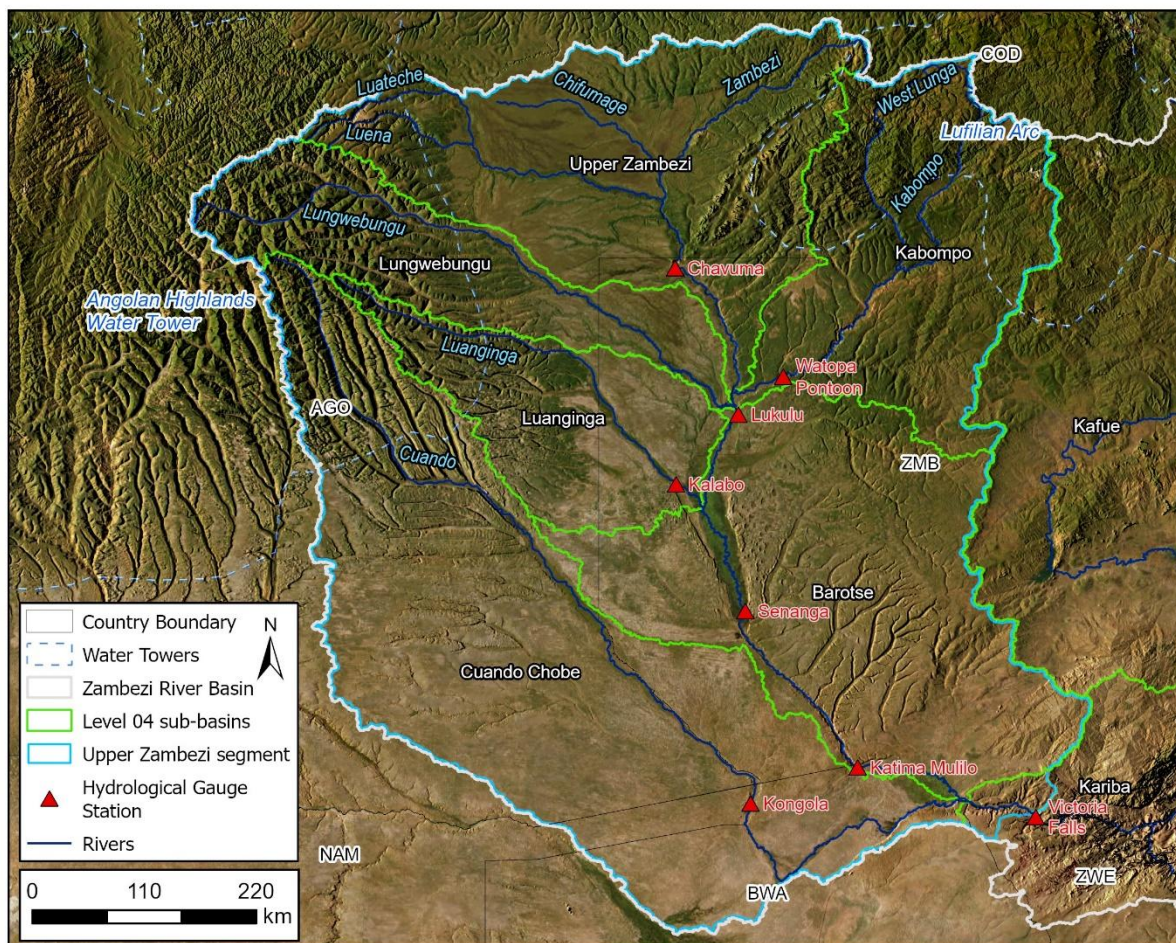


# Assessment of source regions of the Zambezi River: implications for regional water security

## Supporting Material



5 Figure S1. The locations of each hydrological gauge station (red triangles) used in comparison with the Collins et al. (2024) and Akpoti et al. (2024) datasets within the Upper Zambezi Segment.

