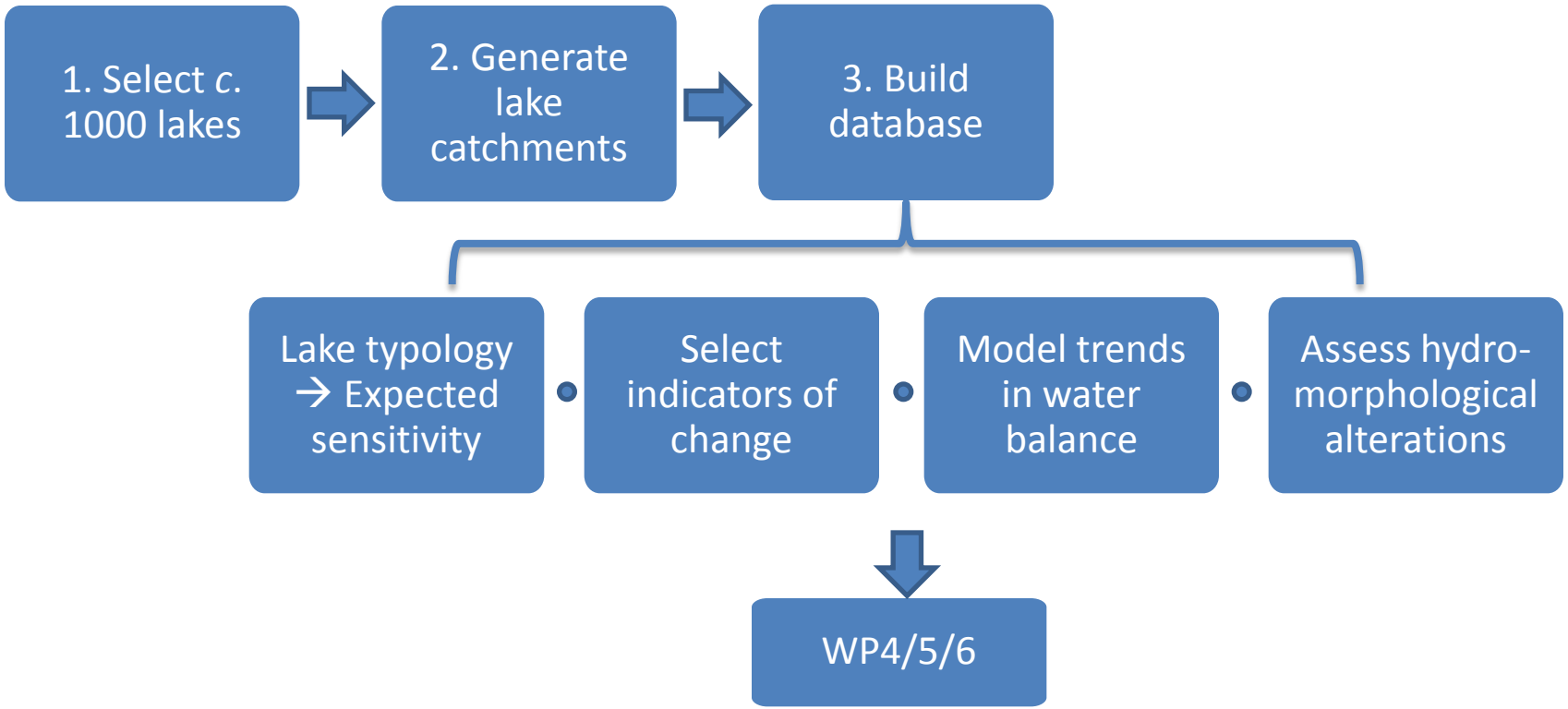
GloboLakes 2nd Advisory Board Meeting Stirling, 15th January 2014

WP3 | MC, JR, TD, EP

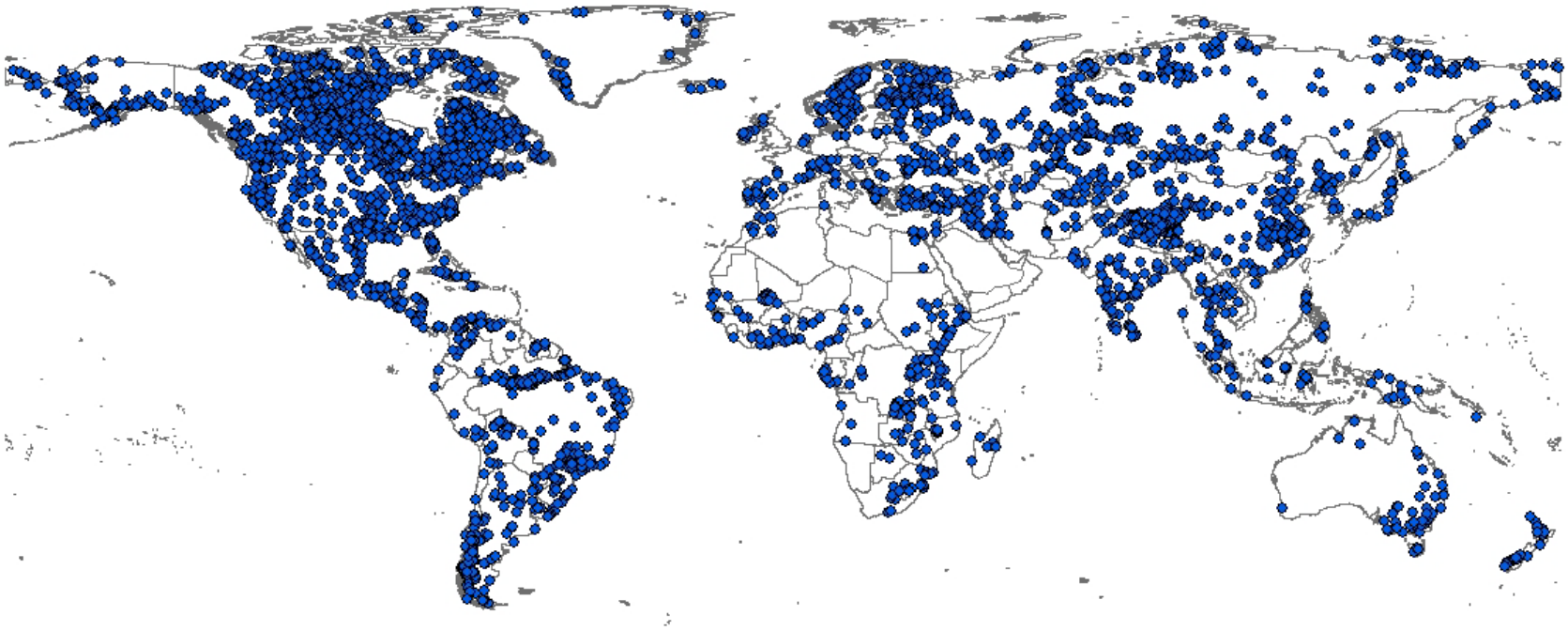
WP3 | Climate & non-climate drivers of change



