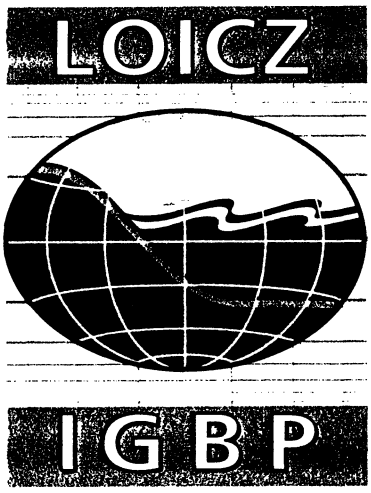
LAND-OCEAN INTERACTIONS IN THE COASTAL ZONE (LOICZ)

Core Project of the
International Geosphere Biosphere Programme: A Study of Global Change
(IBGP)



RIVER DISCHARGE TO THE SEA
A Global River Index (GLORI)

Prepared by
John D. Milliman[1], Christine Rutkowski[1] and Michel Meybeck[2]

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College of William and Mary
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April 1995

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LOICZ Core Project Office
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April 1995

prepared at
The School of Marine Science
Virginia Institute of Marine Science
College of William and Mary

Introduction to GLORI

Rivers represent the major pathway for the transfer of water and solids from land to the sea. Collectively they annually discharge about 40,000 km^3 of water and more than 25 billion tons of particulate and dissolved solids.

Although the number of papers discussing river-derived water and solids has increased appreciably in recent years, there has been no central index to which the interested scientist, manager or student can refer for data concerning a river or series of rivers. UNESCO produced a preliminary data base in 1971, but no subsequent index was issued; the original effort remains in a few office files, but regrettably is generally unknown and unused.

A World River Index (WORRI) report was prepared by UNESCO in 1978, largely through the efforts of M. Meybeck, but, like the earlier UNESCO effort, it was not published. Milliman and Meade (1983) and later Milliman and Syvitski (1992) accumulated many of the accessible data regarding basin area, water discharge and suspended load. Meybeck has maintained a personal index of world rivers, most of which appears in the present effort.

GLORI Data Base

The present global river index, whose acronym is GLORI, represents a first attempt to collate all available data in a single volume. It should be emphasized that we only list rivers that discharge to the sea or to a major body of water that itself discharges to the sea. Rivers discharging into the Black Sea, for instance, are listed, but those discharging into the Caspian Sea are not.

The parameters presented in this index are basic: river name, body of water (generally ocean) to which the river discharges, drainage basin area, river length, maximum elevation in the drainage basin, mean annual water discharge (Q), mean annual total suspended sediment load (TSS), and mean annual total dissolved sediment load (TDS); references are also listed with each entry. We have entered all rivers with basin areas greater than 1000 km2 for which only water discharge is available; but rivers larger than 100 km^2 are listed if suspended or dissolved sediment data are given. We list nearly 800 rivers (including about 20 for which we could not find data regarding their drainage basin area), and their distribution relative to basin size is depicted in Figure 1. In addition, there are approximately 30 rivers whose location we could not verify on available maps; we have high-lighted in shadow font the names of these rivers on the spreadsheets to indicate uncertainty as to whether the rivers actually discharge to the sea.

In total, the collective basin area of rivers with water discharge data represents slightly more than 75 percent of the land area draining into the oceans. Not surprisingly, fewer rivers have been monitored for suspended or dissolved sediment loads, 66 and 62 percent of the land area draining to the oceans, respectively. In terms of drainage basin area, the best studied river systems in the world are those in Russia, Europe and North America (U.S.A. and Canada), whereas the islands in Oceania are the poorest documented, with only about 10 percent of the total drainage area cited in this data base (Table 1).

Using this Data Base

Each river is listed under that country through which the river discharges to the sea. For instance, most of the Colorado River lies in the United States, but it discharges through Mexico; therefore, we classify this river as Mexican. Similarly, the Ganges and Brahmaputra rivers are grouped as Bangladeshi rivers, not Indian.

We have listed the river data for 80 countries, which have been grouped into 54 series of maps on which are located the drainage paths for those rivers for which data appear in the following pages.

Table 1. Distribution of drainage areas in various land masses for which there are data for fluvial water, suspended sediment, and dissolved solid discharge to the sea.

	Area (x106 km2)		
Land Mass	Water	Suspended Sediment	Dissolved Sediment
N. America	14	11	11
C. America	0.1	0	0
S. America	13	11	11
Europe	6	5	2
Africa	12	12	9
Russia	14	13	13
S. Asia	13	12	12
Oceania	0.4	0.3	0.2
Australia	2	2	1

To access the data for any river, the reader can refer directly to the country listed on pp vi-vii. Conversely, if one does not know the name of a specific river, the general location might be identified the world map on p. v, from which one can reference the correct country in the index. From this one can access the country map; the numbers on the map refers to the river, whose relevant data appear in the accompanying table.

Cautions in Using This Data Base

Mean values for river discharge and sediment load can hide a wide range of shorter term values as well as a multitude of errors. Some of the data, for example, come from primary sources, such as the U.S. Geological Survey or the Geological Survey of Canada. Other data, however, are derived from other indices (such as UNESCO, 1971), which means that we may know little of where or for how long the measurements were made, or the techniques used in obtaining them. Some rivers have been measured for many years, other data entries in this index may represent only one or two years worth of data. Where the number of years of observations are known, we have high-lighted the data as less than 5 years (italics), 5-20 years (outline) or >20 years (bold) of measurements.

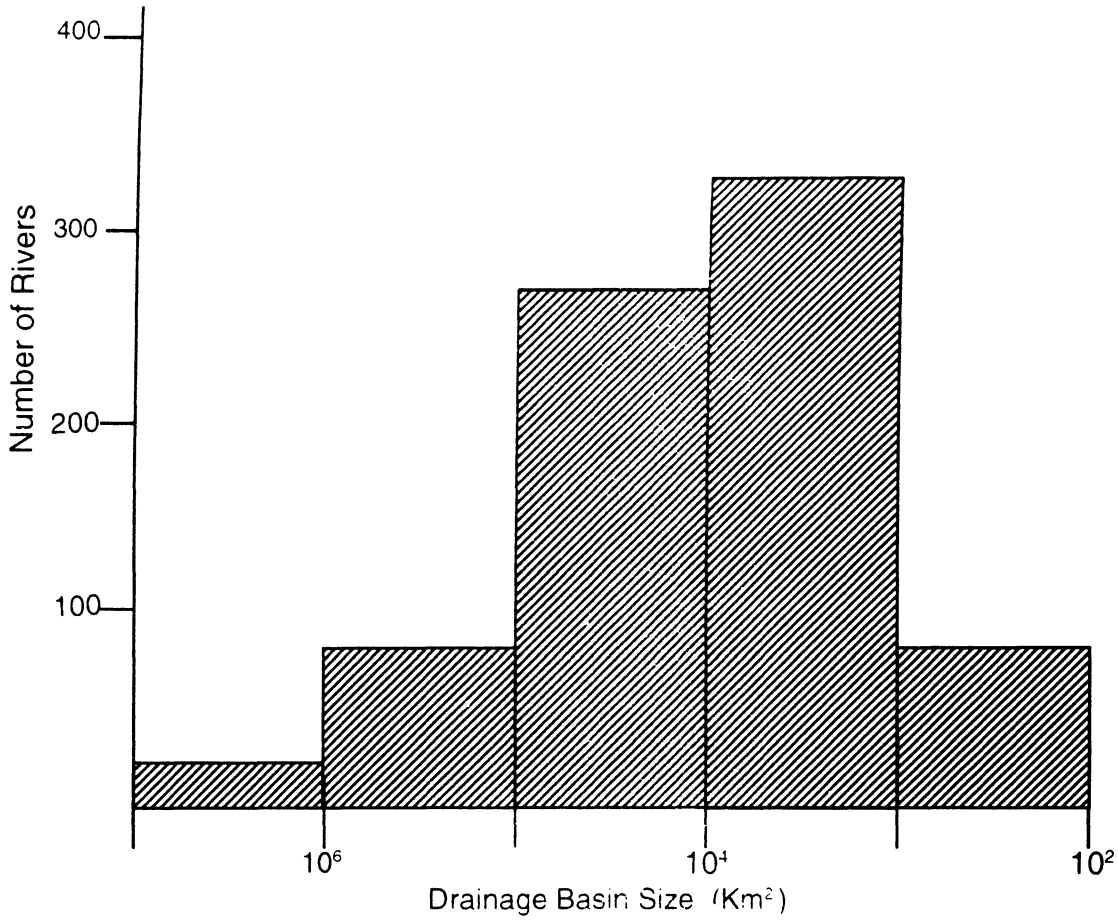

Figure 1. Distribution of drainage basin size for the nearly 800 rivers represented in this data base. Nearly all the rivers larger than 100,000 km² are listed in this index, whereas the majority of rivers smaller than 10,000 km² are not, because of the lack of available measurements for smaller rivers.

Smaller rivers can experience episodic flooding whose discharge values can be two to five orders of magnitude greater than normal. The sediment load for Chira River in Peru, for example, is based on two years worth of observations, one during an El Niño year, the other during a normal rainfall year. As a result, the average for these two years differs by more than an order of magnitude. Small rivers, therefore, particularly need long-term records if their average discharge is to represent a meaningful value.

Finally, we note that the data for many rivers may not represent present-day values or, conversely, that present-day values may not represent historical values. Dammed rivers, for instance, may now discharge little sediment or water to the sea, whereas recently deforested or developed river basins may have far greater sediment erosion than they did previously.

Plea to the Interested Reader

We must emphasize that this present report should be considered as a preliminary report. We realize that some data may be wrong and that we may have ignored many other rivers for which there are data that we could not find.

There are clearly many rivers not listed here for which some data may occur. We urge the interested reader to contact one of us if there are corrections to be made or new rivers to be added. We will acknowledge you in the next edition of this data base.

Acknowledgments

The effort was sponsored by LOICZ, who also funded a preliminary workshop in Strasburg (France) in May 1994, hosted by Jean-Luc Probst and attended by Robert Meade (Denver), Stefan Kempe (Darmstadt), Michel Meybeck (Paris) and John Milliman (Gloucester Point). We acknowledge Jean-Luc Probst (Strasburg) for supplying data for Algeria, Tunisia and Morocco, Peter Harris (Hobart) for access to his Australian river data base, and Edgardo Gomez (Quezon City) for supplying data from Philippine rivers. We are particularly grateful to Harold Burrell and Wanda Cohen (Gloucester Point) for their help in preparing the final text for publication. Much of Milliman's and Rutkowski's funding for the preparation of this report came from the National Science Foundation (NSF-ATM 9222405) and the Office of Naval Research (N00014-94-1-0179).

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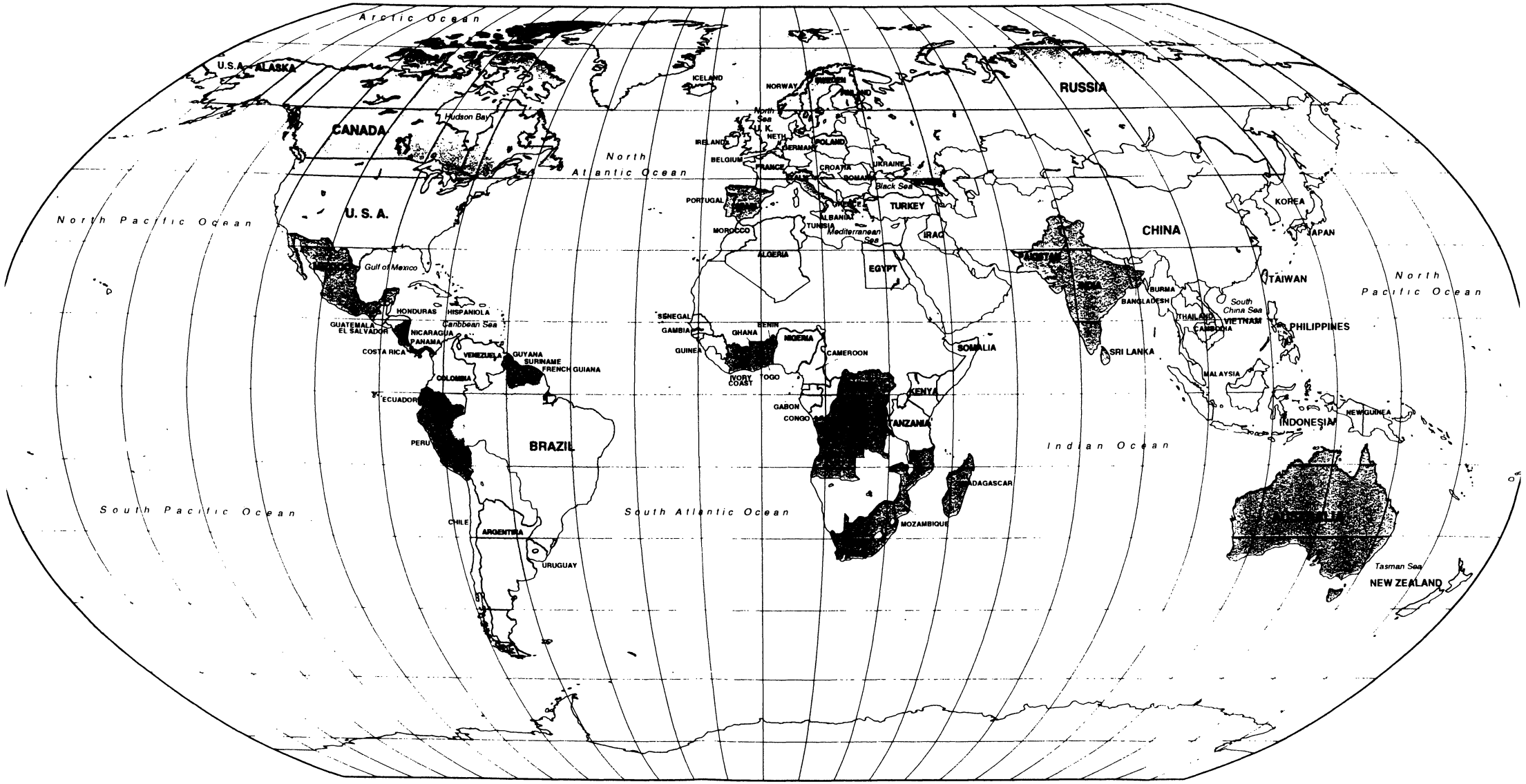
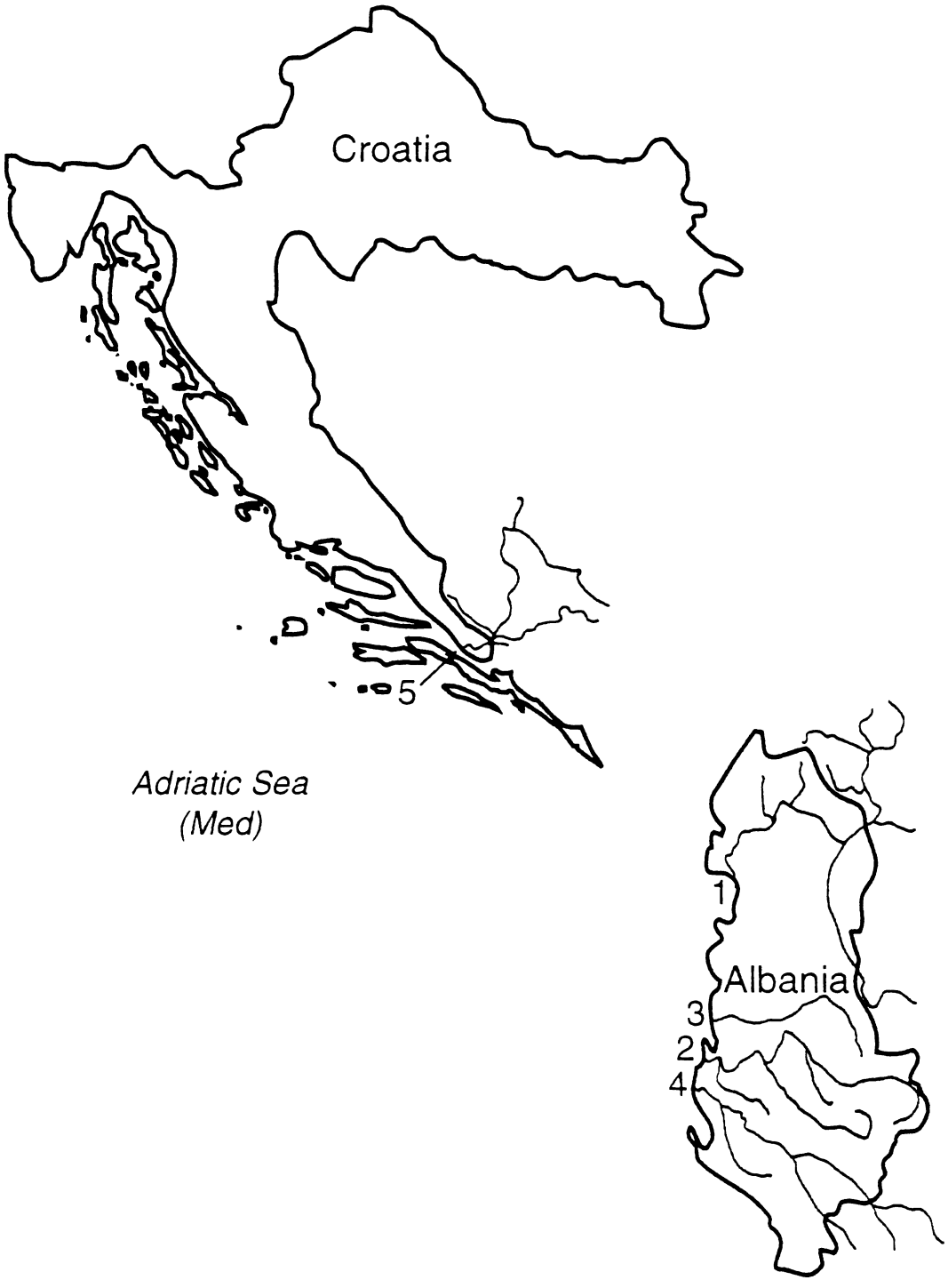