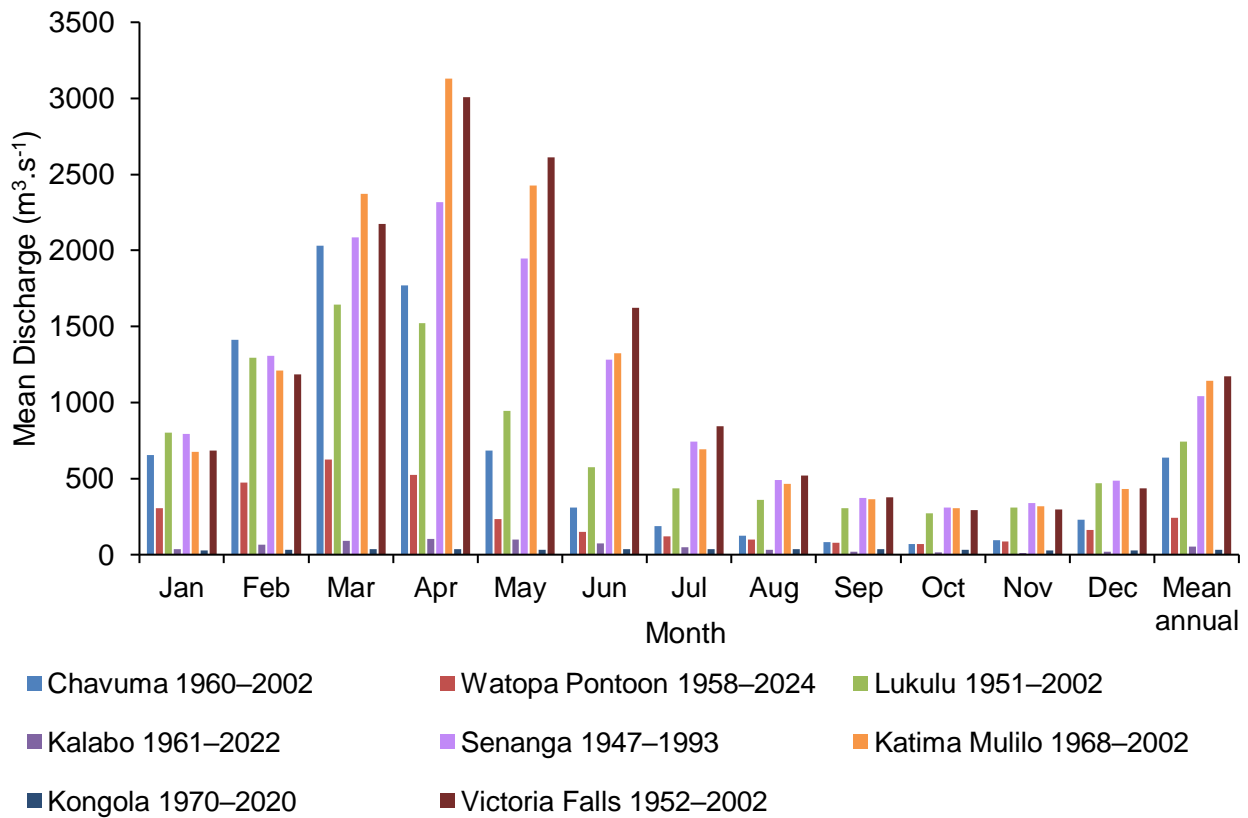


Figure S2. The mean monthly discharge over separate time series for each of the eight hydrological gauge stations.

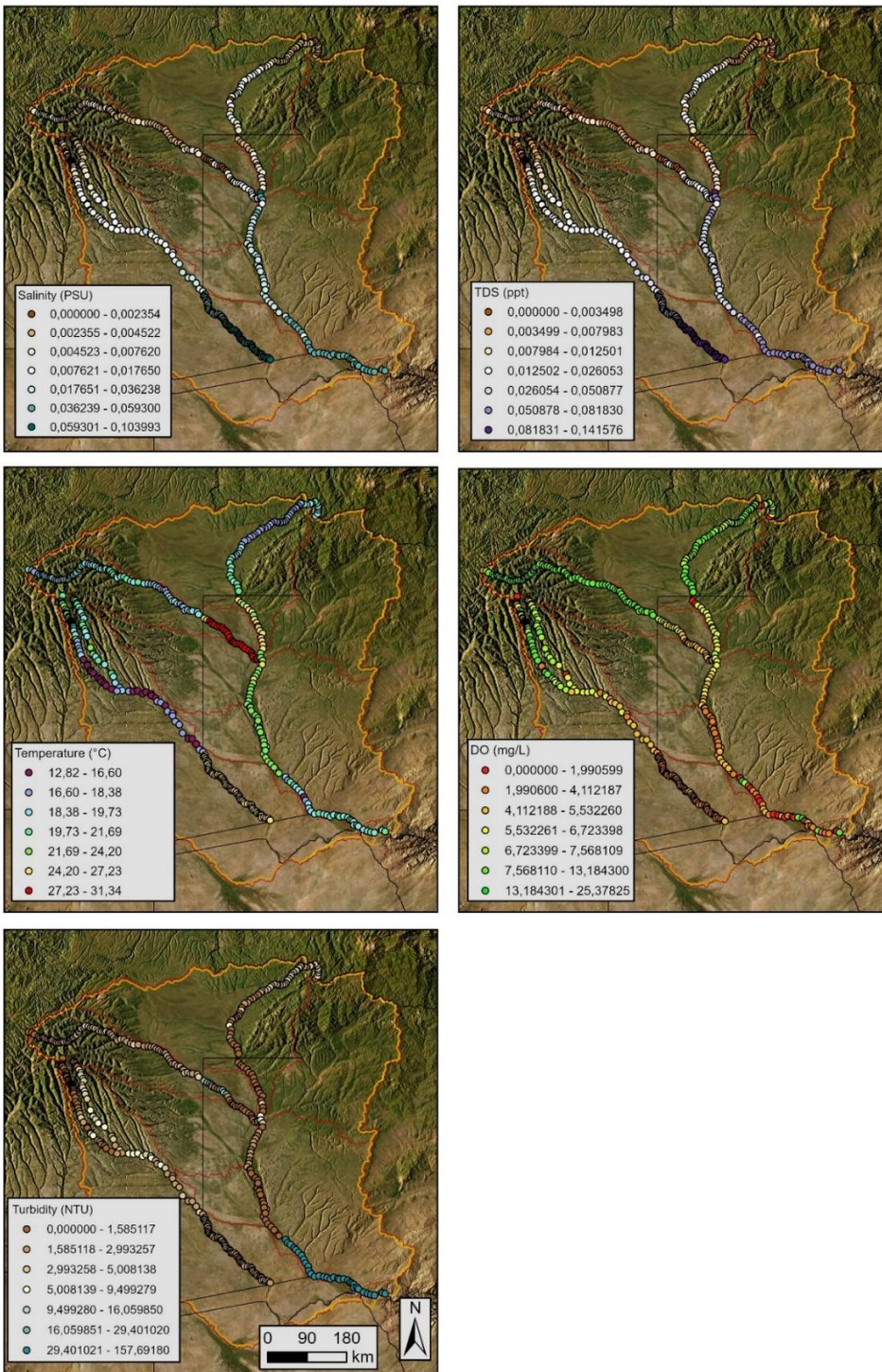
**Table S1. ADCP discharge measurements within the Upper Zambezi segment, listed in chronological order**