WP3 | 1. Site Selection Protocol

GLWD Level-1 (3,721 water bodies) → Water body type → R/S water mask → Water-mask-to-lake-area → No. of daytime R/S observations per year → 960 lakes & reservoirs

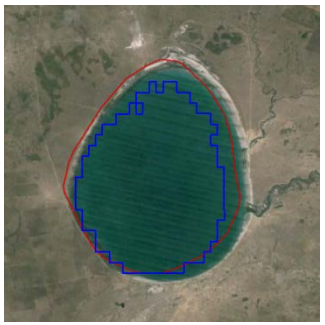
Global Lakes and Wetlands Database (GLWD) Level-1 data



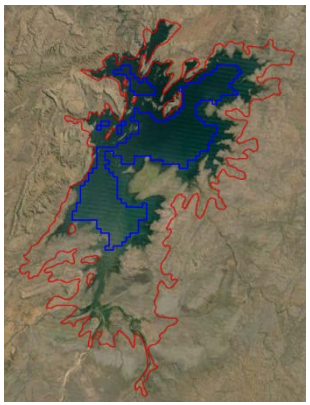
GLWD Level-1 (3,721 water bodies) → Water body type → R/S water mask → Water-mask-to-lake-area → No. of daytime R/S observations per year → 960 lakes & reservoirs

Regular shoreline – Larger area detected by R/S

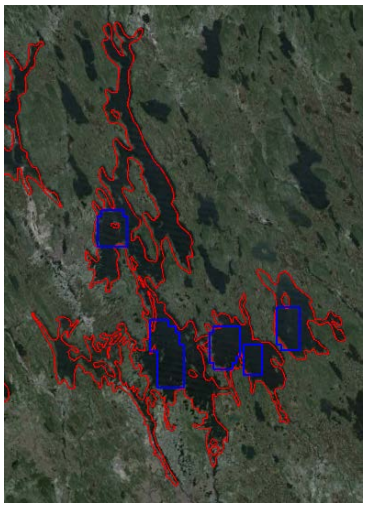
Irregular shoreline – Smaller area detected by R/S