Arctic Ocean
U.S.A.
ALASKA
CANADA
Hudson Bay
U. S. A.
North Pacific Ocean
North Atlantic Ocean
Gulf of Mexico
Caribbean Sea
HONDURAS
HISPANIOLA
GUATEMALA
EL SALVADOR
NICARAGUA
PANAMA
COSTA RICA
VENEZUELA
GUYANA
SURINAME
FRENCH GUIANA
COLOMBIA
ECUADOR
PERU
BRAZIL
CHILE
ARGENTINA
URUGUAY
South Pacific Ocean
South Atlantic Ocean
ICELAND
NORWAY
SWEDEN
FINLAND
RUSSIA
North Sea
U.K.
IRELAND
NETH.
GERMANY
POLAND
BELGIUM
FRANCE
CROATIA
ROMANIA
UKRAINE
Black Sea
PORTUGAL
SPAIN
GREECE
TURKEY
ALBANIA
TUNISIA
Mediterranean Sea
MOROCCO
ALGERIA
EGYPT
IRAQ
SENEGAL
GAMBIA
GUINEA
GHANA
BENIN
NIGERIA
CAMEROON
IVORY COAST
TOGO
GABON
CONGO
KENYA
TANZANIA
SOMALIA
MADAGASCAR
MOZAMBIQUE
Indian Ocean
CHINA
KOREA
JAPAN
TAIWAN
PAKISTAN
INDIA
BURMA
BANGLADESH
SRI LANKA
THAILAND
CAMBODIA
VIETNAM
South China Sea
PHILIPPINES
MALAYSIA
INDONESIA
NEW GUINEA
AUSTRALIA
Tasman Sea
NEW ZEALAND
North Pacific Ocean

World Index to Maps

Albania and Croatia



GLORI - Albania and Croatia

	River	Ocean	Area(103km2	Length (km)	Max Elev (m)	Q (km3/yr)	TSS(106t/yr)	TDS (106t/yr)	Reference(s)
	Albania								
1	Drini	Med	12	280			*15*		1,2,5
2	Semani	Med	5.2				*22*		4
3	Shkumbini	Med	1.9	140			6.8		3
4	Vijose	Med	5.2						1
	Croatia								
5	Neretva	Med	13	220		12			6

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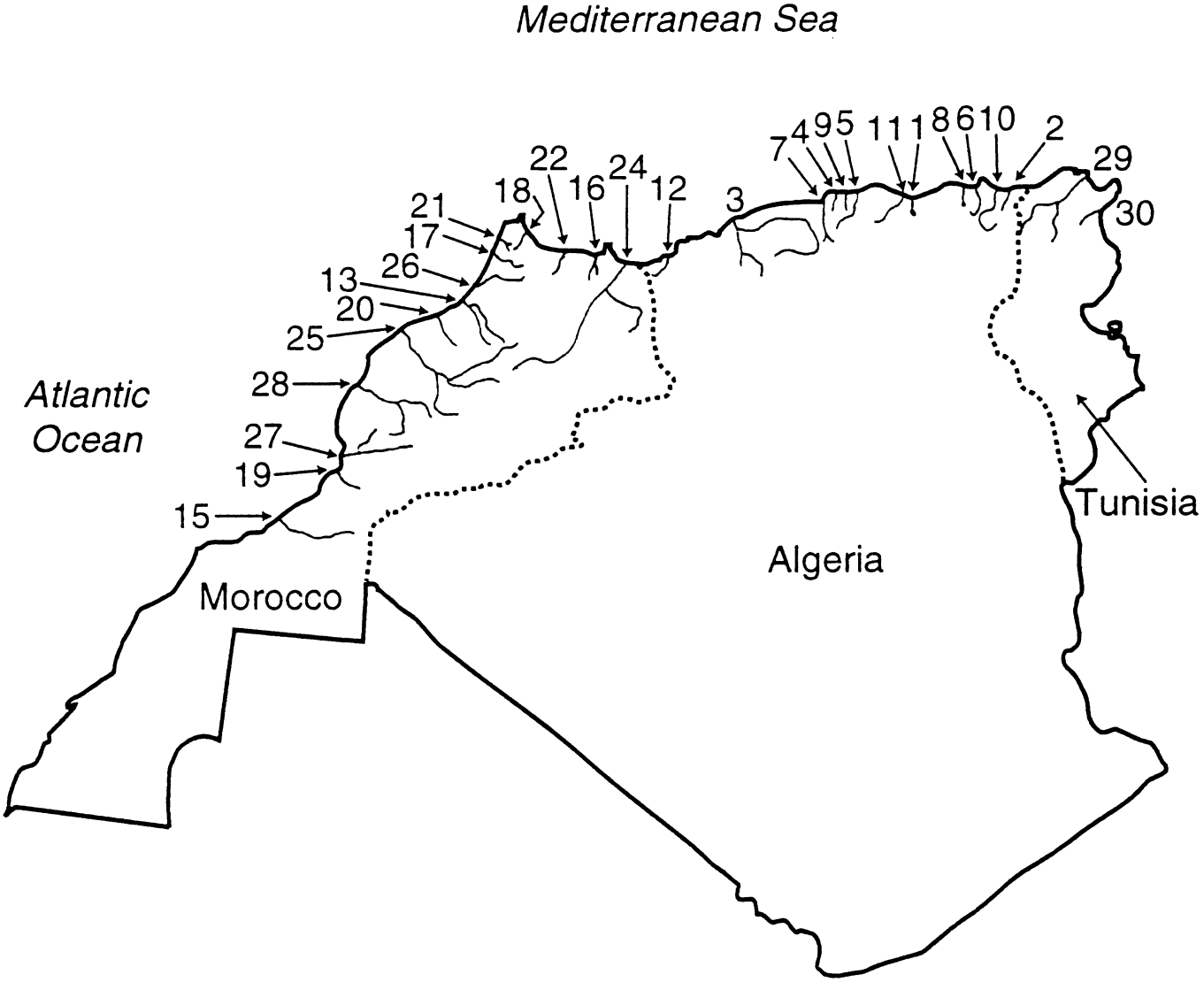
Algeria, Morocco, and Tunisia



Global River Index -Algeria

	Algeria River	Ocean	Area(103km2	Length(km)	Max Elev(m)	Q(km3/yr)	TSS(106t/yr)	TDS(106t/yr)	Reference(s)
1	Agrioun	Med	0.66			0.17	4.8		4
2	B. Namoussa	Med	0.57			0.15	0.18		4
3	Chellif	Med	44	700		1.3	4		1,2,4
4	El Harrach	Med	0.39			0.13	0.63		3
5	Isser	Med	3.6			0.36	8.3		4
6	Kebir O	Med	1.1			0.23	0.22		4
7	Mazafran	Med	1.8			0.44	3		4
8	Saf-Saf	Med	0.3			0.07	0.37		4
9	Sebaou	Med	1.5			0.51	1.2		4
10	Seybousse	Med	5.5	200		0.43	1.2		4,5
11	Soumman	Med	8.5			0.79	4.1		1,4
12	Tafna	Med	6.9			0.28	1		4

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Global River Index - Morocco

	Morocco River	Ocean	Area (103km2	Length (km)	Max Elev(m)	Q (km3/yr)	TSS (106t/yr)	TDS (106t/yr)	Reference(s)
13	Bou Regreg	Atl	9.8			0.56	4.7		6
14	Bou Sellam		2.3			0.04	0.22		2
15	Draa	Atl	15			0.42	14		6
16	Kerte	Med	3.1			0.25			3
17	Loukos	Atl	1.8			0.9	1.8		6
18	Martine	Med	1.2						3
19	Massa	Atl	3.8			0.16	1.6		6
20	Mellah	Atl	1.8			0.16	1		6
21	Mharhar	Atl	0.18			0.06	0.21		6
22	Moulouya	Med	51	450		1.6	6.7		5
23	N'Fiss		1.8			0.16	0.95		5
24	Nekor	Med	0.79			0.9	2.8		1
25	Oum Er Rbia	Atl	30			3.3	6.6		5
26	Sebou	Atl	40	310		4.4	26	0.55	4,7
27	Souss	Atl	16			0.31	1.6	0.04	
28	Tensift	Atl	20			0.91			3

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Global River Index - Tunisia

	Tunisia River	Ocean	Area(103km2	Length(km)	Max Elev(m)	Q(km3/yr)	TSS(106t/yr)	TDS(106t/yr)	Reference(s)
29	Medjerdha	Med	22			0.94	9.4		2,3
30	Miliane	Med	2			0.02	0.9		1

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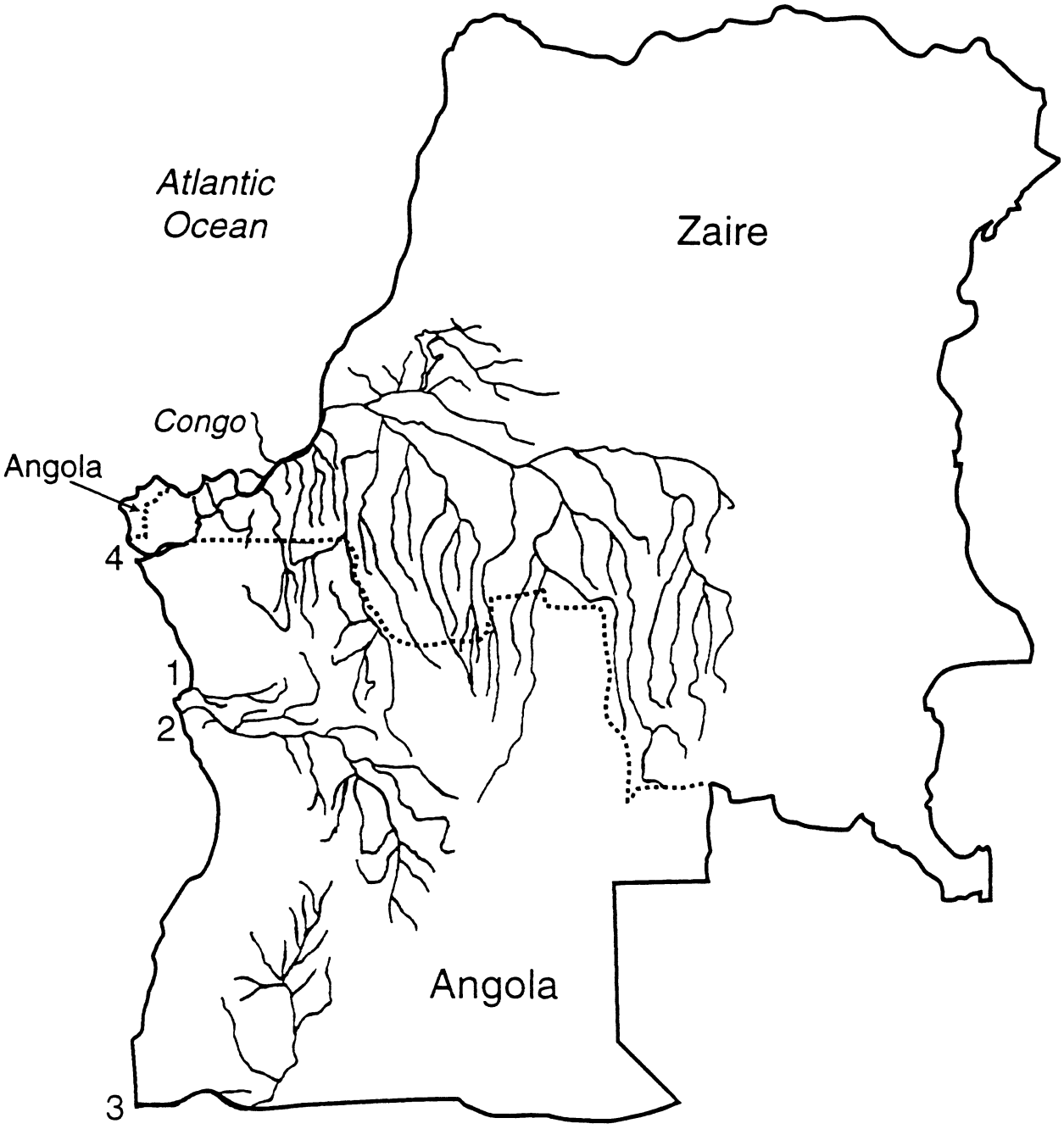
Angola and Zaire