<b>Site No.</b>	<b>Site description and river names</b>	<b>Q (m<sup>3</sup>.s<sup>-1</sup>)</b>	<b>Date</b>
1	Measured along Lungwebungu River	8.19	2022/06/07
2	Measured along Lungwebungu River	13.14	2022/06/10
3	Measured along Lungwebungu River	21.51	2022/06/11
4	Measured along Lungwebungu River	36.84	2022/06/16
5	Measured along Lungwebungu River	55.59	2022/06/19
6	Measured along Lungwebungu River	81.13	2022/06/23
7	Measured along Lungwebungu River	86.76	2022/06/26
8	Measured along Lungwebungu River	90.46	2022/07/01
9	Measured along Lungwebungu River	104.91	2022/07/04
10	Measured along Luanginga River	14.07	2022/07/05
11	Measured along Lungwebungu River	201.40	2023/03/04
12	Measured along Lungwebungu River	213.10	2023/03/07
13	Measured along Lungwebungu River	257.80	2023/03/07
14	Measured along Lungwebungu River	288.30	2023/03/08
15	Measured at end of Kashiji River confluence with Lungwebungu	75.60	2023/03/10
16	Measured at end of Lungwebungu confluence with Zambezi	335.70	2023/03/10
17	Measured along Zambezi River downstream of Lungwebungu	1471.10	2023/03/10
18	Measured along Cuando River	29.06	2023/03/29
19	Measured along Cuando River	24.64	2023/04/06
20	Measured along Cuando River	23.91	2023/04/06
21	Measured along Zambezi River	1.55	2023/05/05
22	Measured along Zambezi River	6.70	2023/05/06
23	Measured along Zambezi River	16.00	2023/05/10
24	Measured along Zambezi River	923.38	2023/05/17
25	Measured along Zambezi River	928.56	2023/05/17
26	Measured at end of Kabompo, confluence with Zambezi	318.08	2023/05/21
27	Measured at end of Lungwebungu, confluence with Zambezi	193.85	2023/05/22
28	Measured along Zambezi River upstream of LB confluence	1194.19	2023/05/22
29	Measured along Zambezi River upstream of Ngoye Falls	2323.12	2023/05/31
30	Measured at end of Jimbe, confluence with Zambezi	3.62	2023/07/07
31	Measured along Zambezi River	18.03	2023/07/08
32	Measured along Zambezi River	26.78	2023/07/10
33	Measured along Zambezi River	28.52	2023/07/13
34	Measured at the end of smaller Luateche tributary with Zambezi	5.19	2023/07/14
35	Measured at the end of Luisaba River, confluence with Zambezi	37.72	2023/07/16
36	Measured along Zambezi River	105.95	2023/07/18