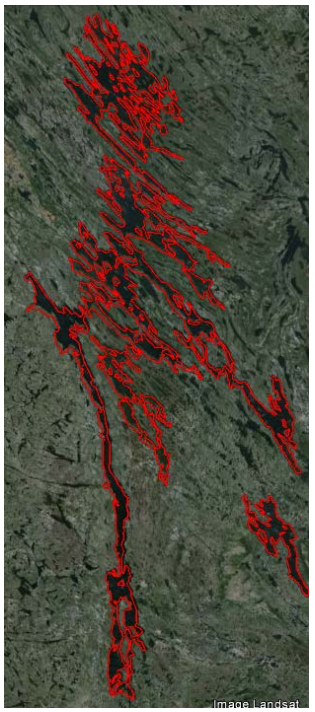
GLWD ID 907, D_L = 1.03



GLWD ID 98, D_L = 3.8



GLWD ID 345, D_L = 7.9



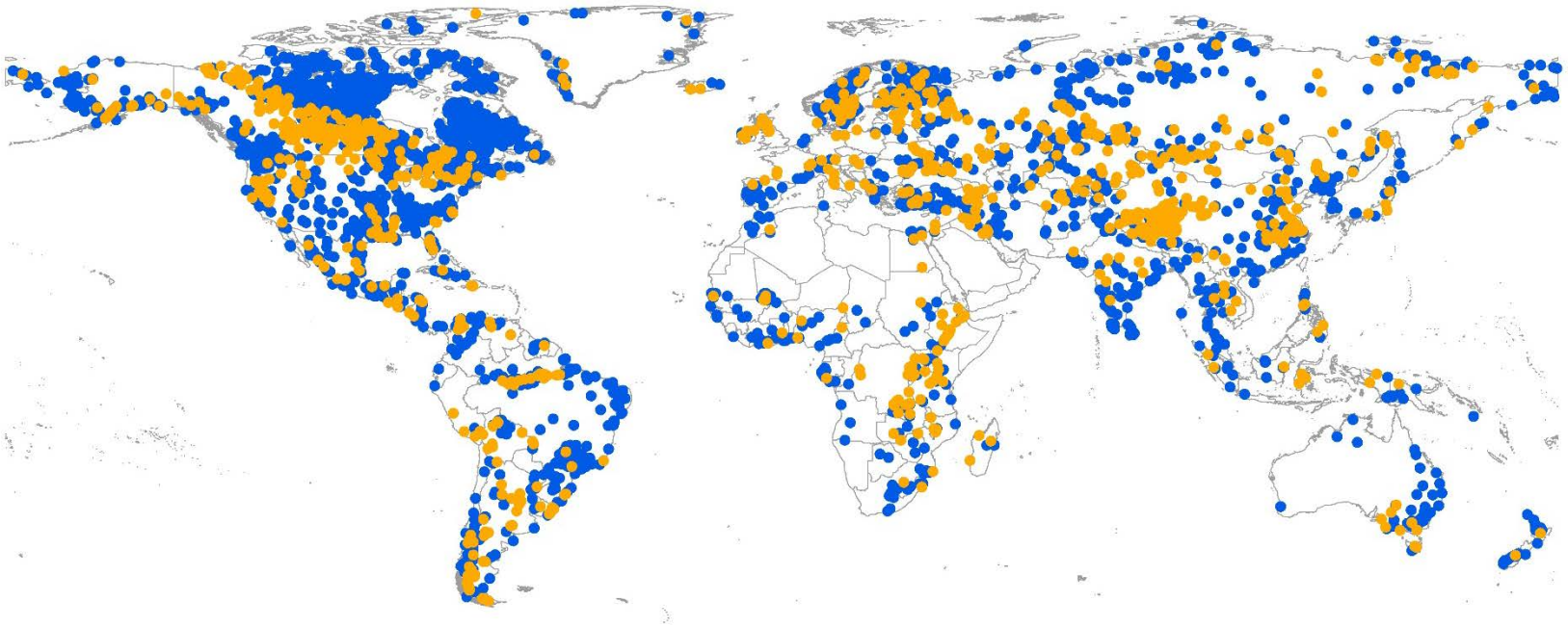
GLWD ID 115, D_L = 17

R/S mask (detectable area)

GLWD Level-1 lake shoreline

Water mask developed by ARC Lake

WP3 | 1. Site Selection Protocol



GLWD Level-1 (3,721)

GloboLakes (991)