	River	Ocean	Area(103km2	Length (km)	Max Elev (m)	Q (km3/yr)	TSS(106t/yr)	TDS(106t/yr)	Reference(s)
	Angola								
1	Bengo	Atl	7.4			1.2			1,7
2	Cuanza	Atl	150	630		26			1,2,7
3	Cunene	Atl	110	830		6.8	0.35		1,2,7
	Zaire								
4	Congo(Zaire)	Atl	3800	4700	1100	1200	43	37	3,4,5,6,8,9,10

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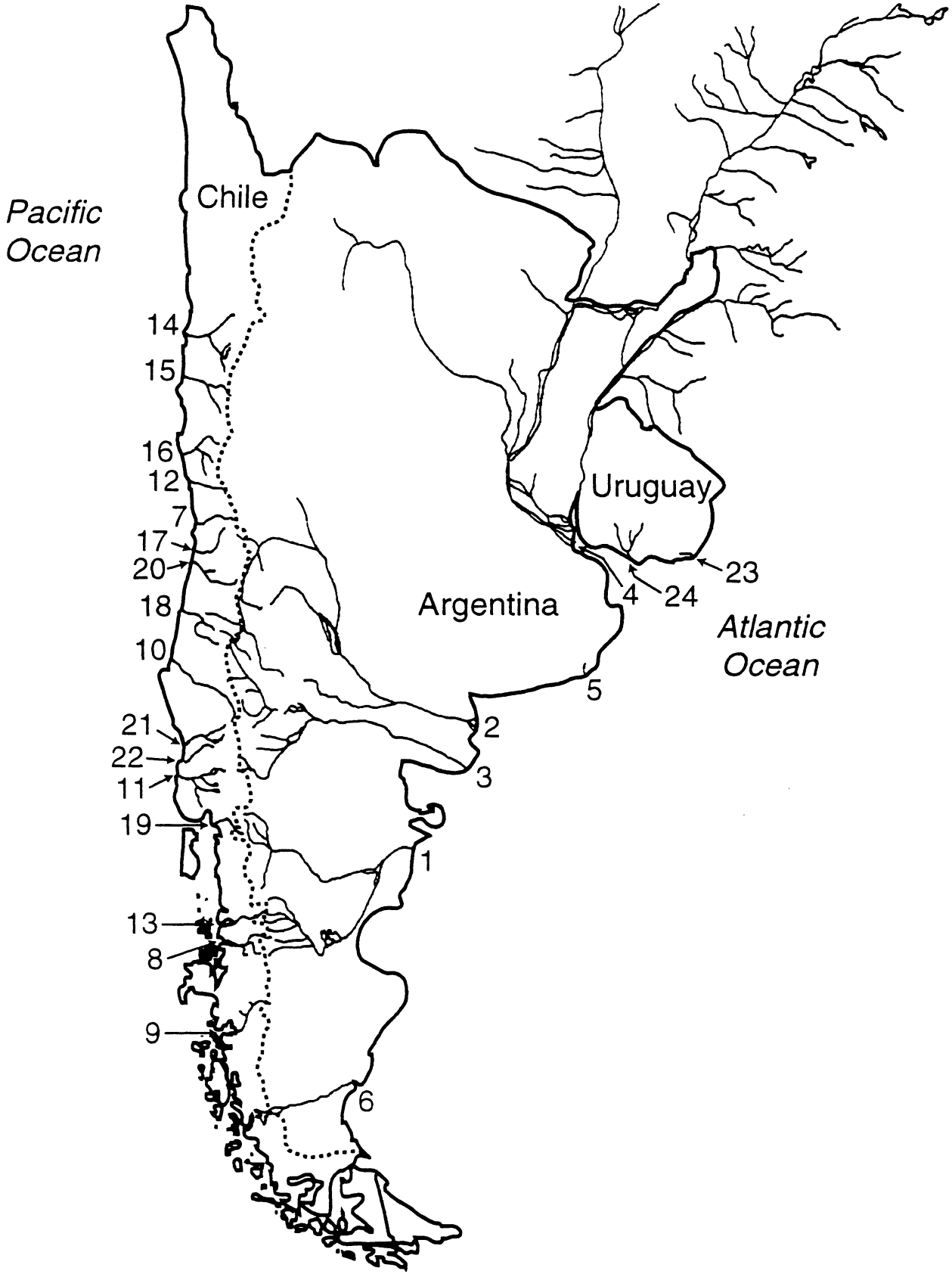
Argentina, Chile, and Uruguay



Global River Index - Argentina

	Argentina River	Ocean	Area(103km2	Length (km)	Max Elev(m)	Q (km3/yr)	TSS(106t/yr)	TDS(106t/yr)	Reference(s)
1	Chubut	Atl	16	850					1,2,3
2	Colorado	Atl	65	1000		**4.1**	**6.9**		1,4
3	Negro	Atl	95	1000		**30**		5.4	1,2,3,4
4	Parana/Urugua	Atl	2800	4800	4000	**470**	79	51	1,2,5,6,7,8
5	Pescado	Atl	5.1						1
6	Santa Cruz	Atl	15						1

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Global River Index - Chile

	Chile River	Ocean	Area(103km2	Length (km)	Max Elev(m)	Q (km3/yr)	TSS(106t/yr)	TDS(106t/yr)	Reference(s)
7	Aconcagua	Pac	2.6	70		1			1
8	Aisen	Pac	3.1	110		1.4			1
9	Baker	Pac	24	310		31			1
10	Bio-Bio	Pac	24	380		15		1.8	1,2,3
11	Bueno	Pac	3.7	120		11			1
12	Choapa	Pac	3.6	150		0.34			1
13	Cisnes	Pac	5.2	140		7.9			1
14	Copiapo	Pac	5.1	170		0.07			1
15	Huasco	Pac	3	150		0.15			1
16	Limari	Pac	6.2	110		0.25			1
17	Maipo	Pac	15	230		3.2			1
18	Maule	Pac	22	88		13			1,3
19	Puelo	Pac	8.6	150		21			1
20	Rapel	Pac	13	210		5			1
21	Tolten	Pac	3	120		10			1
22	Valdivia	Pac	11	150		14			1,3

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	Uraguay River	Ocean	Area(103km2	Length (km)	Max Elev (m)	Q (km3/yr)	TSS(106t/yr)	TDS(106t/yr)	Reference(s)
23	Cebollati	Atl	18			**3.2**			2
24	Santa Lucia	Atl	3.2			1.2			1

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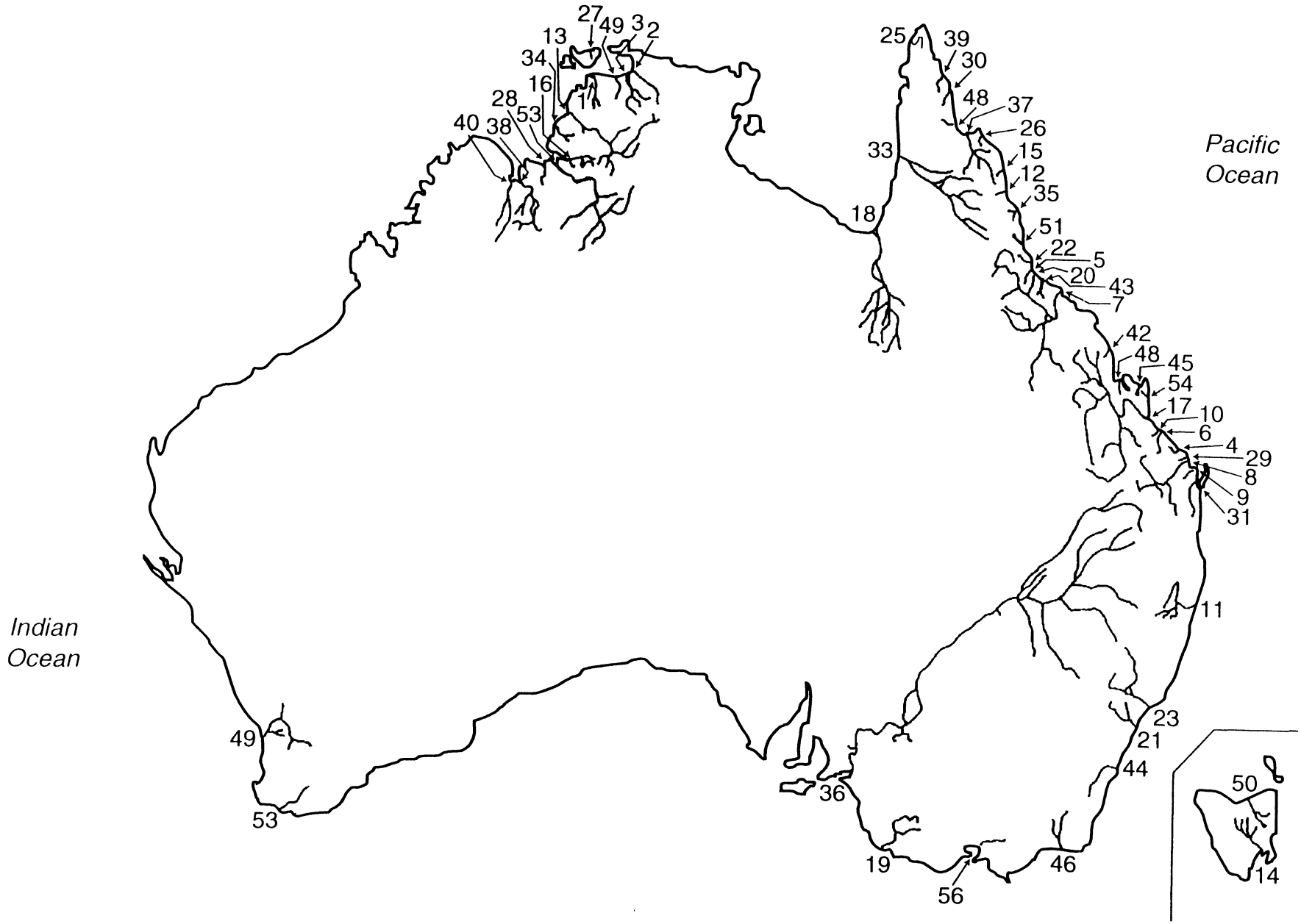
Australia


Pacific Ocean
Indian Ocean
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	Australia River	Ocean	Area(103km2	Length (km)	Max Elev (m)	Q (km3/yr)	TSS(106t/yr)	TDS(106t/yr)	Reference(s)
1	Adelaide	Pac	7.6			2			1
2	Alligator, East	Pac	14			6.9			1
3	Alligator, Soutl	Pac	12			6.6			1
4	Baffle Ck	Pac	3.9			0.7	0.4		2
5	Black	Pac	1.1			0.5	0.2		2
6	Boyne	Pac	2.5			0.4	0.3		2
7	Burdekin	Pac	130	680	980	10	3		2,3
8	Burnett	Pac	33	400		1.7	0.7		3,4,12
9	Burrum	Pac	3.3			0.7	0.3		2
10	Calliope	Pac	2.3			0.3	0.2		2
11	Clarence	Pac	6.4	340					4,12
12	Daintree	Pac	2.1			3.6	1.2		2
13	Daly	Pac	52	360		6.7			1
14	Derwent (Tasn	Indian	9.2	170		4.3	0.11		1,12
15	Endeavour	Pac	2.2			1.8	0.75		2
16	Fitzmaurice	Pac	11	170		1.6			1,12
17	Fitzroy	Pac	140	560		7.1	2.2		1,5,12
18	Flinders	Pac	110	830		3	9.3	0.3	1,3
19	Glenelg	Indian	4.2						4
20	Haughton	Pac	3.6			0.8	0.4		2
21	Hawkesbury	Pac	22	470		2.8	1.5		8,9,12
22	Herbert	Pac	10			5	1.6		2
23	Hunter	Pac	22			1.8	11		1,4,12
24	Jacky Jacky Creek		2.8			1.9	0.8		2
25	Jardine	Pac	3.3			2.2	0.76		1
26	Jeannie	Pac	3.8			2.4	1		1
27	Johnson	Pac	2.3			4.7	1.9		1
28	Keep	Pac	12			0.5			2
29	Kolan	Pac	3			0.5	0.3		2
30	Lockhart	Pac	2.8			1.6	0.6		2

31	Mary	Pac	9.6	270		2.3	0.9	1,2,12	
32	Mcleay		11			2	0.1 (1.7)		1
33	Mitchell	Pac	72	560		12	0.43	1,12	
34	Mossman	Pac	0.49			0.7	0.4		2
35	Moyle	Pac	7.5			0.64			1
36	Mulgrave-Russ	Pac	2			4.2	1.6		2
37	Murray	Indian	1100	3500		12	28	8.4 1,3,6,7	
38	Normanby	Pac	25			5.9	2.7		2
39	Ord	Pac	55			5.1	35		1
40	Pascoe	Pac	4.3			4.2	1.2		2
41	Pentecost	Pac	29			4.3			1
42	Plane Creek	Pac	2.7			1.4	0.55		2
43	Ross	Pac	1.8			0.4	0.3		2
44	Shoalhaven	Indian	8			1.8	0.93	8,9,10,11	
45	Shoalwater Ck	Pac	3.7			0.8	0.3		2
46	Snowy	Indian	5.1	430	2200			4,13	
47	Stewart	Pac	2.8			1.6	0.5		2
48	Styx	Pac	3.1			0.8	0.3		2
49	Swan Avon	Indian	124	390		0.88		5,12	
50	Tamar (Tasm)	Indian	12			3.1	0.14		1
51	Tully	Pac	1.7			3.7	1.2		2
52	Victoria	Pac	78			5		1,12	
53	Warren	Pac	1.4						4
54	Water Park Ck	Pac	1.9			0.7	0.3		2
55	Wildman	Pac	4.8			0.8			1
56	Yarra	Pac	4.1	180		1.1	0.15	1,12	

