

Appendix 1

Table A1.1: Actors' list of the case study Basel

N°	Acronym	Actor's name	Actor type	Nationality
1	ADMLoerr	District administration of the city of Lörrach	Regional political actor	G
2	AIBBL	Cantonal Office for Industrial Companies, Basel Landschaft	Regional political actor	CH
3	ALSACENAT	Alsace Nature	Environmental NGO	F
4	APRONA	Association for the protection of the groundwater of the Alsatian plain	Environmental NGO	F
5	AQUAEXP	Union of Laboratories of Swiss Drinking Water Provider	Scientific institution	CH
6	AQUAVIV	Prevention of Water Pollution Northwest Switzerland	Environmental NGO	CH
7	AUEBL	Cantonal Office for Environmental Protection and Energy, Basel Landschaft	Regional political actor	CH
8	AUEBS	Cantonal Office for the Environment and Energy, Basel Stadt	Regional political actor	CH
9	AWBR	Association of Waterworks Lake Constance-Rhine	Water association	Internat.
10	CERCL	Association of the cantonal experts of water biology and chemistry	Scientific institution	CH
11	CITYWeil	City of Weil am Rhein; Waterworks Südliches Markgräflerland	Service provider	G
12	EAWAG	Swiss Federal Institute of Aquatic Science and Technology	Scientific institution	CH
13	ESPECS	Environment, spatial planning and energy committees of the members of the Swiss parliament	National political actors	CH
14	FOEN_W	Federal Office for the Environment, Water Division	National political actor	CH
15	FSVO	Federal Food Safety and Veterinary Office	National political actor	CH
16	HKBB	Basel Chamber of Commerce	Polluter	CH
17	IAWR	International Association of Water Works in the Rhine Basin	Water association	Internat.
18	ICPR	International Commission for the Protection of the Rhine	Water association	Internat.
19	IWB	Industrial Works Basel (Drinking water provider in Basel)	Service provider	CH
20	KI	Organization of municipal infrastructure	Service provider	CH
21	KI.SSV.SGV	Swiss Association of the Municipalities	Regional political actor	CH
22	LABBL	Cantonal Laboratory Basel-Landschaft	Scientific institution	CH

N°	Acronym	Actor's name	Actor type	Nationality
23	LABBS	Cantonal Laboratory Basel City	Scientific institution	CH
24	LUBW	Regional institution for the environment, measurement and nature conservation, Baden-Württemberg; Department prevention of water pollution	Regional political actor	G
25	NOVARTIS	Novartis International - Chemical company	Polluter	CH
26	PRONA	Pronatura – Environmental Protection Organization	Environmental NGO	CH
27	ROCHE	F. Hoffmann-La Roche plc – Chemical company	Polluter	CH
28	SBrV	Swiss Association of well craftsmen	Service provider	CH
29	SFA	Swiss Fishery Association	Consumer organization	CH
30	SVGW	Swiss Gas and Water Industry Association	Water association	CH
31	TZWK	German Water Centre, Karlsruhe	Scientific institution	G
32	VSA	Swiss Water Association	Water association	CH
33	WWB	Hardwasser plc (Drinking water provider in Basel)	Service provider	CH
34	WWF	World Wide Fund for Nature, Switzerland: regional group Basel	Environmental NGO	CH
35	WWR	Water Works Reinach and surrounding area	Service provider	CH
36	WWTPBasel	WWTP Basel, ProRhenon plc	Polluter	CH
37	WWTPBirs	WWTP Birs, Birsfelden	Polluter	CH
38	WWTPChem Basel	Industrial WWTP, ProRhenon plc	Polluter	CH
39	WWTPRhein	WWTP Rhein, Schweizerhalle	Polluter	CH

Abbreviations: CH = Switzerland; F = France; G = Germany; Internat. = International actor; WWTP = Waste Water Treatment Plant