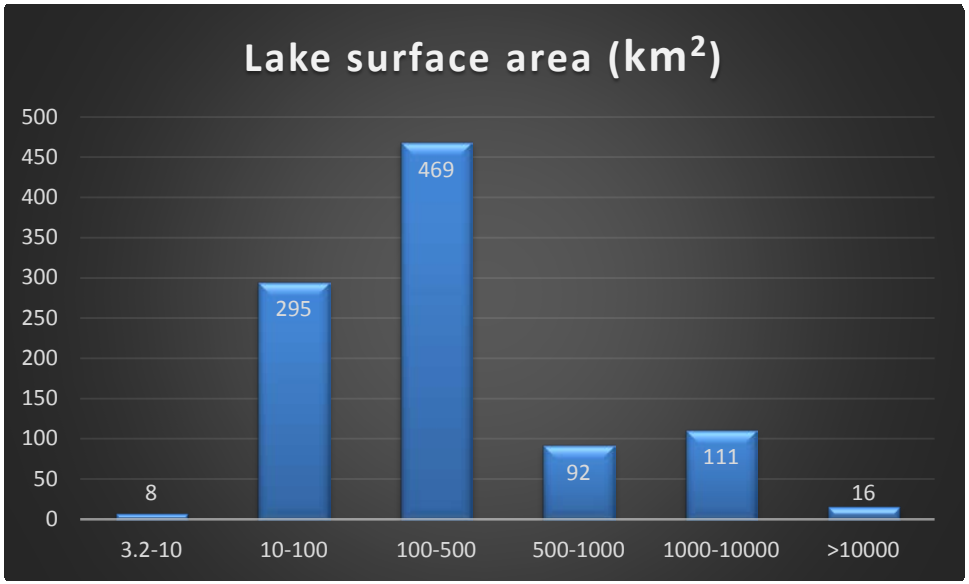
960 + 31 additional smaller lakes

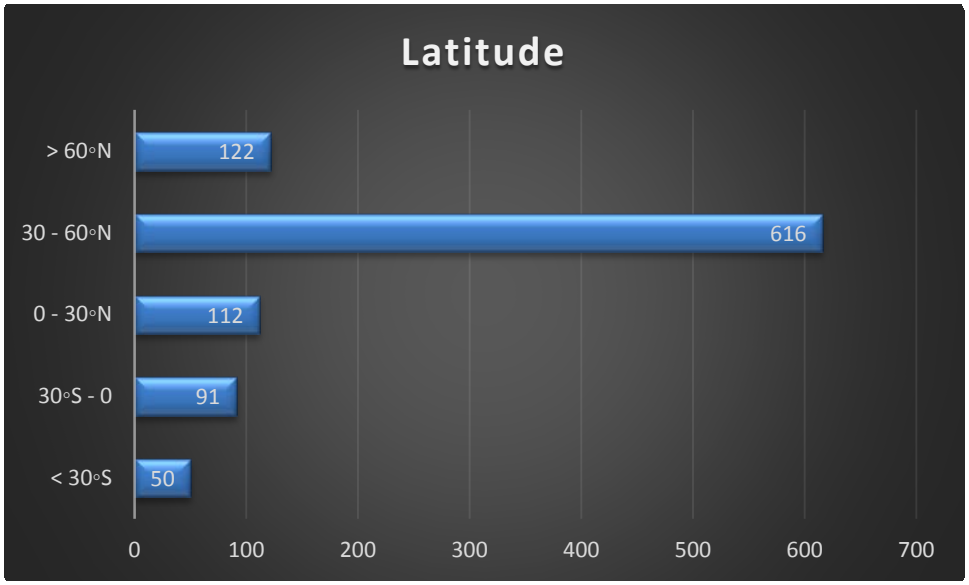
UK & ROI

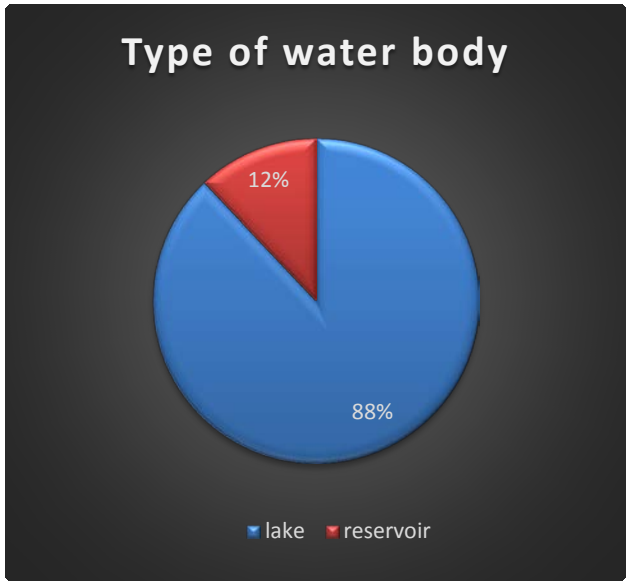
WISER

- Ness
- Lomond
- Tay
- Katrine
- Leven
- Windermere
- Derwent
- Bassenthwaite
- Erne (lower)
- Corrib
- Derg
- Melvin

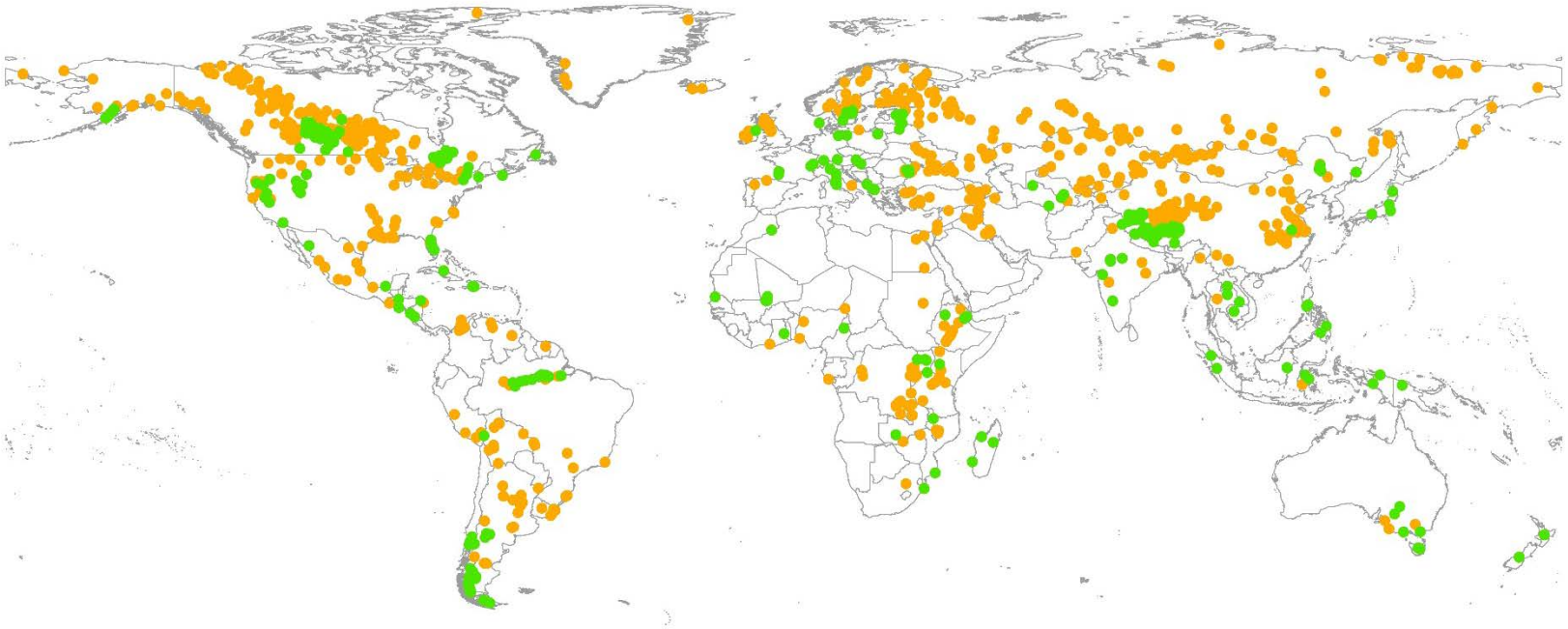
Globolakes sites: Distribution of frequencies