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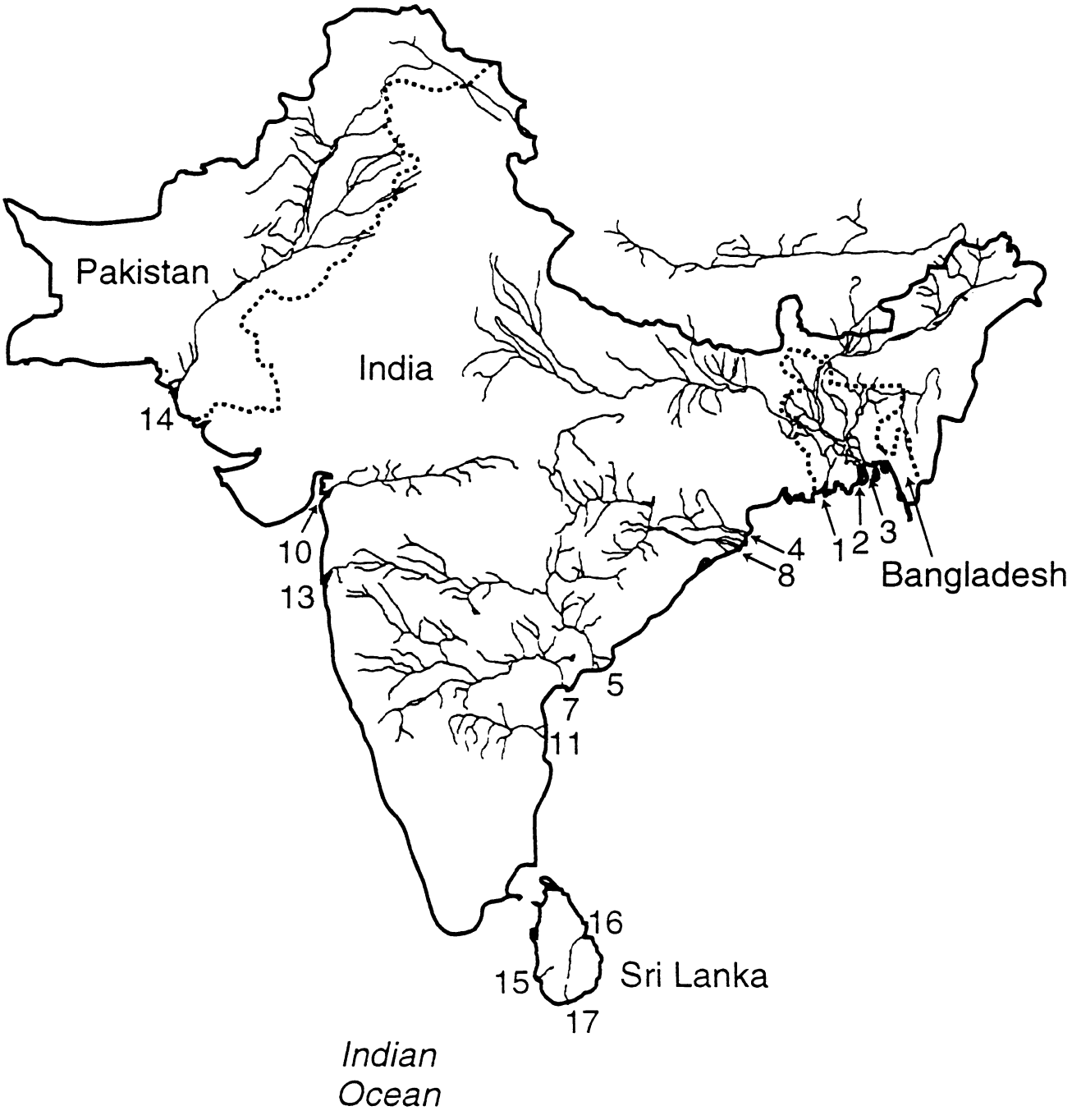
Bangladesh, India, Pakistan, and Sri Lanka



Global River Index - Bangladesh

	Bangladesh River	Ocean	Area(103km2	Length (km)	Max Elev (m)	Q (km3/yr)	TSS (106t/yr)	TDS (106t/yr	Reference(s)
1	Bramaputra	Indian	580	2600	5700	630	540	63	1,2,5
2	Ganges	Indian	980	2200	2160	590	520	110	1,2,5
3	Meghna	Indian	80	900		110			3,4

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Global River Index - India

India River	Ocean	Area(103km2	Length (km)	Max Elev (m)	Q (km3/yr)	TSS(106t/yr)	TDS(106t/yr)	Reference(s)
4 Brahmani	Indian	28	480		16	20	1.2	6,7
5 Godavari	Indian	310	1400		92(100)	170	17	3,5,6
6 Kaweri		87	760		21	1.4	8.3	1,7
7 Krishna	Indian	250	1300		32(67)	4(8.5)	12	1,3,6,7
8 Mahanadi	Indian	88	1300		67	31(61)	8.1	1,3,4,6,8
9 Mani		25			11	9.7	2.8	6
10 Narmada	Indian	88	1300		47	70	10	1,6
11 Penner	Indian	49	560		5.2(3)	6.9	1.1	2,6,7
12 Sabarmathi		14	400		1.4	4.6	0.5	6,7
13 Tapti	Indian	49			10(18)	2.5	3	6

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5. Biksham and Subramanian, 1988
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7. Rand McNally, 1980
8. Harrison, in press

GLORI - Pakistan and Sri Lanka

	Pakistan River	Ocean	Area(103km2	Length (km)	Max Elev(m)	Q(km3/yr)	TSS(106t/yr)	TDS(106t/yr)	Reference(s)
14	Indus	Arabian	970	3200	3800	240	59(250)100	13	1,2,3,4,5
	Sri Lanka(Ceylon)								
15	Kelani	Indian	2.1			**5.6**			6
16	Mahaweli	Indian	7.3	330		**7.1**			6,7
17	Walawe	Indian	1.6	130		**1.4**			6,7

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3. UNESCO(WORRI), 1978
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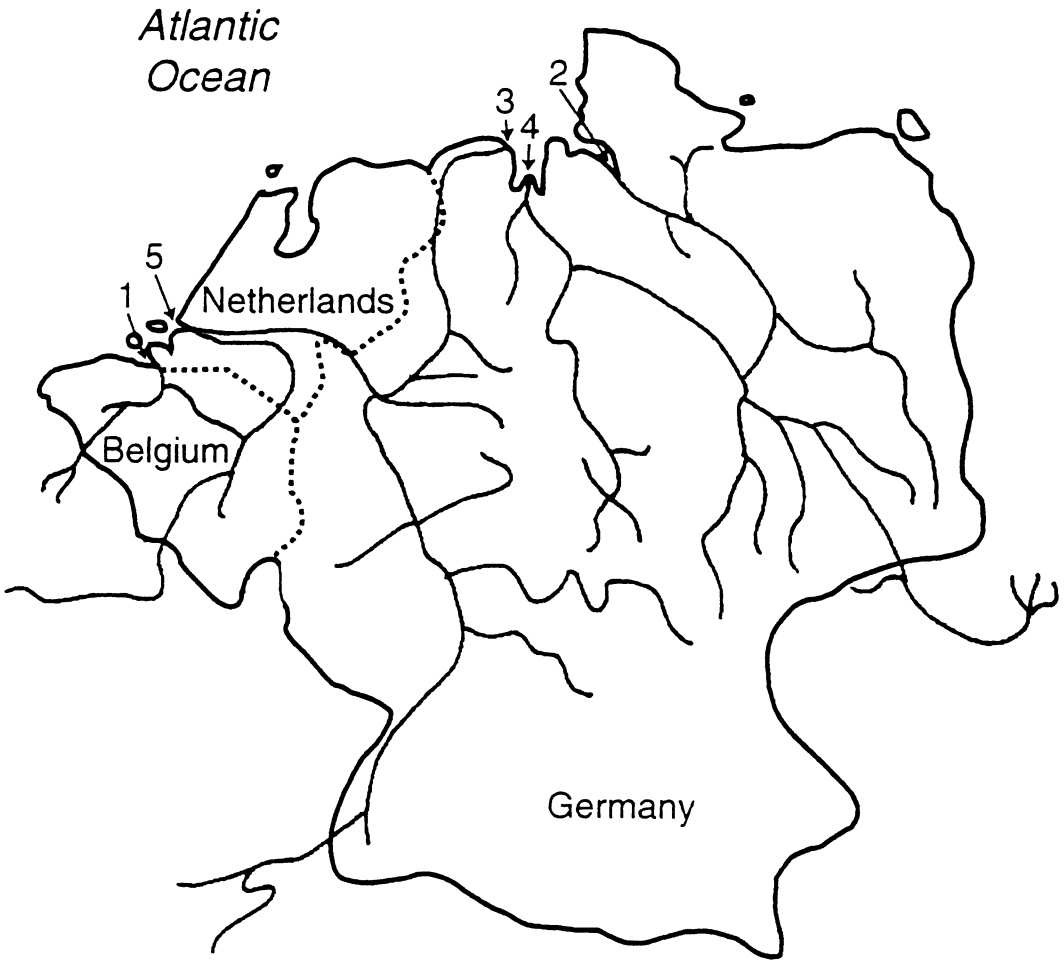
Belgium, Germany, and Netherlands



GLORI - Bel., Ger., and Nether.

	Belgium River	Ocean	Area(103km2	Length (km)	Max Elev (m)	Q (km3/yr)	TSS(106t/yr)	TDS(106t/yr)	Reference(s)
1	Scheldt	Atl	22	430			1		1,2
	Germany								
2	Elbe	Atl	1100			24	0.84	16	3,4,7
3	Ems	Atl	370			1.9		0.06	3,5,8
4	Weser	Atl	720			11	0.33	26	3,4,5
	Netherlands								
5	Meuse	Atl	29			10	**0.7**		5,6
6	Rhine	Atl	220	1400	750	80	**2.8**	58	4,5,6,9,10

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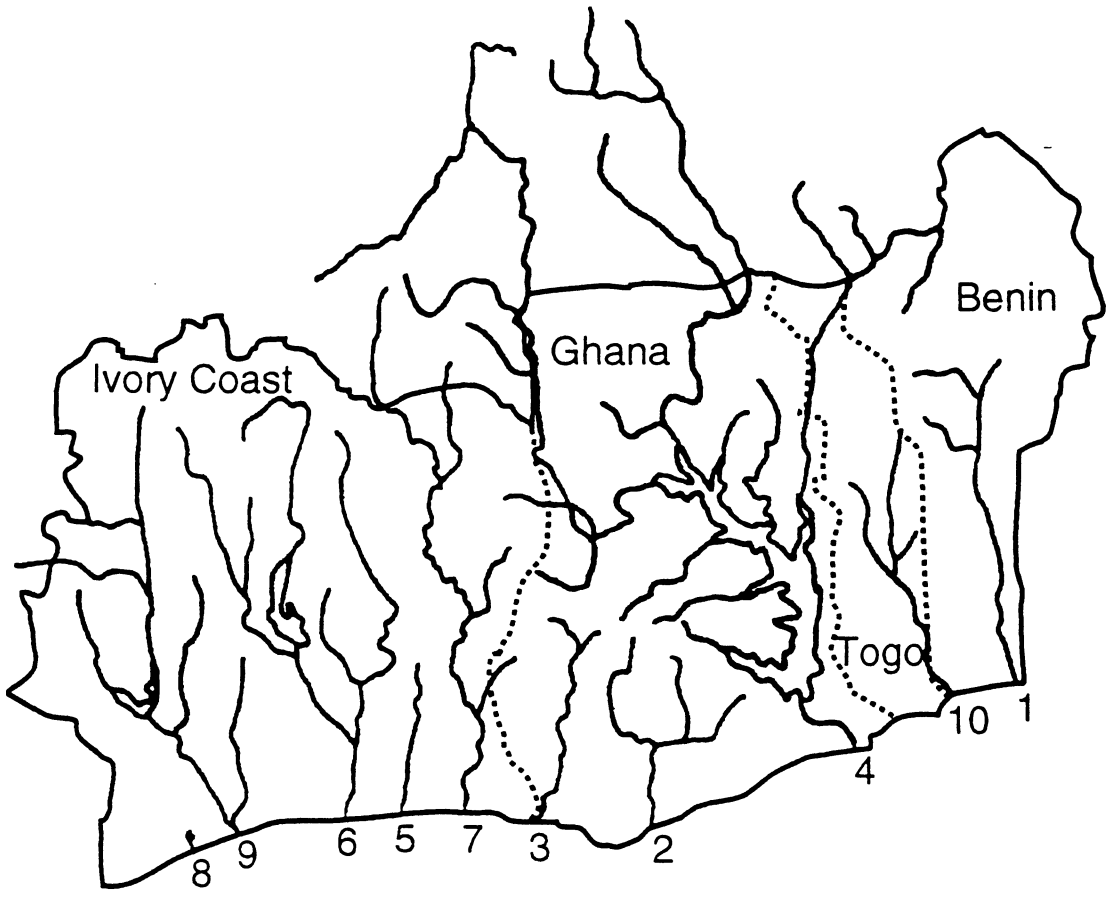
Benin, Ghana, Ivory Coast, and Togo



Atlantic Ocean

	River	Ocean	Area(103km2	Length (km)	Max Elev (m)	Q (km3/yr)	TSS(106t/yr)	TDS(106t/yr)	Reference(s)
	Benin (Dahomey)								
1	Oueme	Atl	50	480		**4.8**			1,9
	Ghana								
2	Pra	Atl	23	240		8.9			7,9
3	Tano	Atl	16	400		4.5	0.35		6,8,9
4	Volta	Atl	400	1600		40	0(19)		2,8
	Cote d'Ivoire								
5	Agneby	Atl	4.6			0.37			1
6	Bandama	Atl	97	780		9.7	0.79		1,2
7	Comoe	Atl	76	1200	420	13		0.67	2,3,4
8	S. Pedro	Atl	3.3				0.07		5
9	Sassandra	Atl	75	660		13		0.68	1,2,4
	Togo								
10	Mono	Atl	22	400		4.9			4,7,9

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Brazil

Global River Index - Brazil

	Brazil River	Ocean	Area(103km2	Length (km)	Max Elev (m)	Q (km3/yr)	TSS (106t/yr)	TDS (106t/yr	Reference(s)
1	Amazon	Atl	6300	6400		6300	1200	270	1,2
2	Doce	Atl	85	580		20			3,8
3	Jequintinhonha	Atl	63	800		13			3,8
4	Paraiba	Atl	56						4
5	Parnaiba	Atl	320	1400		32			
6	Sao Francisco	Atl	630	3200		120	6	6	2,5,6,7,9
7	Toncantins	Atl	700	1600		350			3