Table A1.2: Actors' list of the case study Moselle

N°	Acronym	Actor's name	Actor type	Nationality
1	Aluseau	Luxembourgian association of water services	Service provider	LUX
2	City.LUX	Luxembourg City	Regional political actor	LUX
3	CoA.LUX	Chamber of Agriculture, Luxembourg	Polluter	LUX
4	CoA.RLP	Chamber of Agriculture, RLP	Polluter	G
5	DEA	Water Distribution of the Ardennes	Service provider	LUX
6	EVS	Association of the Disposal of Waste Water Saar	Polluter	G
7	Fish.SAAR	Fishery Association Saar	Consumer organization	G
8	FLPS	Luxembourgian Fishery Association	Consumer organization	LUX
9	Hospitals.LUX	Hospital Center Emile Mayrisch	Polluter	LUX
10	LDEW	Regional Association of the Supply Industry, Hesse/RLP	Water association	G
11	LIST	Luxembourg Institute of Science and Technology	Scientific institution	LUX
12	MinAgri.LUX	Ministry of Agriculture, Viticulture & Consumer Protection, Luxembourg	National political actor	LUX
13	MinDev.LUX	Ministry for Durable Development & Infrastructure, Luxembourg	National political actor	LUX
14	MUEEF.RLP	Ministry for the Environment, Energy, Food & Forest, RLP	Regional political actor	G
15	MUV.SAAR	Ministry for the Environment & Consumer Protection, Saarland	Regional political actor	G
16	MWVLW.RLP	Ministry of Economy, Transport, Agriculture & Viticulture, RLP	Regional political actor	G
17	NaturEmw	natur & ðmwelt	Environmental NGO	LUX
18	OffEnv.LUX	State Office of the Environment, LUX	National political actor	LUX
19	OffNat.RLP	State Office of the Environment, RLP	Regional political actor	G
20	OffNat.SAAR	State Office of the Environment & Safety Protection at the Workplace, Saarland	Regional political actor	G
21	SEBES	Union of the Waters of the Esch-sur-Sûre Dam	Service provider	LUX
22	SES	Union of the Water of the South Koerich	Service provider	LUX
23	SGD	Office of Structure and Approval North, RLP	Regional political actor	G
24	SIDEN	Intercommunal Union of Waste Water Treatment of the North	Polluter	LUX

N°	Acronym	Actor's name	Actor type	Nationality
25	SIDERO	Intercommunal Union of Waste Water Treatment of the West	Polluter	LUX
26	SIDEST	Intercommunal Union of Waste Water Treatment of the East	Polluter	LUX
27	SIVVEC	Intercommunal Union of the Ecological Purpose	Polluter	LUX
28	StGB.RLP	Association of Communities and Cities, RLP	Regional political actor	G
29	SWT	City's Department of Public Works Trier	Service provider	G
30	TUKais	Technical University of Kaiserslautern	Scientific institution	G
31	ULC	Luxembourgian Union of Consumers	Consumer organization	LUX
32	UNI.LUX	University of Luxembourg	Scientific institution	LUX

Abbreviations: G = Germany; LUX = Luxembourg; RLP = Rhineland-Palatinate

Table A1.3: Actors' list of the case study Ruhr

N°	Acronym	Actor's name	Actor type	Nationality
1	ARW	Association of Waterworks Rhine	Water association	G
2	AWWR	Association of Waterworks Ruhr	Water association	G
3	BMG	Federal Ministry of Health	National political actor	G
4	BMU	Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety, Germany	National political actor	G
5	BUND.NRW	Friends of the Earth Germany, regional group NRW	Environmental NGO	G
6	CoA.NRW	Chamber of Agriculture, NRW	Polluter	G
7	CompCent. NRW	Competence Centre Micro-pollutants, NRW	Scientific institution	G
8	DA.Duess	District authority Düsseldorf, NRW	Regional political actor	G
9	DEW21	Dortmund Energy and Water Supply Ltd	Service provider	G
10	EAWAG	Swiss Federal Institute of Aquatic Science and Technology	Scientific institution	CH
11	Fish.NRW	Fishing union NRW	Consumer organization	G
12	Fish.RUHR	Cooperative association of fishing in the Ruhr	Consumer organization	G
13	Gelsen.plc	Gelsenwasser plc – Drinking water provider	Service provider	G
14	InstHyg.Gelsen	Institute of Hygiene, Gelsenkirchen	Scientific institution	G
15	IVA.NRW	Agricultural-industrial association, NRW	Polluter	G
16	IWW	IWW Water Centre, Water Research Institute	Scientific institution	G
17	MKULNV	Ministry for Climate Protection, Environment, Agriculture, Nature & Consumer Protection, NRW	Regional political actor	G
18	Paper.NRW	Industrial federation of the paper industry, NRW	Polluter	G
19	RLV	Rhenish Agricultural Association	Polluter	G
20	RV	Ruhrverband – Non-profit water management company	Polluter	G
21	RVR	Regional association of the Ruhr region	Regional political actor	G
22	RWTHAach	Rhenish Westphalian Technical University Aachen	Scientific institution	G
23	RWW	Rhenish Westphalian Waterworks Ltd	Service provider	G