WP3 | 2. Catchment generation



Generated catchments

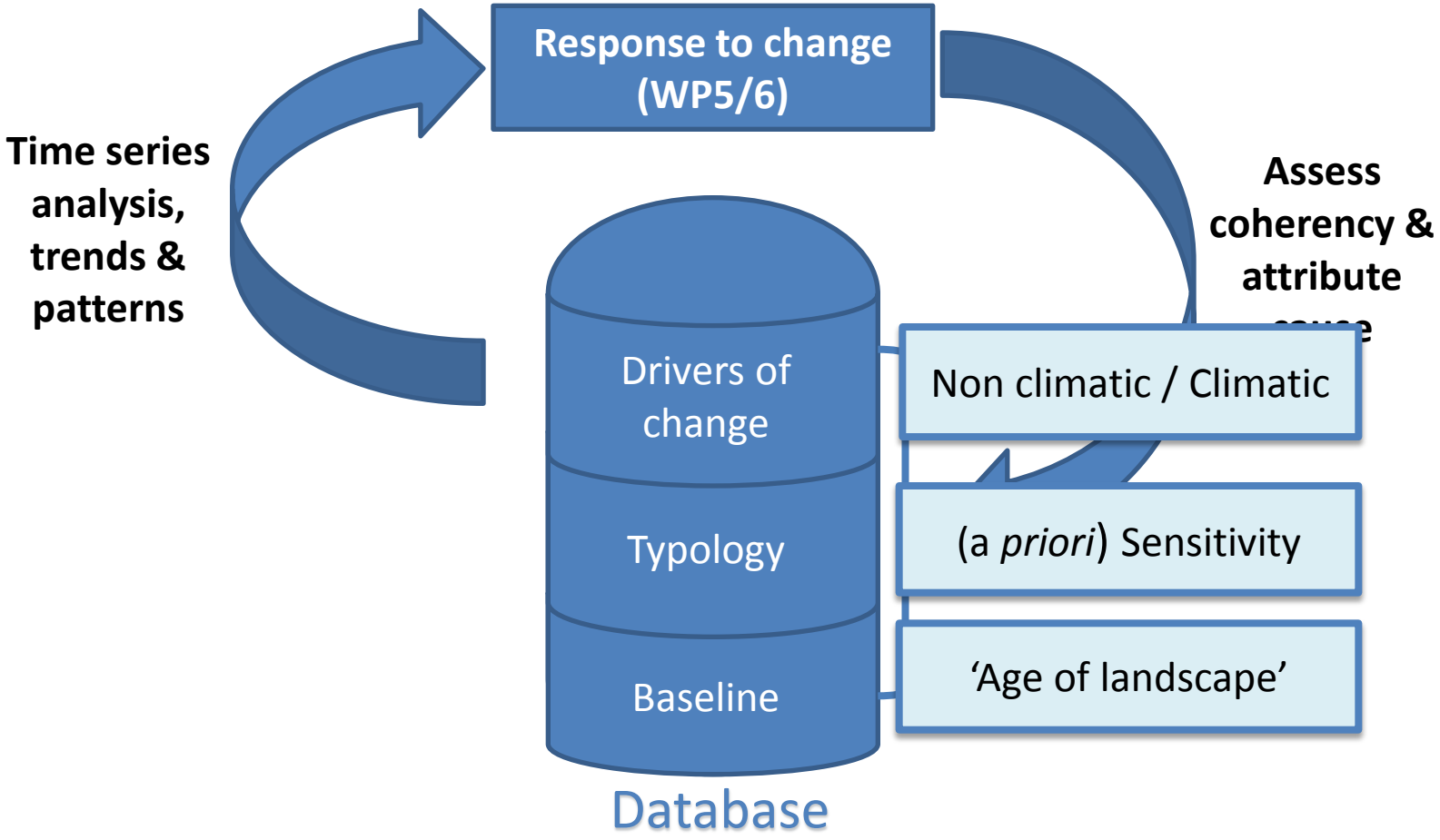
GloboLakes


GISMinions 1-5


GISMinions 6-10


GISMinions 11-15

WP3 | 3. Building the GloboLakes database



WP3 | 3.1 Lake typology

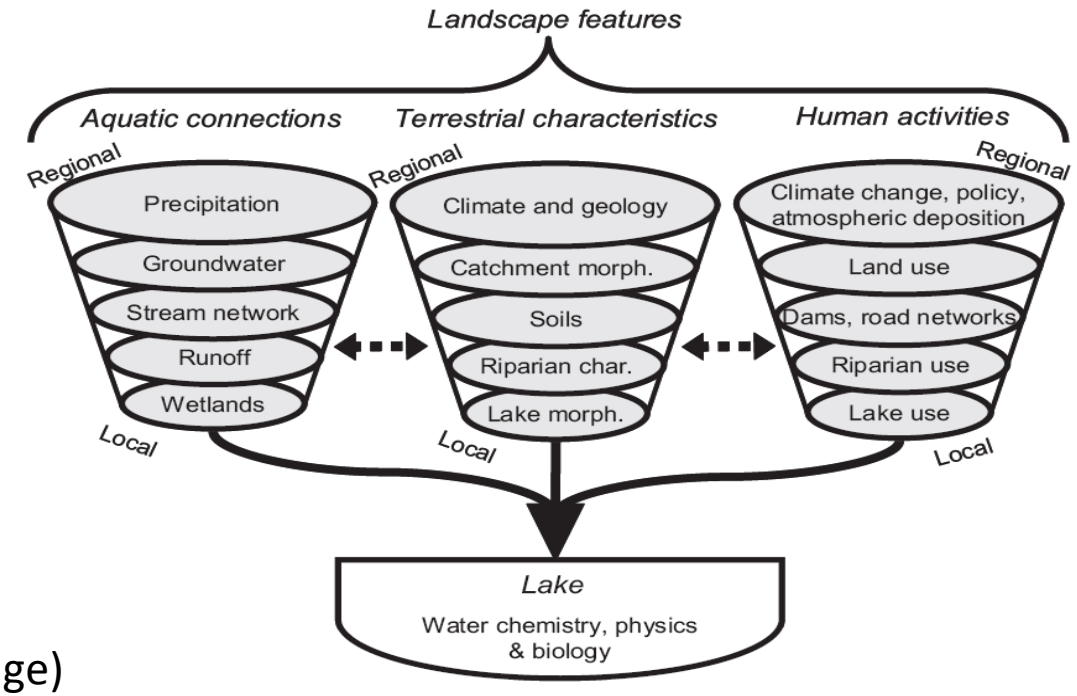
EU Water Framework Directive (WFD) factors