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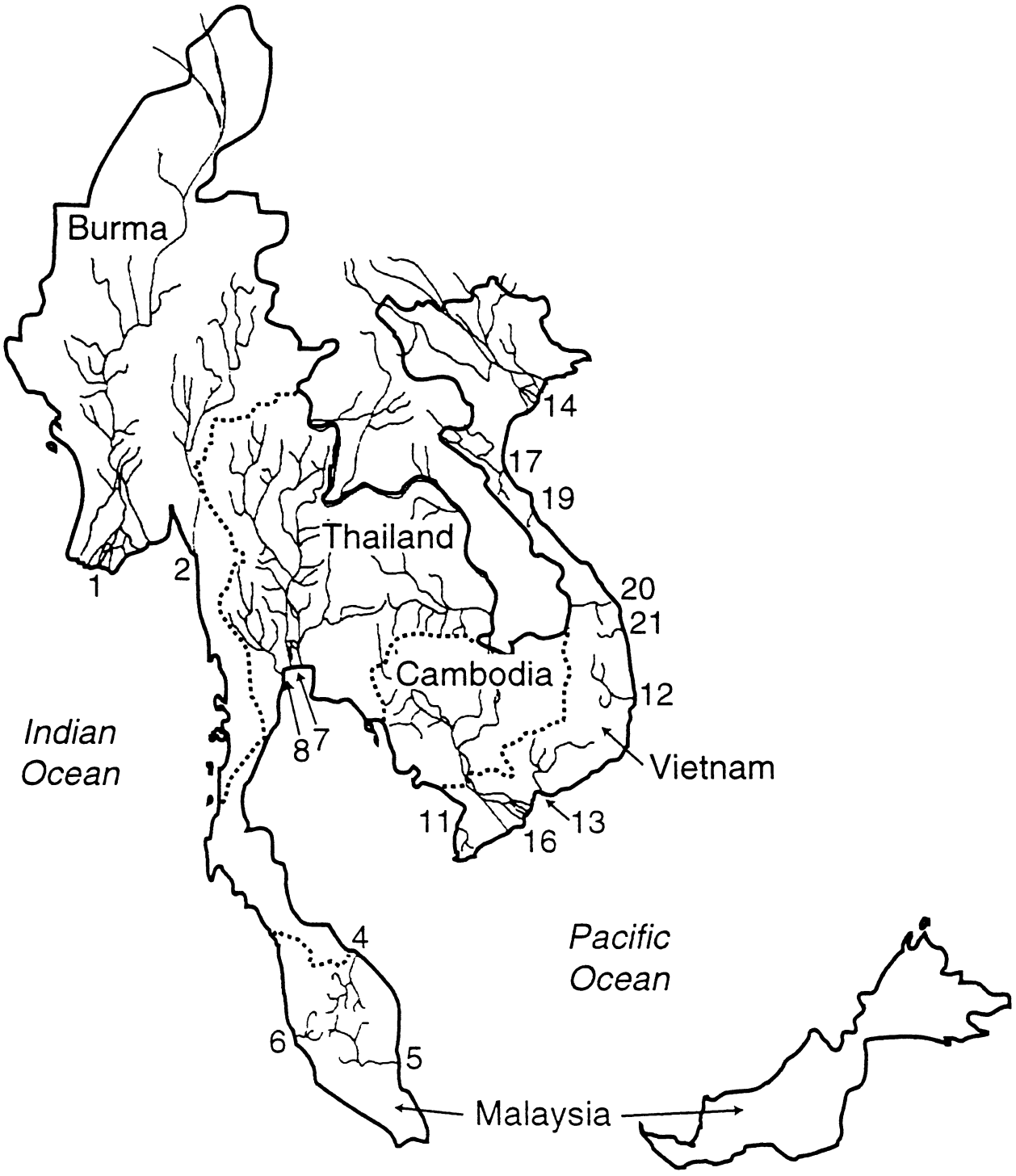
Burma, Cambodia, Malaysia, Thailand, and Vietnam



GLORI-Burma, Cam., & Malaysia

	River	Ocean	Area(103km2	Length (km)	Max Elev(m)	Q (km3/yr)	TSS(106t/yr)	TDS(106t/yr)	Reference(s)
	Burma(Myanmar)								
1	Irrawaddy	Indian	430	2300		430	260	86	1,2
2	Salween	Indian	170	2800		50			1
	Cambodia								
3	Selangor		3.2				0.09		4
	Malaysia								
4	Kelantan	Pac	12	240		15			3,5
5	Pahang	Pac	26	320		21			3
6	Perak	Indian	13			12			3

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Global River Index-Thailand

	Thailand River	Ocean	Area(103km2	Length (km)	Max Elev (m)	Q (km3/yr)	TSS(106t/yr)	TDS(106t/yr)	Reference(s)
7	Chao Phya	Pac	160	1200		30		5.3	1,2
8	Mae Klong	Pac	27			13			3,4,5
9	Petch		4			0.05			4

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Global River Index - Vietnam

	Vietnam River	Ocean	Area(103km2	Length (km)	Max Elev (m)	Q (km3/yr)	TSS(106t/yr)	TDS(106t/yr)	Reference(s)
10	An-Nong		1.5			3.7			1
11	Cai	Pac	2			4.8			1
12	Da-Rang	Pac	12						1
13	Dong-Nai	Pac	22			16			1,2
14	Hong He	Pac	160	1200		120	130	70	3
15	Kone		1.4			1.8			1
16	Mekong	Pac	790	4500		470	160	57	1,3,4
17	Song-Koi	Pac		800		120			5
18	Tam-Giang		1.8						1
19	Thach-Han	Pac	1.4			2.5			1
20	Thu-Bon	Pac	3.3						1
21	Tra-Khuc	Pac	2.8						1

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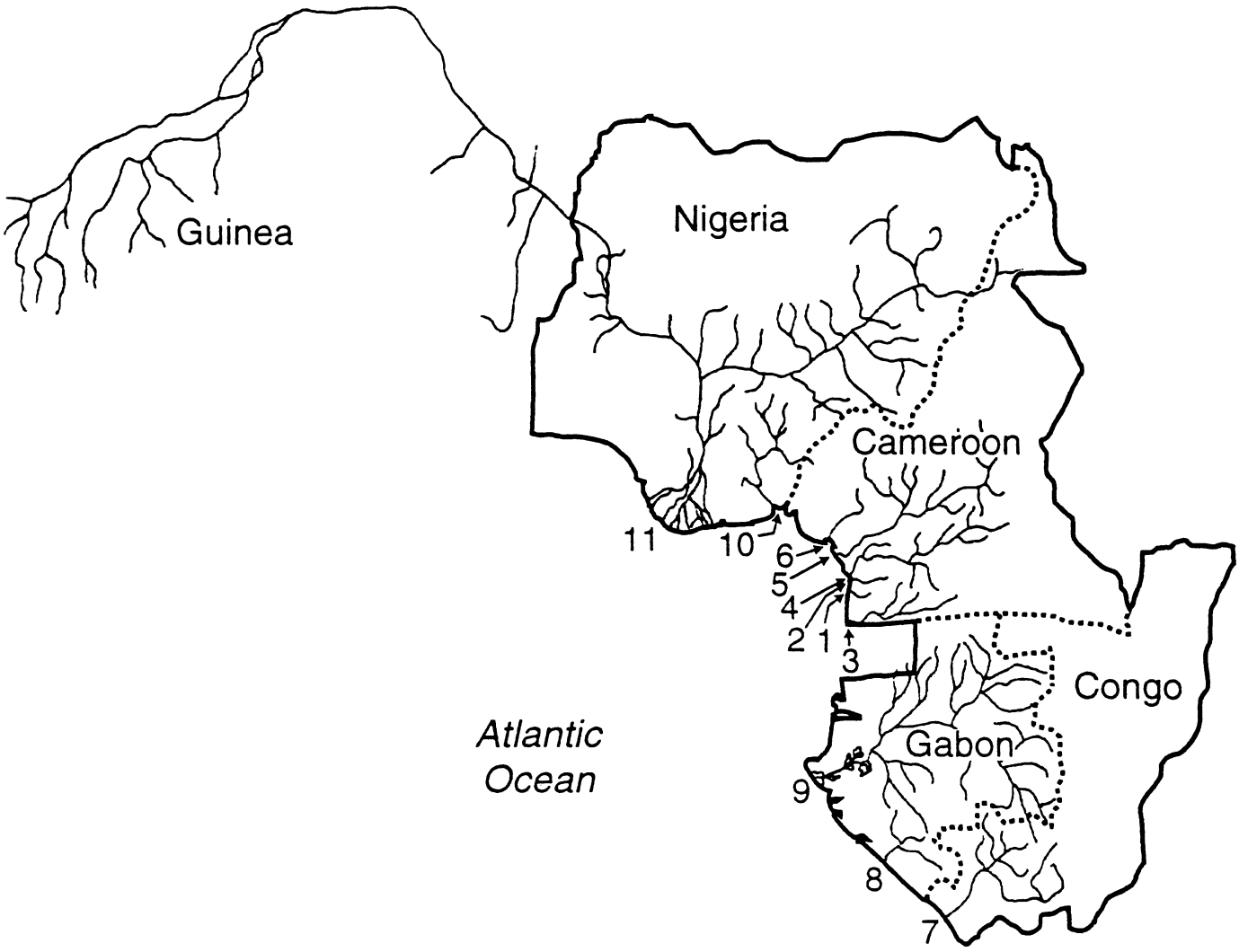
Cameroon, Congo, Gabon, and Nigeria



Global River Index - Cameroon

	Cameroon River	Ocean	Area(103km2	Length (km)	Max Elev(m)	Q (km3/yr)	TSS(106t/yr)	TDS(106t/yr)	Reference(s)
1	Lobe	Atl	1.9						1
2	Lokoundje	Atl	1.2						1
3	Ntem	Atl	31						1
4	Nyong	Atl	19			**4.5**			1,3
5	Sanaga	Atl	130	860		**65**	2.2	2.1	1,2
6	Wouri	Atl	8.2						1

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	Congo River	Ocean	Area(103km2	Length (km)	Max Elev (m)	Q (km3/yr)	TSS(106t/yr)	TDS(106t/yr)	Reference(s)
7	Kouilou	Atl	55						1
	Gabon								
8	Nyanga	Atl	21	390		20			3,4
9	Ogooue	Atl	200	850		150			2,4
	Nigeria								
10	Cross	Atl	48	480					3,5
11	Niger	Atl	1200	4000	820	200	40	14	2,6,7,8,9,10,1

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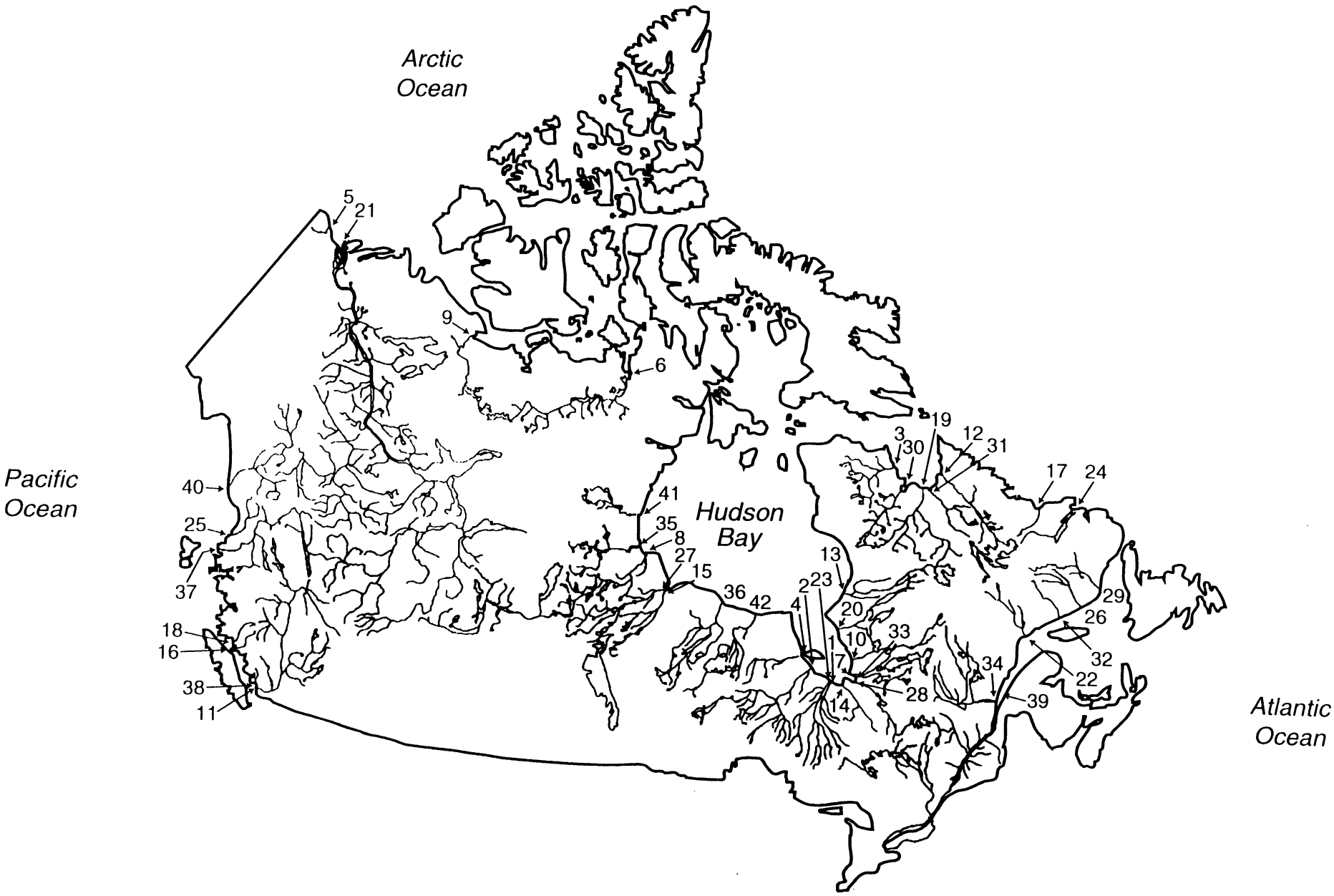
Canada


Arctic Ocean
Pacific Ocean
Hudson Bay
Atlantic Ocean
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Global River Index -Canada

	Canada River	Ocean	Area(103km2	Length (km)	Max Elev (m)	Q (km3/yr)	TSS(106t/yr)	TDS(106t/yr)	Reference(s)
1	Abitibi	Arctic (HB)	2.4	370			0.14		2,7
2	Albany	Arctic (HB)	130	970		44		5.2	1,3
3	Arnaud	Arctic	49			21		0.16	1,3
4	Attawapiskat	Arctic (HB)	50	760		11	0.2	0.14	1,2,3,7
5	Babbage	Arctic	50				3.5		4
6	Back	Arctic	110	960		16		0.18	1
7	Broadback	Arctic (HB)				12			14
8	Churchill	Arctic (HB)	290	1800		50		4.6	1
9	Coppermine	Arctic		850		11			7,14
10	Eastmain	Arctic(HB)	47	680		29		0.38	1
11	Fraser	Pac	220	1400		110	20	11	1,5
12	Georges	Arctic	41	550		29		0.39	1,3
13	Grand Riv Balei	Arctic(HB)	43	700		21		0.3	1
14	Harricana	Arctic (HB)	29	400		18			3,7
15	Hayes	Arctic(HB)	110	480		18			1,3,7
16	Homathko	Pac	5.7			0.8	4.3		6
17	Kanairiktok	Atl				11			15
18	Kliniklim	Pac	6.5			1	5	5.2	1,6
19	Koksoak	Arctic	130	150		80			1,7
20	LaGrande	Arctic (HB)	97			54		0.7	1
21	MacKenzie	Arctic	1800	4200	1220	330	100	69	1,8,13
22	Moisie	Atl	19			13		0.04	1
23	Moose	Arctic (HB)	110			43	0.4	6.6	2
24	Naskaupi	Atl				11			14
25	Nass	Pac	21	320		30			3,7
26	Natashquan	Atl		320		13			7,14
27	Nelson	Arctic (HB)	1100	2700		110		31	1
28	Nottaway	Artcic (HB)	65	330		37	1		7,9
29	Petit Mecantina	Atl	20			17			3,14
30	R. aux Feuilles	Arctic	43			18			14
31	Rivere de la Ba	Arctic	32			18		0.26	1,3