N°	Acronym	Actor's name	Actor type	Nationality
24	UBA	Federal Environmental Agency	National political actor	G
25	UNI.Boch	University Bochum	Scientific institution	G
26	UNI.Duis	University Duisburg-Essen	Scientific institution	G
27	VKU.NRW	Association of Municipal Enterprises, NRW	Service provider	G
28	WLV	Westphalian Agricultural Association	Polluter	G
29	WWW	Waterworks Westphalia	Service provider	G

Abbreviations: CH = Switzerland; G = Germany; NRW = North Rhine-Westphalia

Table A1.4: Number of actors, number of returned questionnaires, response rate

	Basel	Moselle	Ruhr	Total
N	51	44	39	134
Questionnaires returned	39	32	29	100
Response Rate	76.5%	72.7%	74.4%	74.6%

Table A1.5: Case study Basel: Descriptive statistics of the actor network

Network size (no. of actors)	51
Network density (%) (no. of ties)	0.139 (355)
Degree centralization (%)	0.508
Reciprocity (%)	0.315
Transitivity (%)	0.389

Table A1.6: Case study Moselle: Descriptive statistics of the actor network

Network size (no. of actors)	44
Network density (%) (no. of ties)	0.158 (298)
Degree centralization (%)	0.396
Reciprocity (%)	0.263
Transitivity (%)	0.528

Table A1.7: Case study Ruhr: Descriptive statistics of the actor network

Network size (no. of actors)	39
Network density (%) (no. of ties)	0.179 (265)
Degree centralization (%)	0.610
Reciprocity (%)	0.233
Transitivity (%)	0.519

Note: Network density is defined as proportion of observed relations in relation to all possible relations. Degree centralization indicates the dependence of the network on one or a small number of actors. Reciprocity shows the share of ties (dyads) in the network that are "confirmed" between two actors. Transitivity displays the degree of ordered triplets in which $i \rightarrow j$ and $j \rightarrow k$. All network measurements were calculated using dichotomized data. Before calculating network centralization, the data were symmetrized.

Table A1.8: Case study Basel: Descriptive statistics of the ecological network

Network size (no. of sub-catchments)	74
Network density (%) (no. of ties)	0.014 (73)
Degree centralization (%)	0.014
Reciprocity (%)	0.000
Transitivity (%)	0.000

Table A1.9: Case study Moselle: Descriptive statistics of the ecological network

Network size (no. of sub-catchments)	31
Network density (%) (no. of ties)	0.032 (30)
Degree centralization (%)	0.038
Reciprocity (%)	0.000
Transitivity (%)	0.000

Table A1.10: Case study Ruhr: Descriptive statistics of the ecological network

Network size (no. of sub-catchments)	11
Network density (%) (no. of ties)	0.091 (10)
Degree centralization (%)	0.144
Reciprocity (%)	0.000
Transitivity (%)	0.000

Note: Network density is defined as proportion of observed relations in relation to all possible relations. Degree centralization indicates the dependence of the network on one or a small number of actors. Reciprocity shows the share of ties (dyads) in the network that are “confirmed” between two actors. Transitivity displays the degree of ordered triplets in which $i \rightarrow j$ and $j \rightarrow k$. All network measurements were calculated using dichotomized data. Before calculating network centralization, the data were symmetrized.