- Geology
- Mean depth

WFD Core Typology

- Size (surface area)
- Altitude
- Ecoregion
- Shape
- Residence time
- Mixing regime
- Water level fluctuation
- Air temperature (mean, range)
- *and others*

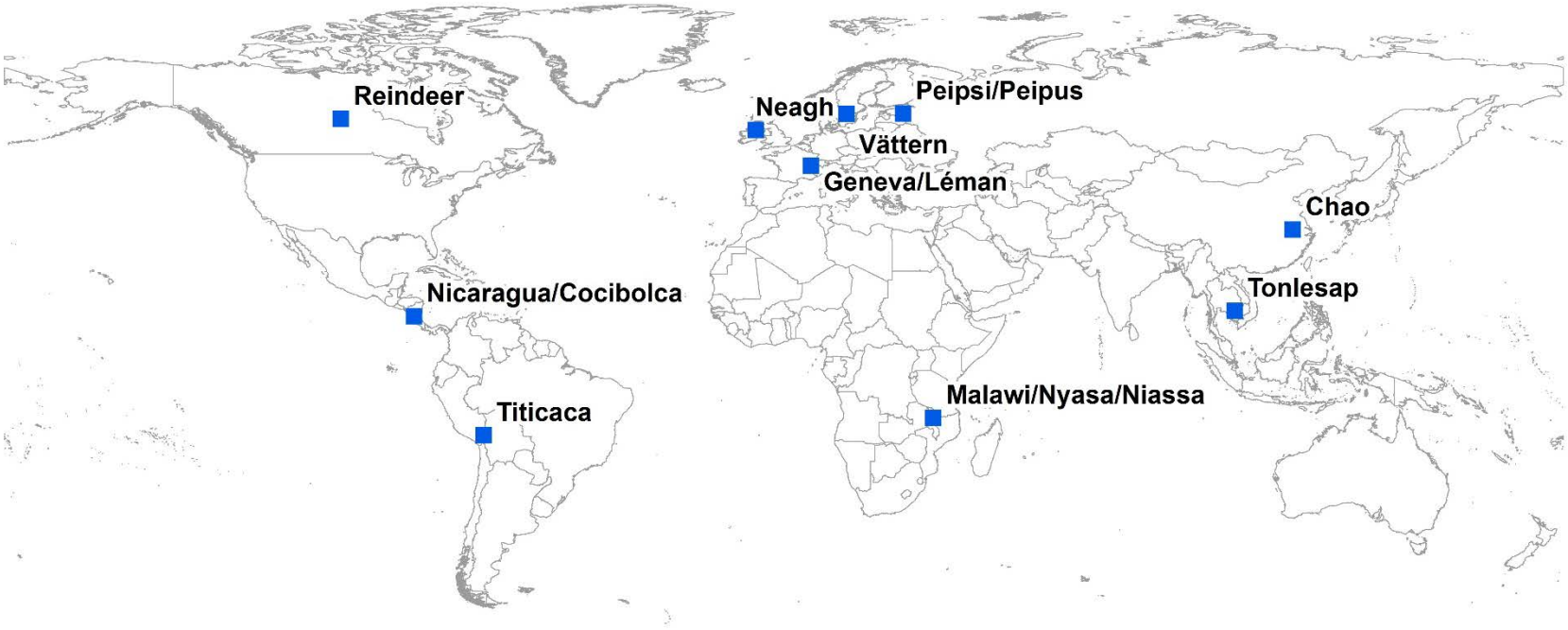
Lake Landscape Context (LLC) framework



(Sorrano et al., 2009)

WP3 | 3.1 Lake typology – Case studies

- 10 case studies



WP3 | 3.1 Lake typology – Case studies

- Division into 12 types based on WFD core typology
  - Geology: 4 types
  - Mean depth: 3 types

Geology / Depth	Organic	Siliceous	Calcareous	Other
<3m				1
3-15m	1	1		2
>15m	2		1	2