32 Romaine	Atl	14	400			0.16	7,10	
33 Rupert	Arctic(HB)	43	610		28		0.06 1,7	
34 Saguenay	Atl	90	700		55	0.4		2
35 Seal	Arctic (HB)				11			14
36 Severn	Arctic (HB)	100	390		15			
37 Skeena	Pac	55	510		55	11	3.4 1,11	
38 Squamish	Pac	3.6			1.8	1.8		12
39 St. Lawrence	Atl	1200	3100		450	4	62 1,4	
40 Stikine	Pac	18	540		12	20	7,8	
41 Thaanne	Arctic(HB)				16			15
42 Winisk	Arctic(HB)	67	740	670	13		1,5	

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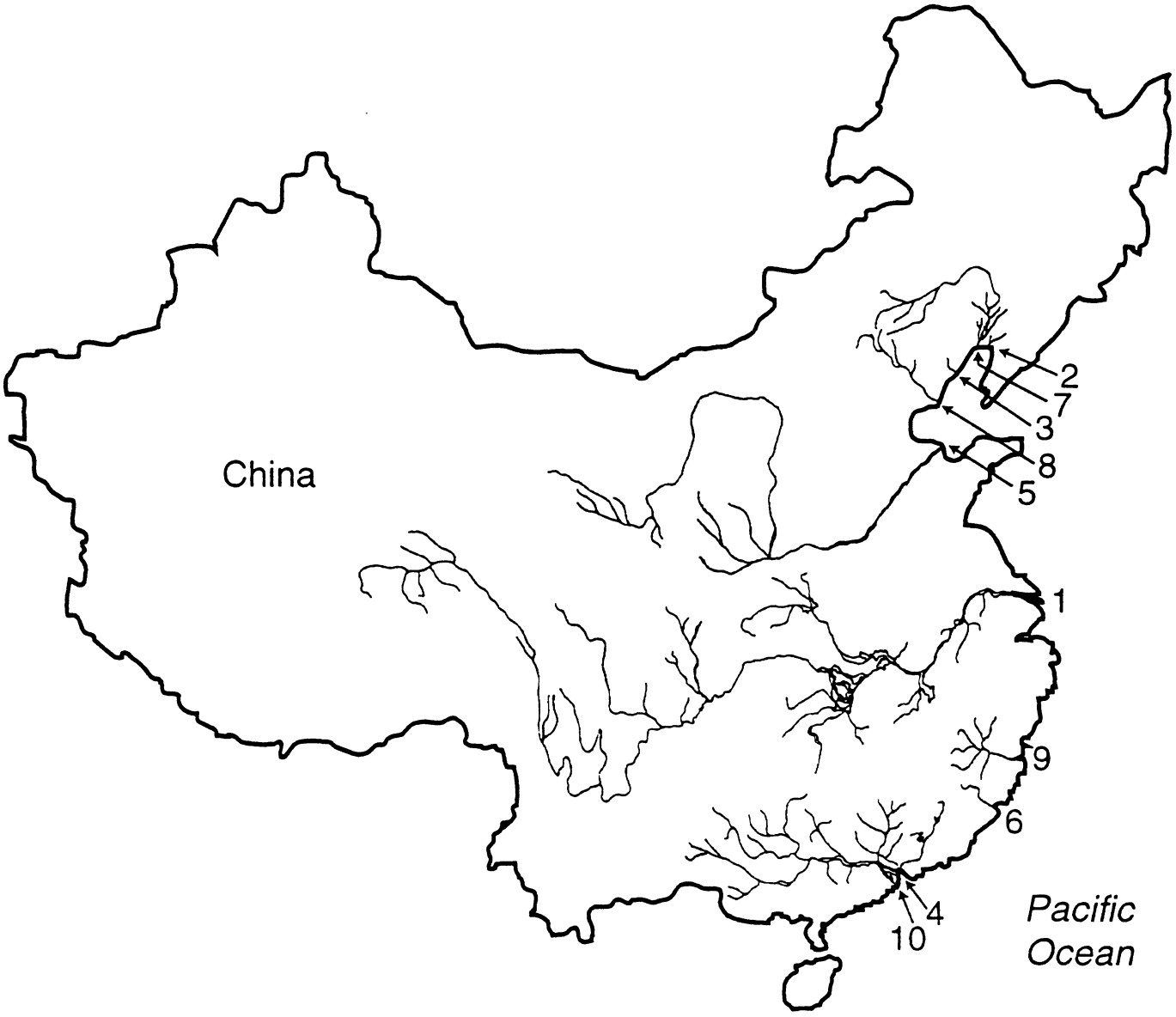
China



	China River	Ocean	Area (103 km	Length (km)	Max Elev (m)	Q (km3/yr)	TSS (106t/yr)	TDS (106t/yr)	Reference(s)
1	Changjiang	Pac	1900	5500	3200	930	480	180	2,3
2	Daliaohe	Pac	27			9(1)	110(36)	2.5	2,4
3	Daling	Pac	20			1	36		4
4	Dongjiang	Pac	25			23		1	
5	Huanghe	Pac	770	4700	3100	59	1100	17	2
6	Juilongjiang	Pac	15			15	3.1	1.3	1
7	Liaohe	Pac	230	1300		16(6)	41		4
8	Luanhe	Pac	44	880					1
9	Menjiang	Pac	61			58	7.5	2.4	1,2
10	Xijiang	Pac	440	2200		300	69	58	1,2,4

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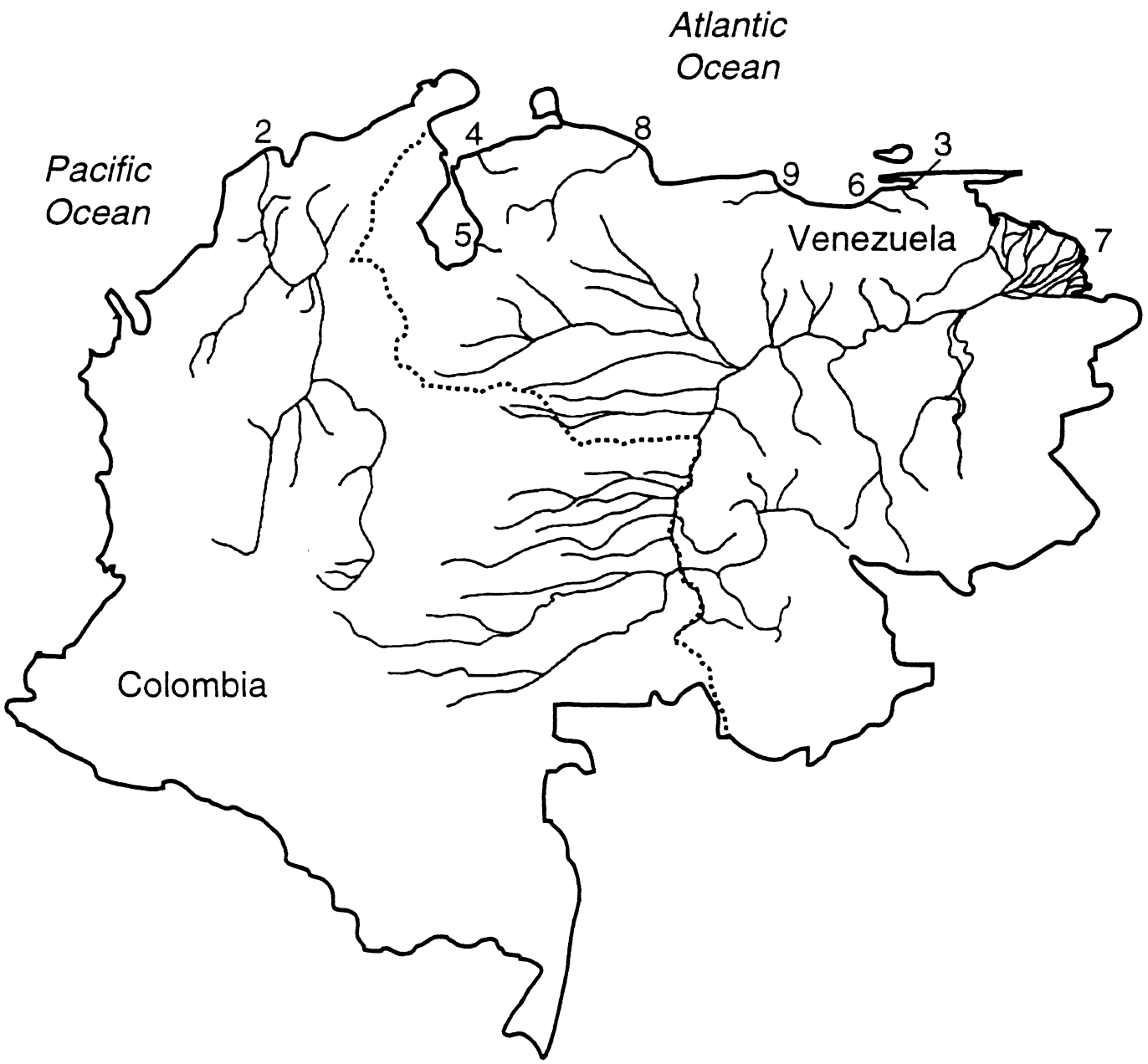
Colombia and Venezuela



GLORI - Colombia and Venezuela

	Colombia River	Ocean	Area(103km2	Length (km)	Max Elev (m)	Q (km3/yr)	TSS(106t/yr)	TDS(106t/yr)	Reference(s)
1	Lili								1
2	Magdalena	Atl	280	1500		240	220	28	2
	Venezuela								
3	Manzanares	Atl	0.83						4
4	Maticora	Atl	2.5						4
5	Motatan	Atl	4.4			**1.1**			3
6	Neveri	Atl	0.98						4
7	Orinoco	Atl	990	2800	1600	1100	210(150)	28	2,3,5,6,7,8
8	Tocuyo	Atl	3.6			**0.37**			3
9	Yaracuy	Atl	1.2			0.3			3

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Costa Rica, Nicaragua, and Panama

	River	Ocean	Area(103km2	Length(km)	Max Elev(m)	Q (km3/yr)	TSS(106t/yr)	TDS(106t/yr)	Reference(s)
	Costa Rica								
1	G. de Terraba	Atl	4.8			9.6			2
	Nicaragua								
2	Coco	Atl	5.8			1.6			1
3	San Juan	Atl	30			18			1
	Panama								
4	Bayano	Pac	3.9			5.7			1
5	Changuinola	Atl	2.7			6.4			1
6	Chiriqui	Pac	1.4			3.9			1
7	Santa Maria	Pac	1.2			2.5			1
8	Tabasara	Atl	1.1			2.3			1

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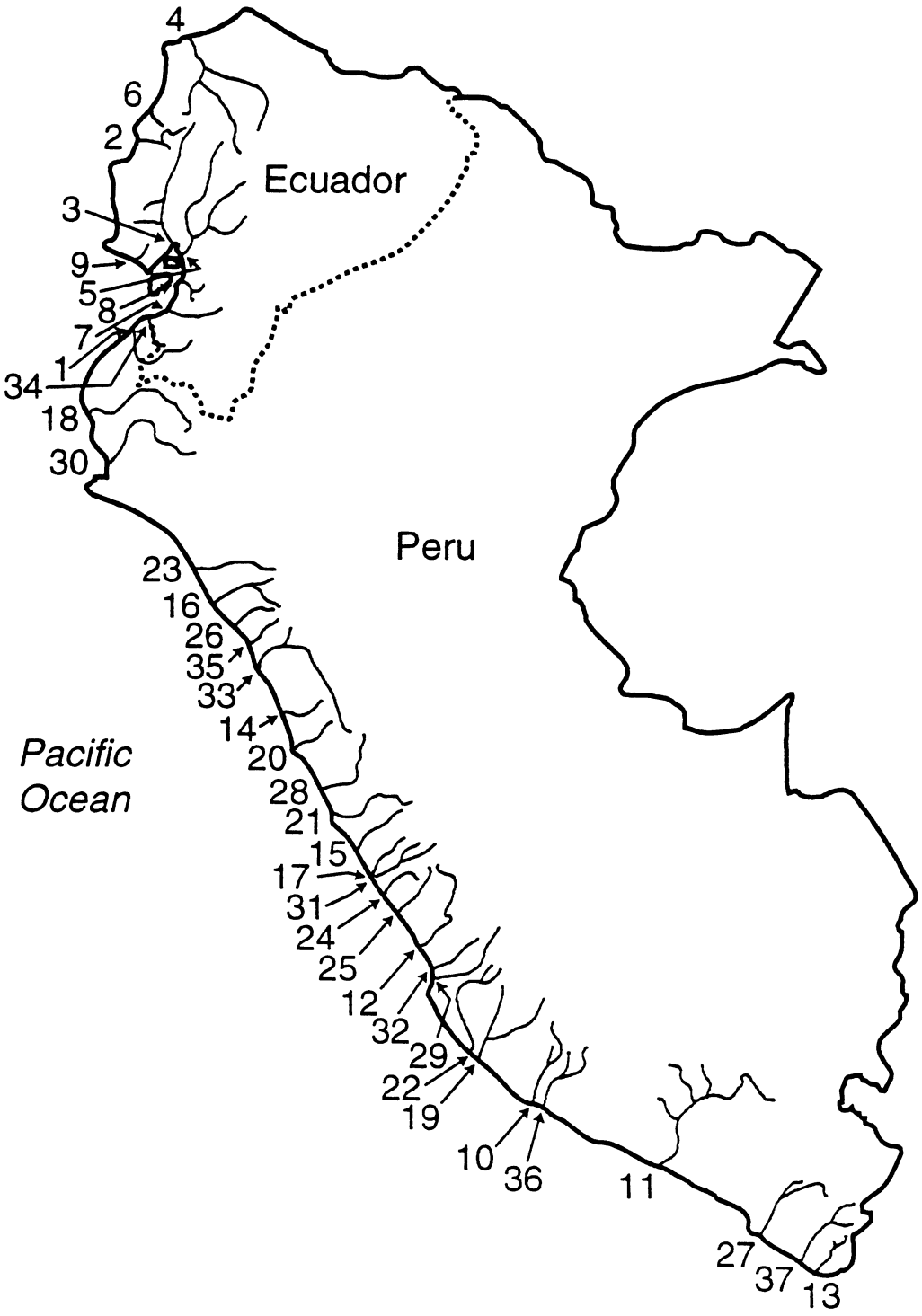
Ecuador and Peru



Global River Index - Ecuador

	Ecuador River	Ocean	Area(103km2	Length (km)	Max Elev (m)	Q (km3/yr)	TSS(106t/yr)	TDS(106t/yr)	Reference(s)
1	Catamayo-Chir	Pac	7			0.3			1
2	Chone	Pac	2.6			0.1			1
3	Daule	Pac	9			8.7			3
4	Esmeraldas	Pac	21			26			1,4
5	Guayes	Pac	35			4.7			1
6	Jama	Pac	1.6			0.1			1
7	Jubones	Pac	5.3			0.4			1
8	Puyango-Tumb	Pac	3.7			0.4			1
9	Zapotal	Pac	2.3			4.8			2