Table A1.11: Motif statistics

Case Study	Number of identified motifs with 3 nodes	Number of identified motifs with 3 nodes (level attributes)	Number of identified motifs with 4 nodes	Number of identified motifs with 5 nodes
Basel	9	27	43	277
Moselle	9	27	43	212
Ruhr	9	25	39	79

Figure A1.1: The catchment area of the Rhine River, divided into sub-catchments of Strahler stream order ≥ 4 (there are no sub-catchments indicated on the Dutch territory)

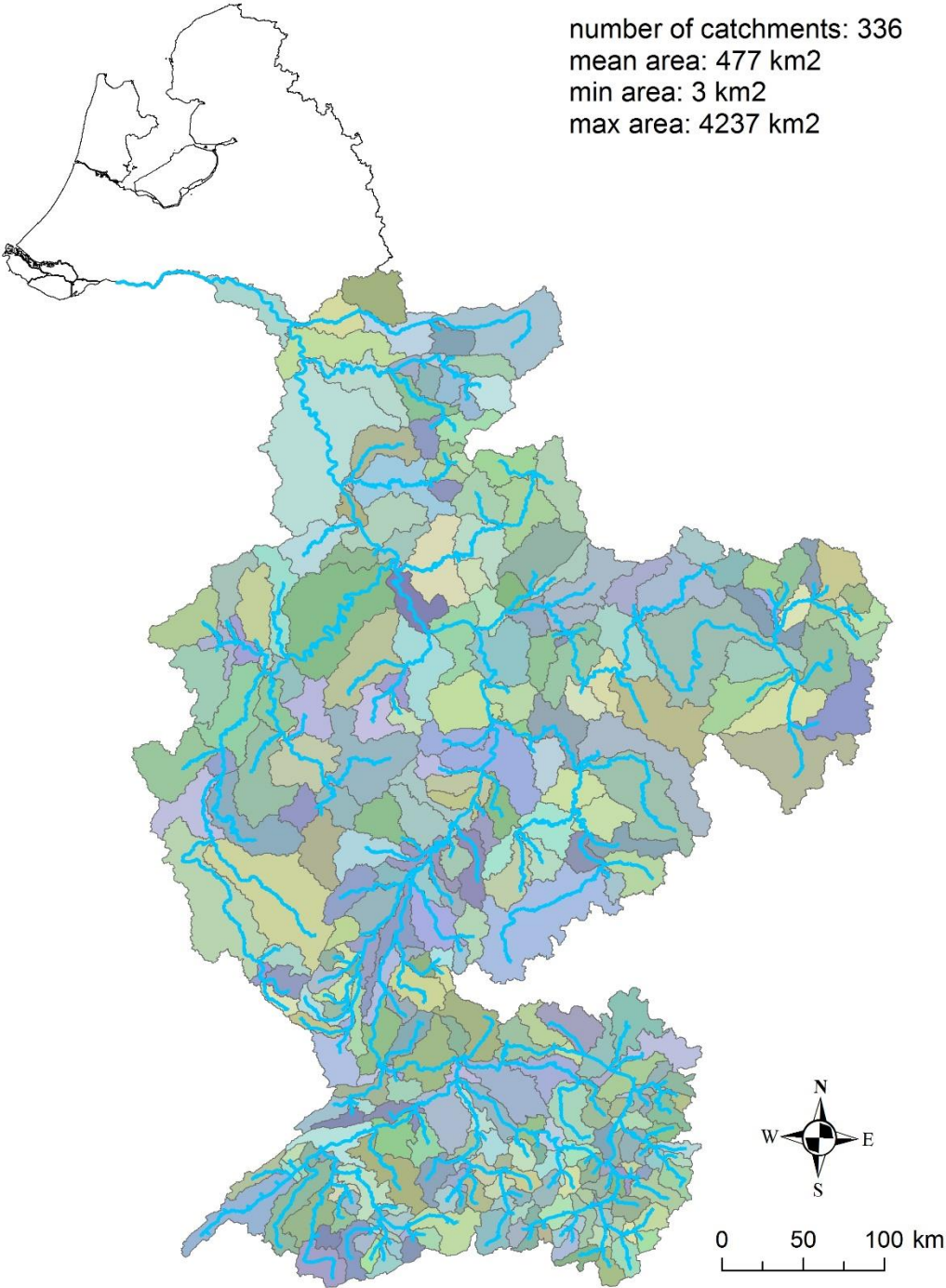


Figure A1.2: Catchment area of the Basel case, indicating its 74 sub-catchments of Strahler stream order ≥ 4 and their connection among each other.

