operator ‘AND’ to combine the different queries. The terms [country] and [region] were replaced by the names of countries and regions in the geographic scope of the review (see Appendix #1).

Step 2: In addition, several targeted searches were conducted to identify further scenarios to fill the data gaps which became obvious after the initial search. The gaps and respective search terms are listed in Table A2.2.

Step 3: The studies obtained by the systematic and targeted searches were limited according to the following criteria:

- Relation to biodiversity and ecosystems (thus, e.g. studies addressing the effect of climate change on precipitation levels/river discharge/water levels, production of specific crop or scenario analyses related to energy were not included);
- Time span from 2005 to May 2017;
- Addressing two and more drivers (since the focus of the review was on driver interactions);
- National, sub-regional or regional coverage;
- Semi-quantified or quantified trends in drivers (purely qualitative narratives excluded).

Step 4: A total of 436 scenarios in 143 studies from both the formal and informal reviews met the review criteria and were assessed, out of which 252 scenarios were unique. The scenarios were screened for future trends in direct and indirect drivers of biodiversity and ecosystem services change and their interactions (Table A2.3).

Table A2.1: Search terms used for the literature review.

Keywords	Motivation
scenario AND ([country] OR [region])	General scenarios focusing on biodiversity and ecosystem services change
analysis ecosystem ecological biodiversity  economic GDP socioeconomic scenario demographic population urbanization technology governance meat consumption diet	Indirect-driver specific scenarios
invasive species biological control climate greenhouse gas emissions land use land change deforestation restoration LUC AFOLU fisheries resource exploitation acidification pollution fertilizer phosphorus nitrogen	Direct-driver specific scenarios

Table A2.2: Search terms used for the targeted searches.

Query	Keywords	Motivation
1	scenario AND (river OR basin OR watershed OR catchment) AND (Volga OR Danube OR Ural OR Dnieper OR Don OR Pechora OR Kama OR Dvina OR Vychegda OR Oka OR Belaya OR Dniester OR Rhine OR Elbe OR Donets OR Vistula OR Tagus OR Daugava OR Loire)	Freshwater-ecosystem related scenarios: Scenarios related to major European and Central Asian rivers (>1000 km) and their catchments
2	scenario AND (lake OR basin OR catchment OR watershed) AND (Ladoga OR Onega OR Saimaa OR Vänern OR Kuybyshev OR Rybinsk OR Tsimlyansk OR Kremenchuk OR Kakhovka OR Vättern OR Kamsk OR Kallavesi OR Saratov OR Limfjorden OR Päijänne OR Inari OR Vygozero OR Gorky OR Nasijarvi OR Mälaren OR Imandra OR Pielinen OR Sevan OR Topozero OR Votkin OR IJsselmeer OR Beloye OR Oulujarvi OR Hornavan OR Caspian OR Balkhash OR Issyk-Kul OR Sarygamysh OR Tengiz OR Zaysan OR Aral OR Alakol OR Kaptchagay)	Freshwater-ecosystem related scenarios: Scenarios related to major European and Central Asian lakes (>1000 km <sup>2</sup> ) and their catchments
3	Due to language constraints, this gap was addressed by an informal review of grey literature using the knowledge of the author team	Exploratory scenarios for Eastern Europe and Central Asia
4	scenario AND ([scenario name] or [scenario family])  Scenario families and names: ALARM GRAS: 'growth applied strategy' BAMBU: 'business-as-might-be-usual' SEDG: 'sustainable European development goal' BIOSCENE Business as Usual Liberalization Managed Change for Biodiversity Wilding/Natural Processes	Large-scale multi-driver scenarios: Multi-driver scenario families developed within international research initiatives, assessments and large-scale interdisciplinary projects.

Query	Keywords	Motivation
	CLIMSAVE	
	We are the world	
	Icarus	
	Riders on the storm	
	Should I stay or should I go	
	EURURALIS:	
	Global Economy	
	Global Co-operation	
	Continental Market	
	Regional Communities	
	MA	
	Global Orchestration	
	Order from Strength	
	Adapting Mosaic	
	TechnoGarden	
	SCALER:	
	1A	
	1B	
	2A	
	2B	
	SCENES:	
	Economy First	
	Policy Rules	
	Fortress Europe	
	Sustainability Eventually	
	SSP (Shared Socioeconomic Pathways)	
	SSP1 – SSP5 †	
	UK National Ecosystem Assessment (UK NEA)	
	Green and Pleasant Land	
	Nature @Work	
	World Markets	
	National Security	
	Local Stewardship	
	Go with the Flow	
	SRES (Special Report on Emissions Scenarios)	
	A1 (A1F1, A1B, A1T)	
	A2	
	B1	
	B2	

† SSP consistent RCPs were included in the review, however, the primary focus was on the socio-economic scenarios.

Table A2.3: Information extracted from the selected studies for each scenario.

Database field	Details
Descriptive characteristics of scenarios	<p>Stakeholders involvement in the scenario building process (0/1)</p> <p>Notion of values explicitly addressed in the scenario (0/1)</p> <p>Biodiversity explicitly addressed in the scenario (0/1)</p> <p>Time horizon</p> <p>Region or country</p> <p>Ecosystem domain addressed (e.g. forests, grasslands, marine)</p> <p>Activity sector addressed (e.g. agriculture, forestry)</p>
Drivers addressed in the scenario and their respective trends	<p>Demographic (e.g. population growth, urbanisation)</p> <p>Economic (e.g. Gross Domestic Product)</p> <p>Cultural (e.g. diet type, intensity of material consumption, attitude towards environmental issues)</p> <p>Technological (e.g. rate of innovation, agricultural productivity, irrigation efficiency)</p> <p>Institutional (e.g. level of international cooperation, efficiency of institutions, management strategies )</p> <p>Climate change (e.g. radiative forcing, temperature, greenhouse gas emissions)</p> <p>Land use/land cover change (e.g. rate of land cover change, land homogenisation, deforestation, land use intensification)</p> <p>Natural resource use (e.g. rate of exploitation, water extraction, energy use)</p> <p>Pollution (e.g. nutrient emissions)</p> <p>Invasive species (e.g. rate of dispersion)</p>