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	Peru River	Ocean	Area(103km2	Length (km)	Max Elev (m)	Q (km3/yr)	TSS(106t/yr)	TDS(106t/yr)	Reference(s)
10	Acari	Pac	4.1						1
11	Camana o Maje	Pac	17						1
12	Canete	Pac	6.7			1.7			1
13	Caplina	Pac	2.2						1
14	Casma	Pac	2.9			0.18			1
15	Chancay	Pac	5.2			0.89			1
16	Chicama	Pac	4.8			0.95			1
17	Chillon	Pac	2			0.29			1
18	Chira	Pac	20			5	20		1,2
19	Grande	Pac	13			0.55			1
20	Huarmey	Pac	2.1						1
21	Huaura	Pac	5.5			0.88			1
22	Ica	Pac	7.4			0.33			1
23	Jequetepeque	Pac	4.2			0.9			1
24	Lurin	Pac	2.5						1
25	Mala	Pac	2.1			0.57			1
26	Moche	Pac	2.1			0.3			1
27	Moquegua	Pac	3.4			0.06			1
28	Pativilca	Pac	4.7			1.4			1
29	Pisco	Pac	4.4			0.83			1
30	Piura	Pac	13			0.83			1
31	Rimac	Pac	3.5			0.91			1
32	San Juan	Pac	3.9			0.2			1
33	Santa	Pac	12			4.7			1
34	Tumbes	Pac	1.9						1
35	Viru	Pac	2			0.12			1
36	Yauca	Pac	4.5						1
37	Zana	Pac	2			0.26			1

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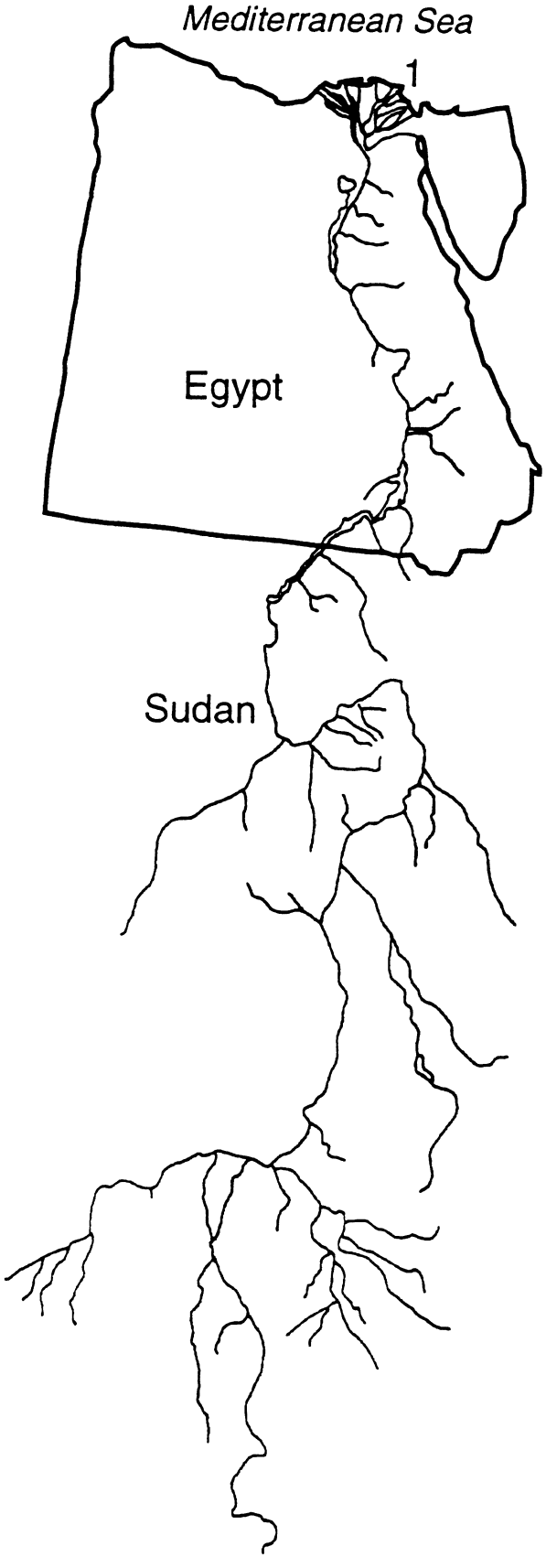
Egypt



Global River Index - Egypt

	Egypt River	Ocean	Area(103km2	Length (km)	Max Elev (m)	Q (km3/yr)	TSS(106t/yr)	TDS(106t/yr)	Reference(s)
1	Nile	Med	3000	6700	1600	90	0(120)	(6.1).	1,2,3

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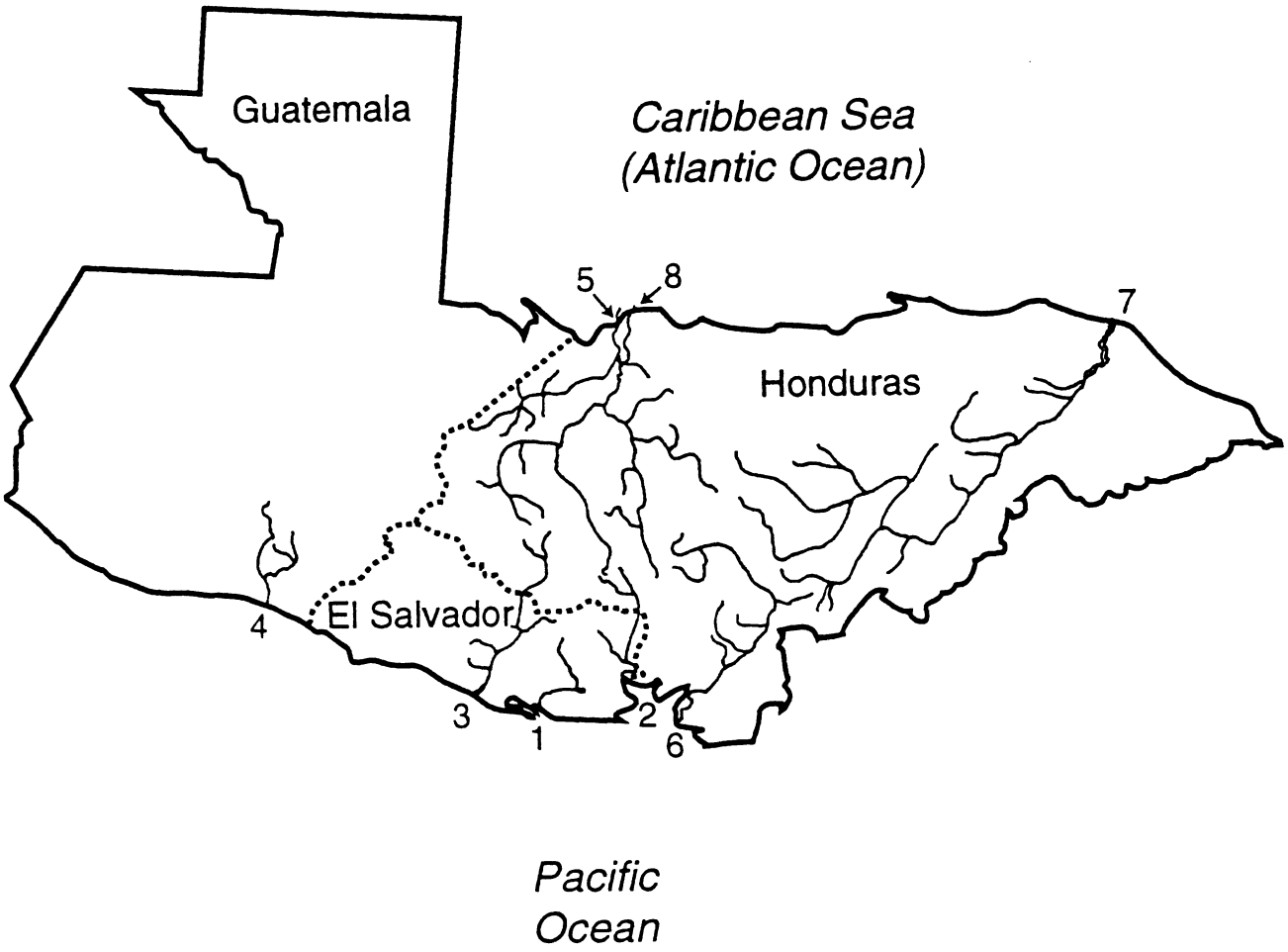
El Salvador, Guatemala, and Honduras



	River	Ocean	Area(103km2	Length (km)	Max Elev(m)	Q(km3/yr)	TSS(106t/yr)	TDS(106t/yr)	Reference(s)
	El Salvador								
1	G. San Miguel	Pac	2.4						1
2	Goascoran	Pac	1.7			*1.1*			2
3	Lempa	Pac	18						2
	Guatemala								
4	Los Esclavos	Pac	3.2			0.33			1
	Honduras								
5	Chamelecon	Atl	1.8			1.4			3
6	Choluteca	Pac	6.3			1.1			1
7	Patuca	Atl	26			26			3,4
8	Ulua	Atl	23			17			3,4

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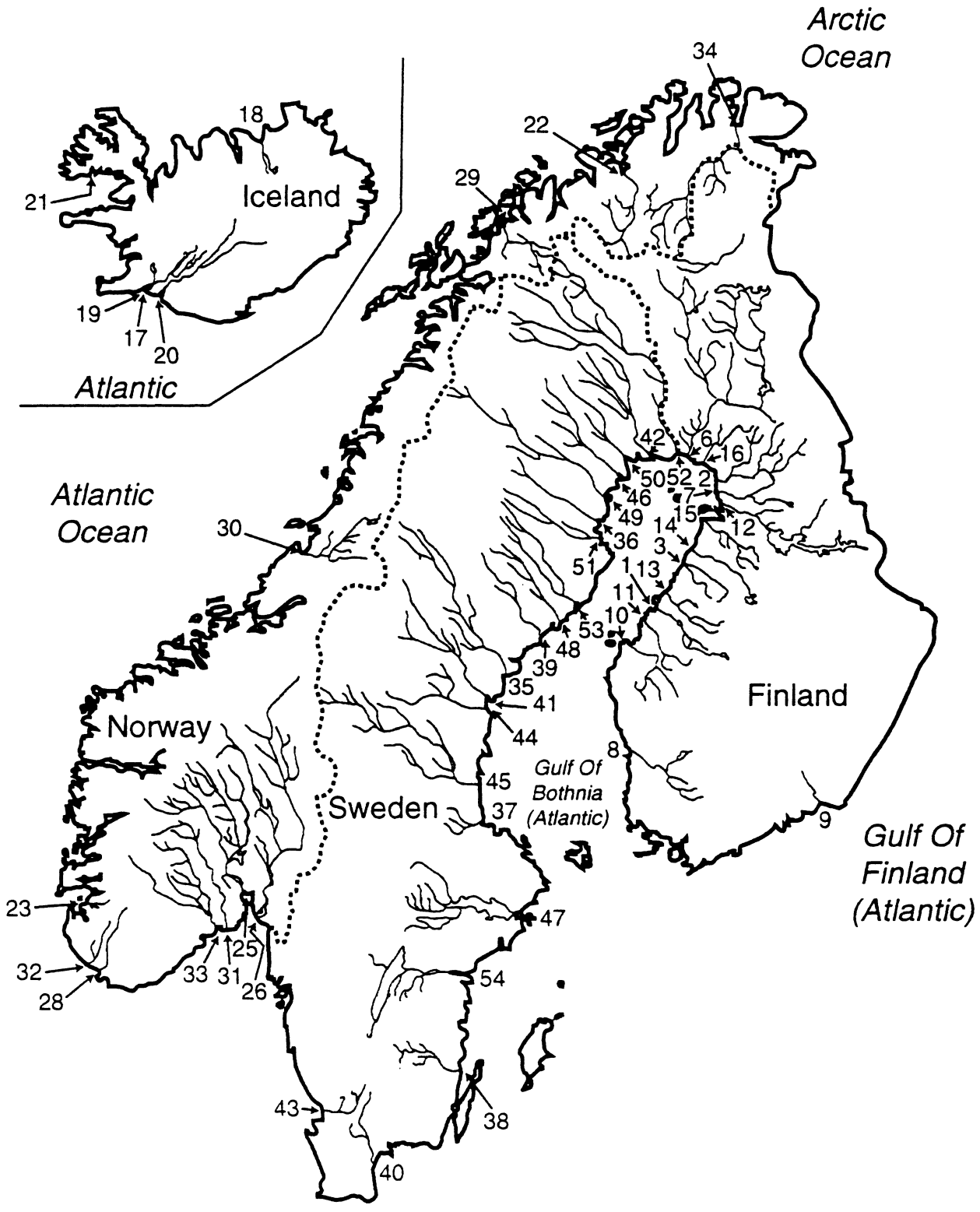
Finland, Iceland, Norway, and Sweden



Global River Index - Finland

	Finland River	Ocean	Area(103km2	Length (km)	Max Elev(m)	Q (km3/yr)	TSS(106t/yr)	TDS(106t/yr)	Reference(s)
1	Ahtavan	Atl(G. of B)	2			0.5			1
2	Iijoki	Atl(G. of B)	14			5.4			1
3	Kala	Atl(G. of B)	4.2			1.1			1
4	Kalkhinen		26	6.6		6.6	0.006		2,3
5	Karjaan		2			0.6			1
6	Kemi	Atl(G. of B)	51	550		17			1,2
7	Kiiminkijoki	Atl(G. of B)	3.9			1.4			1
8	Kokemaen	Atl(G. of B)	27			6.8			1
9	Kymi	Atl(G. of F)	37			9.1	0.01		1,3,4
10	Kyronjoki	Atl(G. of B)	4.9			1.4			1
11	Lapuan	Atl(G. of B)	4.1			0.98			1
12	Oulu	Atl(G. of B)	23			7.8			1
13	Perhon	Atl(G. of B)	2.7			0.69			1
14	Pyha	Atl(G. of B)	3.7			1			1
15	Siika	Atl(G. of B)	4.4			1.1			1
16	Simojoki	Atl(G. of B)	3.2			1.5			1

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4. Hydrological Yearbook 1978-1989

Global River Index - Iceland

	Iceland River	Ocean	Area(103km2	Length (km)	Max Elev(m)	Q (km3/yr)	TSS(106t/y)	TDS(106t/yr)	Reference(s)
17	Hvita (Arnes)	Atl	9.8			3.8			2
18	Laxa(Thingeyia	Atl	3			1.3			2
19	Ofulsa	Atl	5.8			12			1
20	Tjorsa	Atl	7.2			11			1
21	Vatnsdalsa	Atl	1.5			0.27			2

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1. UNESCO (WORRI), 1978
2. Malmstrom, 1958

Global River Index - Norway

	Norway River	Ocean	Area(103km2	Length (km)	Max Elev(m)	Q (km3/yr)	TSS(106t/yr)	TDS(106t/yr)	Reference(s)
22	Altavassdraget	Nor. Sea	7.4			2.6			2,3
23	Ardalseva	Atl				1.4			2
24	Breimsvassdraget					1.3			2
25	Dramselv	Atl	17			10			3
26	Glomma	Atl	42	610		23			1,3
27	Jostedola					1.9			2
28	Kvina	Atl				2.7			2
29	Malselvvassdra	Nor. Sea	6			5.7			2,3
30	Namsen	Nor. Sea	6.3			8.5			2,3
31	Numedalslagen	Atl	5.7			3.7			2,3
32	Sira	Atl				3.7			2
33	Skiensvassdrag	Atl	11			9			2,3
34	Tana	Arctic	16			5.9			3