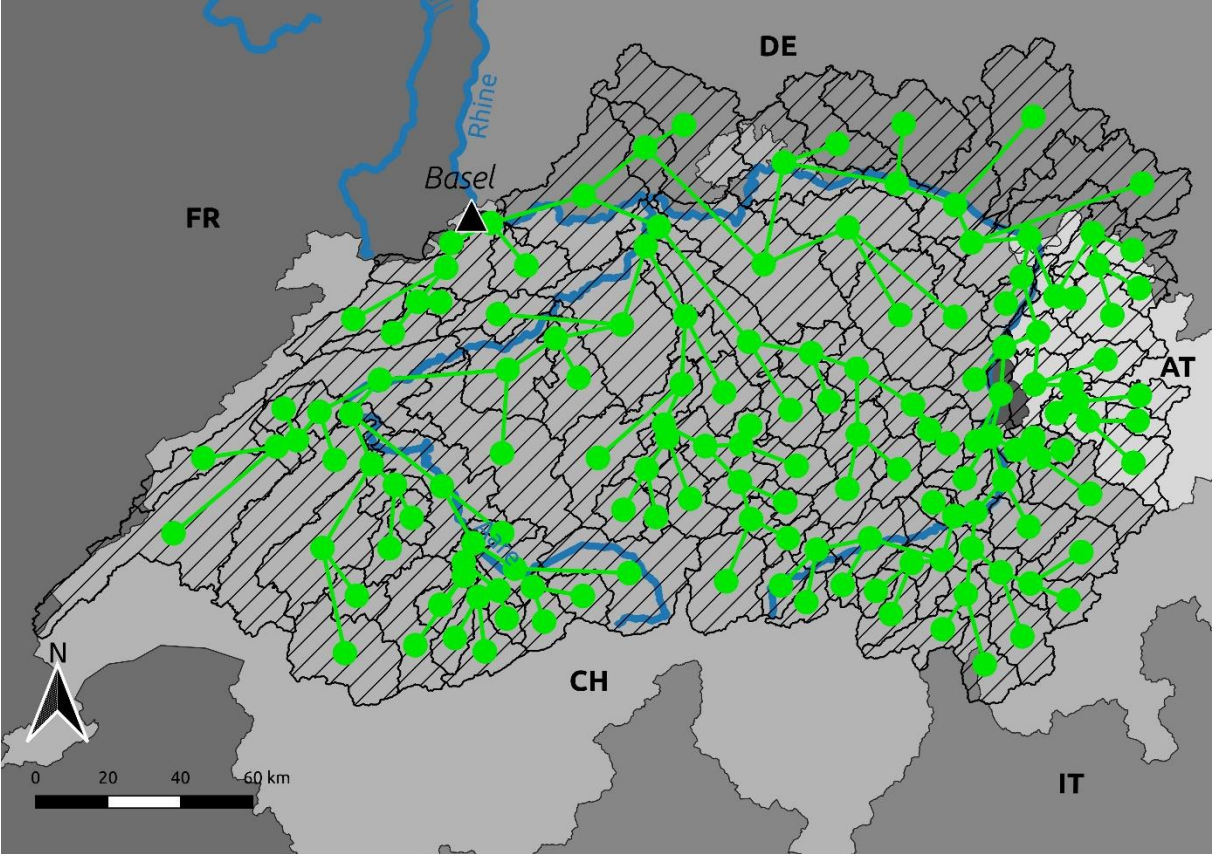


Figure A1.3: Catchment area of the Moselle case, indicating its 31 sub-catchments of Strahler stream order ≥ 4 and their connection among each other.