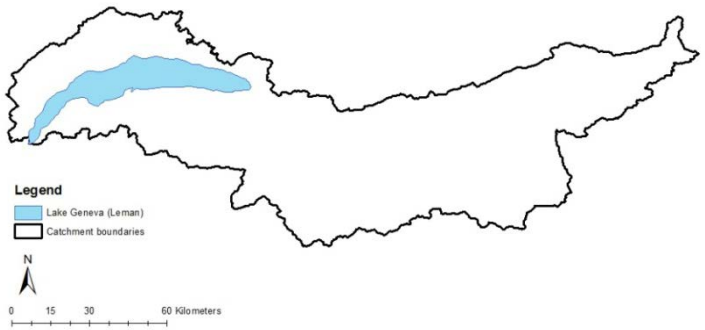
WP3 | 3.1 Lake typology – Case studies

ID	Geology	Depth	Size	Altitude	Eco-region	Shape (SDI)	Residence time	Mixing regime	C/L Ratio
10	Other	D	XL	Mid	Cwa, Aw	C	L	(n/a)	<1
20	Other	D	XL	High	ET	R	XL	Mono	<1
21	Other	Sh	XL	Low	Aw	C	(n/a)	(n/a)	<1
28	Org	D	XL	Mid	Dfc	HI	S/M	Mono	=1
50	Org	Sh	XL	Low	Dfb	C	S	(n/a)	>1
64	Other	VSh	XL	Low	Aw, Am	R	(n/a)	(n/a)	>1
95	Org	D	XL	Low	Dfb	C	M	Dimi	<1
233	Other	Sh	XL	Low	Cfa	C	(n/a)	(n/a)	>1
327	Cal	D	XL	Mid	ET, Cfb	C	M	Dimi	=1
481	Sil	Sh	XL	Low	Cfb	C	S	Homo	<1

WP3 | 3. Global Datasets - Sources

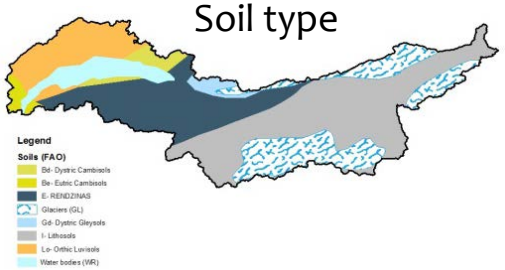
	Parameter	Source	Static	Time series
	Soil	Harmonized World Soil Database (HWSD)	X	
	Geology	Global Lithological Map (GLiM) database	X	
	Ecoregion	Terrestrial Ecoregions of the World (TEOW), Koeppen-Geiger map	X	
	Elevation	NASA Shuttle Radar Topography Mission (SRTM) v4.1	X	
	Dams/impoundments	Global Reservoir and Dam database (GRanD)	X	
	NDVI	NASA Distributed Active Archive Center (DAAC)		X
	Population density	NASA Socioeconomic Data and Applications Center (SEDAC)		X
	GDP	International Monetary Fund (IMF)		X
	Precipitation	Climatic Research Unit (CRU)		X
	Air temperature	European Centre for Medium-Range Weather Forecasts (ECMWF)		X
	Livestock	FAO (global gridded & at national level)		X
*	Water balance	(modelled; e.g. LUWI model, WaterWorld, other)		X
	Land cover/use	Various: ESA GlobCover 2009, Global Land Cover (GLC2000), Global Land Cover Facility (GLCF), NASA DAAC		X
*	Riparian Development	(derived from Land cover/use)		X