37	Measured at the end of Luvua River, confluence with Zambezi	5.52	2023/07/19
38	Measured at end of Chifumage, confluence with Zambezi	21.17	2023/07/21
39	Measured at end of Luena, confluence with Zambezi	72.51	2023/07/22
40	Measured along Zambezi River	135.41	2023/07/22
41	Measured at end of Longonho River, confluence with Zambezi	1.05	2023/07/22
42	Measured at end of Lumbala River, confluence with Zambezi	3.91	2023/07/23
43	Measured at end of Lufuige River, confluence with Zambezi	5.56	2023/07/23
44	Measured along Zambezi River	212.79	2023/07/24
45	Measured along Zambezi River	579.59	2023/07/30
46	Measured at end of Lumbe River, confluence with Zambezi	5.71	2023/08/01
47	Measured along Zambezi River	567.18	2023/08/06

10





**Figure S3. TWP river expedition water quality parameters including salinity, total dissolved solids (TDS), temperature, dissolved oxygen (DO), and turbidity for the Upper Zambezi Segment.**

- 15 The distribution and size of lakes within the Zambezi basin vary significantly among the countries it spans. Zambia (n = 496) and Zimbabwe (n = 795) have the greatest number of lakes within the Zambezi basin (Table S2). Botswana and Tanzania only have five lakes (<10 km<sup>2</sup>) each due to a small percentage of the basin being within the borders of these countries, and Angola has 79 lakes. Within the Zambezi Basin, five lakes are >100 km<sup>2</sup>: Lakes Malombe and Malawi within Malawi, Cahora Bassa Reservoir (artificial) within Mozambique, Itezhi-Tezhi Reservoir (artificial) within Zambia and Kariba Reservoir (artificial) which is shared between Zambia and Zimbabwe.

**Table S2. The number of lakes within each lake surface area interval per country within the Zambezi River Basin.**

Country (within Zambezi Basin)	No. of lakes/ reservoirs within each lake surface area interval					Total
	0.1 – 1 km <sup>2</sup>	1 – 10 km <sup>2</sup>	10 – 50 km <sup>2</sup>	50 – 100 km <sup>2</sup>	>100 km <sup>2</sup>	
Zimbabwe	747	44	3	1	1	795
Zambia	441	48	3	2	2	496
Angola	75	3	1	-	-	79
Malawi	47	8	1	-	2	58
Mozambique	33	7	-	-	1	41
Namibia	26	-	-	-	-	26
United Republic of Tanzania	4	1	-	-	-	5
Botswana	3	2	-	-	-	5
<b>Zambezi Basin</b>	<b>1,376</b>	<b>113</b>	<b>8</b>	<b>3</b>	<b>5*</b>	<b>1,505</b>

\* Kariba Reservoir is shared between Zambia and Zimbabwe



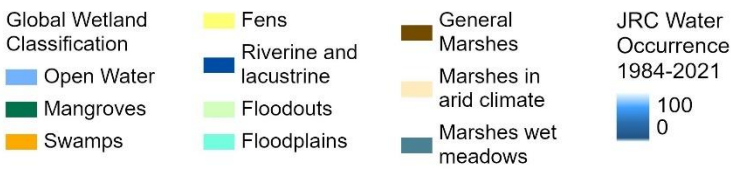
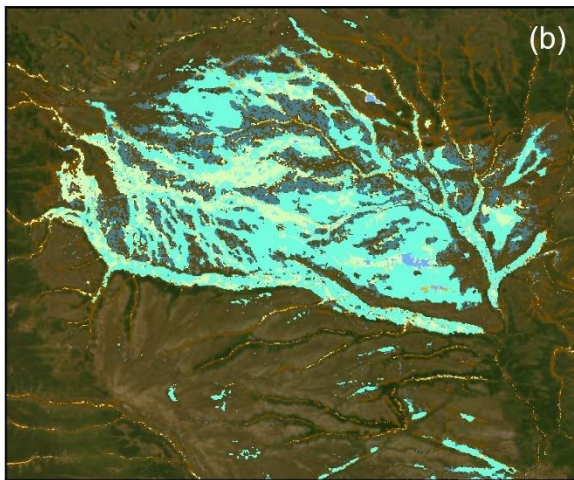
25 **Figure S4. Source of the Lungwebungu, the most distant tributary to the Zambezi Basin, starts as a small trickle pouring out of a bowl-shaped peatland bog supported by groundwater.**





30 **Figure S5.** The traditional source of the Zambezi River originates from a small spring, near Kalene Hill in Zambia.





**Figure S6. (a) Satellite view of the Kameia floodplain region including major rivers of the Upper Zambezi segment, Moxico Province, Angola (source: ESRI World Imagery), (b) CIFOR wetland classification, and (c) JRC water occurrence 1984–2021.**