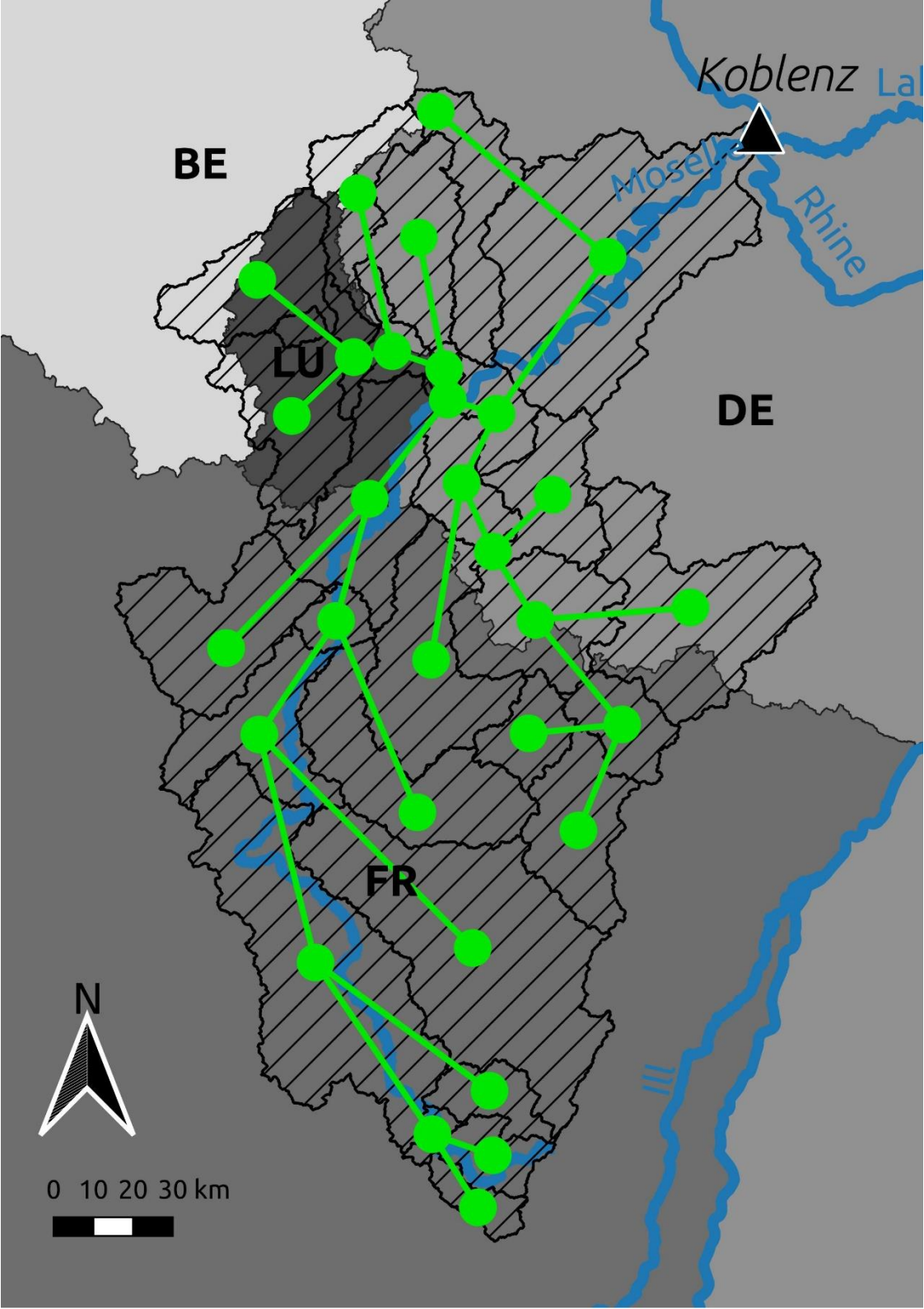


Figure A1.4: Catchment area of the Ruhr case, indicating its 11 sub-catchments of Strahler stream order ≥ 4 and their connection among each other.