Lake & catchment

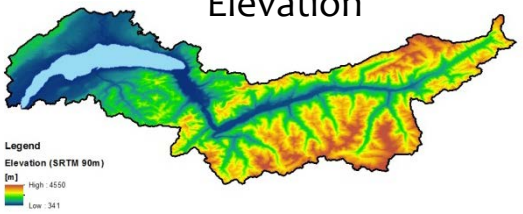


Lake & catchment - example datasets

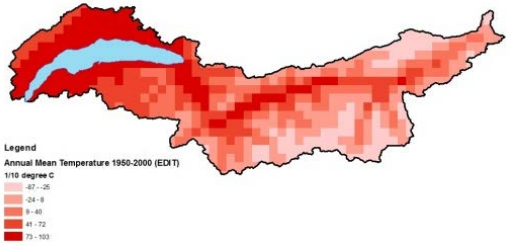
Soil type



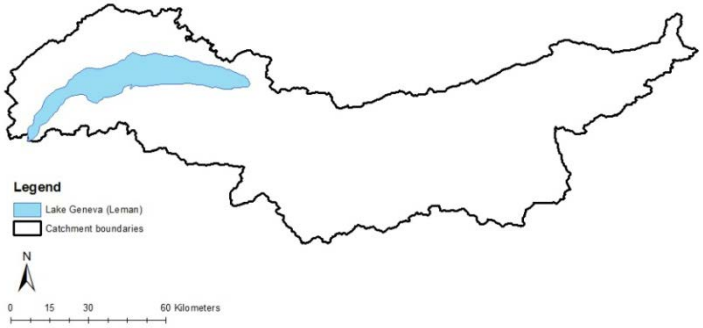
Elevation



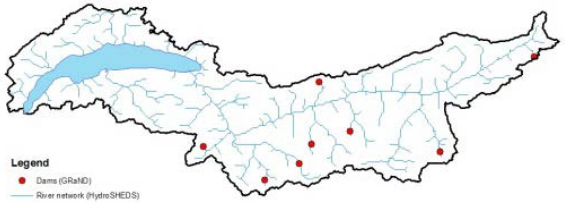
Annual mean temperature



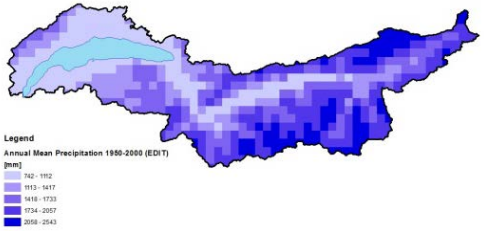
Road network



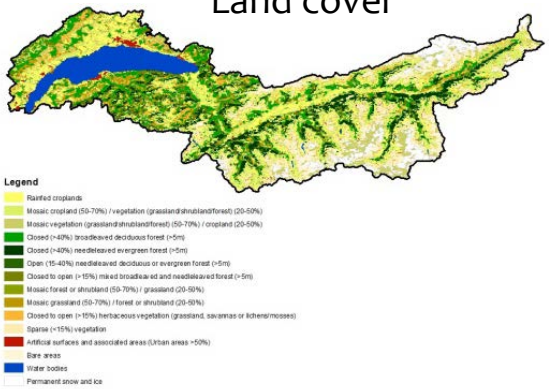
River network & Dams



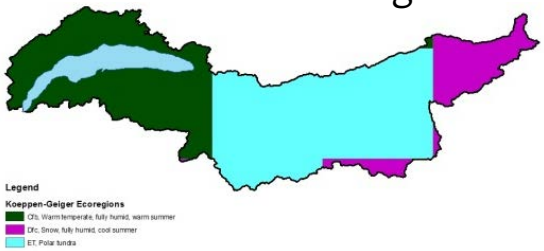
Annual mean precipitation



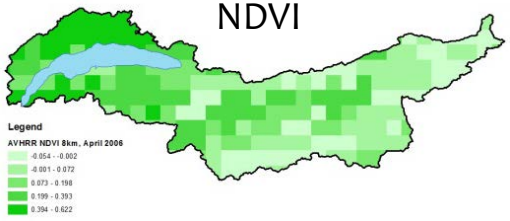
Land cover



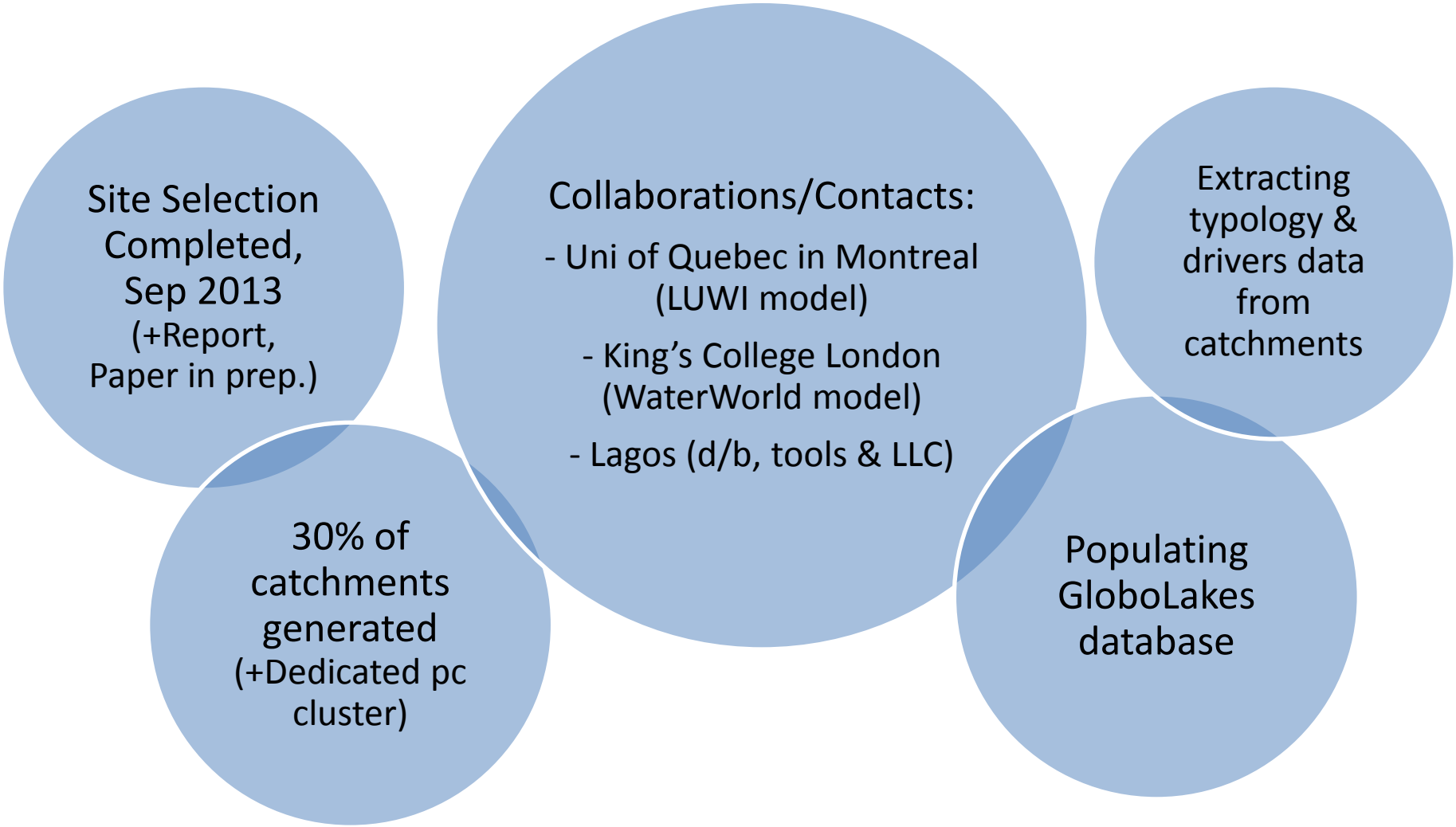
Climatic ecoregions



NDVI



WP3 | Summary


Site Selection Completed, Sep 2013 (+Report, Paper in prep.)
Collaborations/Contacts:
- Uni of Quebec in Montreal (LUWI model)
- King's College London (WaterWorld model)
- Lagos (d/b, tools & LLC)
Extracting typology & drivers data from catchments
30% of catchments generated (+Dedicated pc cluster)
Populating GloboLakes database

Thank you