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2. Dynesius and Nilsson, 1994
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	Sweden River	Ocean	Area(103km2	Length (km)	Max Elev(m)	Q (km3/yr)	TSS(106t/yr)	TDS(106t/yr)	Reference(s)
35	Angermanalver	Atl	32	440		**15**	0.06		1,5,6
36	Byske alv	Atl	3.6	210		1.3			3,5
37	Dalalven	Atl	29	550		**11**	0.03	0.23	2,5,6
38	Eman	Atl	4.5	240		0.88			5
39	Gide alv	Atl	3.4	240		**1.1**			3,5
40	Helgean	Atl	4.8	180		1.5			5
41	Indalsalvan	Atl	27	440		**14**			3,5
42	Kalixalven	Atl	24	450		**8.9**	0.04		4,5,6
43	Lagan	Atl	6.4	250		**2.3**			4,5
44	Ljungan	Atl	13	360		**4.4**	0.01		3,5,6
45	Ljusnan	Atl	20	430		**7.3**			3,5
46	Lule alv	Atl	25	450		**16**	0.04	0.26	1,2,5,6
47	Malaren-Norrst	Atl	23			5.2			4,5
48	Ore alv	Atl	3	220		1	0.03		5,6
49	Pite alv	Atl	11	360		**5.4**	0.07		3,5,6
50	Ranealven	Atl	4.1	210		**1.3**	0.002		4,5,6
51	Skellefteälven	Atl	12	400		**5**	0.009		3,5,6
52	Tornealven	Atl	35	510		**12**	0.1		4,5,6
53	Ume-Vindelalve	Atl	27	450		**14**			3,5
54	Vattern-Motala	Atl	15	100		**2.8**			3,5

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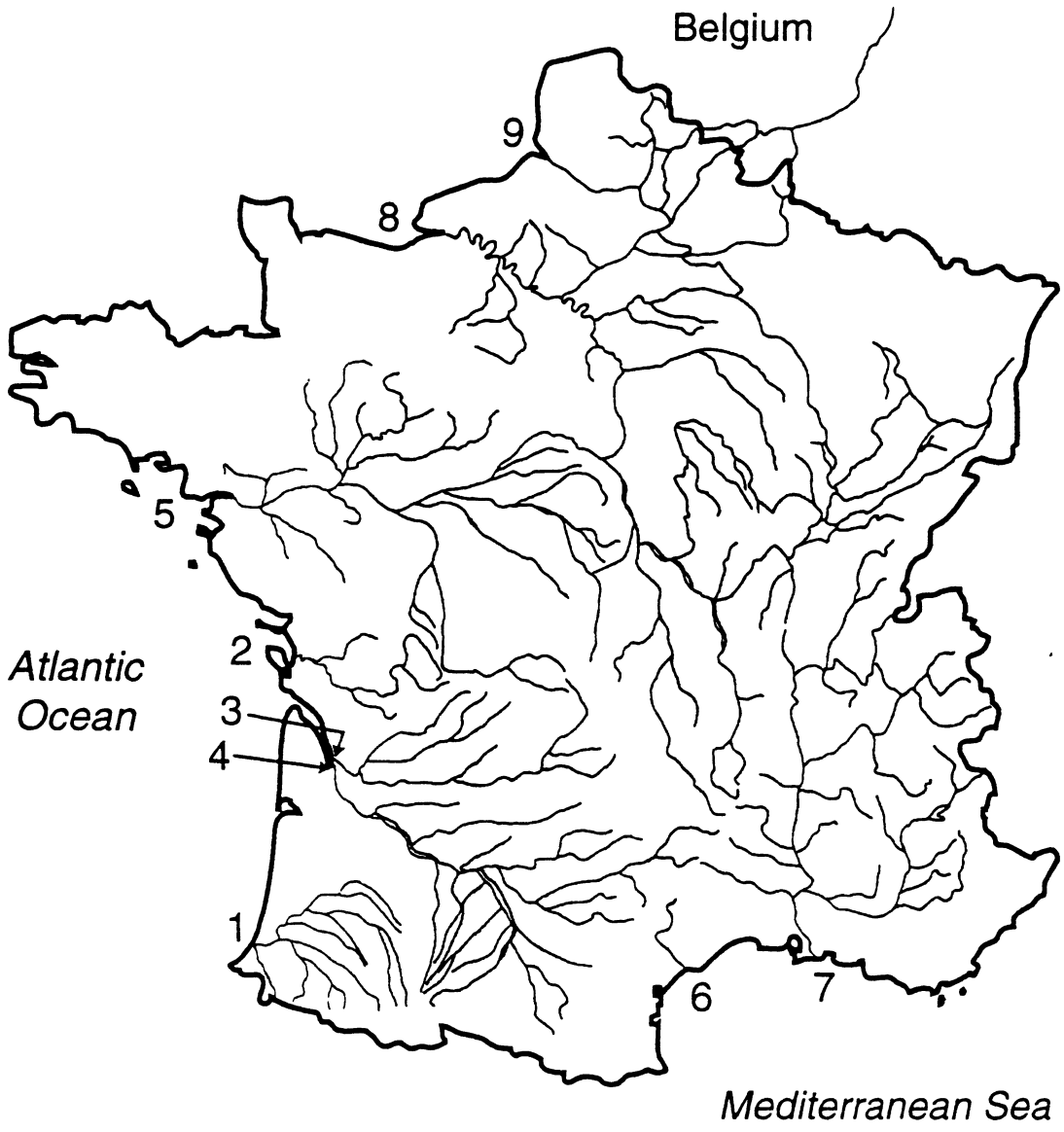

Global River Index - France

	France River	Ocean	Area(103km2	Length (km)	Max Elev (m)	Q (km3/yr)	TSS(106t/yr)	TDS(106t/yr)	Reference(s)
1	Adour	Atl	16	340			0.24	0.75	2,3,8
2	Charente	Atl	4.6	350		*1.8*			1,5,8
3	Dordogne	Atl	14	470	1700				1,5,8
4	Garonne	Atl	85	650		21	4.5	38	1,2,4,5,6
5	Loire	Atl	120	1100		**27**	7.8	38	1,2,5,6
6	Orb	Med	1.8			**1.3**			1,5
7	Rhone	Med	96	1000		**54**	56	17	1,2,5,6,7
8	Seine	Atl	79	780		16	3.5	19	1,2,5,6
9	Somme	Atl	5.5	240		*0.85*			1,5,8

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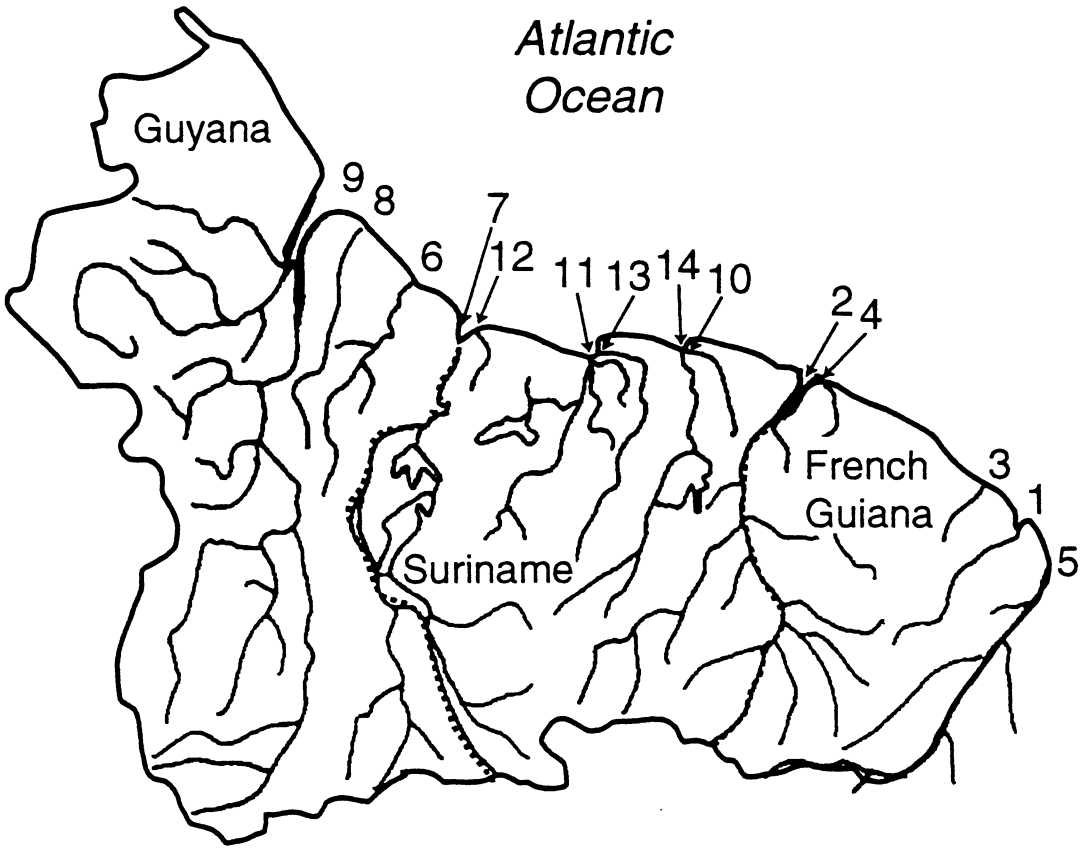
French Guiana, Guyana, and Suriname



	River	Ocean	Area(103km2	Length(km)	Max Elev (m)	Q(km3/yr)	TSS(106t/yr)	TDS(106t/yr)	Reference(s)
French Guiana									
1	Approugua	Atl	1.1			12		0.43	1
2	Lawa-Maroni	Atl	28	720		63		1.6	1,2,3
3	Mahuri	Atl	3.7			7.2		0.24	1
4	Mana	Atl	11	320					2,3
5	Oyapok	Atl	17			16			2
Guyana									
6	Berbice	Atl	2			1.2			4
7	Corantijn	Atl	69			47			1
8	Demerara	Atl	1.6			2.2			4
9	Essequibo	Atl	160	970		69			1,5

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Global River Index - Suriname

	Suriname River	Ocean	Area(103km2	Length (km)	Max Elev (m)	Q (km3/yr)	TSS(106t/yr)	TDS(106t/yr)	Reference(s)
10	Commewijne	Atl	6.7			3.8			1
11	Coppename	Atl	20	410		15			1,3,4
12	Nickerie	Atl	9.7			6.3			1
13	Saramacca	Atl	16	400		7.6			1,3,4
14	Suriname	Atl	16	370		14			1,4

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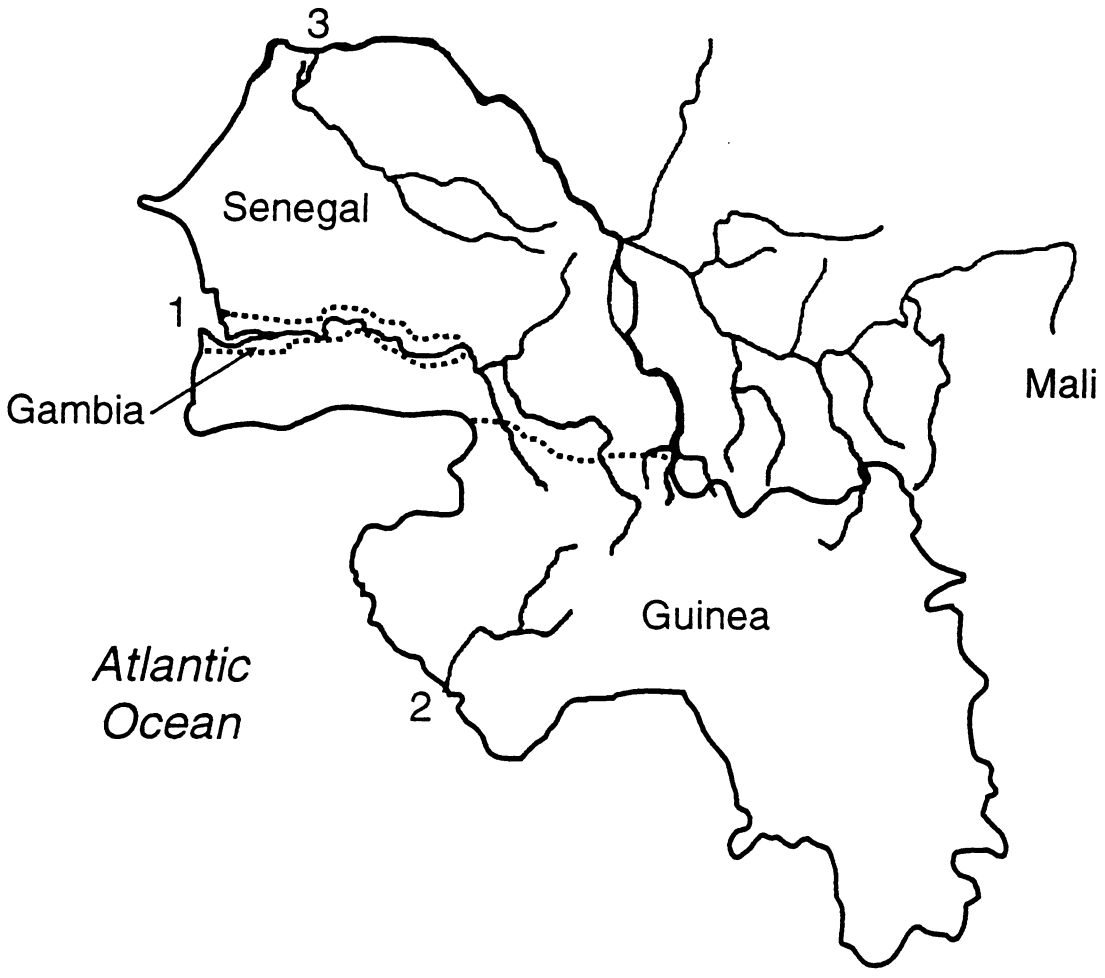
Gambia, Guinea, and Senegal



	Gambia River	Ocean	Area(103km2	Length (km)	Max Elev(m)	Q (km3/yr)	TSS(106t/yr)	TDS(106t/yr)	Reference(s)
1	Gambia	Atl	77	1200		4.9	0.2	0.22	1,4
	Guinea								
2	Konkoure	Atl	16	260					2,5
	Senegal								
3	Senegal	Atl	270	1400		22	21	1.2	1,3,4

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Georgia, Romania and Ukraine

	Georgia River	Ocean	Area(103km2	Length(km)	Max Elev(m)	Q(km3/yr)	TSS(106t/yr)	TDS(106t/yr)	Reference(s)
1	Rioni	Black Sea	16	290		4.9(12)	7.1		1,2,4
	Romania								
2	Danube	Black Sea	810	2800	1200	200	40(83)	62	1,2,5,6 3
	Ukraine								
3	Dnieper	Black Sea	540	2200		52	2.1	9	1,2
4	Dniester	Black Sea	62	1300		10	2.5	6.2	1,2

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1. Hay, 1994
2. Meybeck, 1994
3. UNESCO, 1971
4. Rand McNally, 1980
5. Varga et al, 1989
6. Petschinov, 1968

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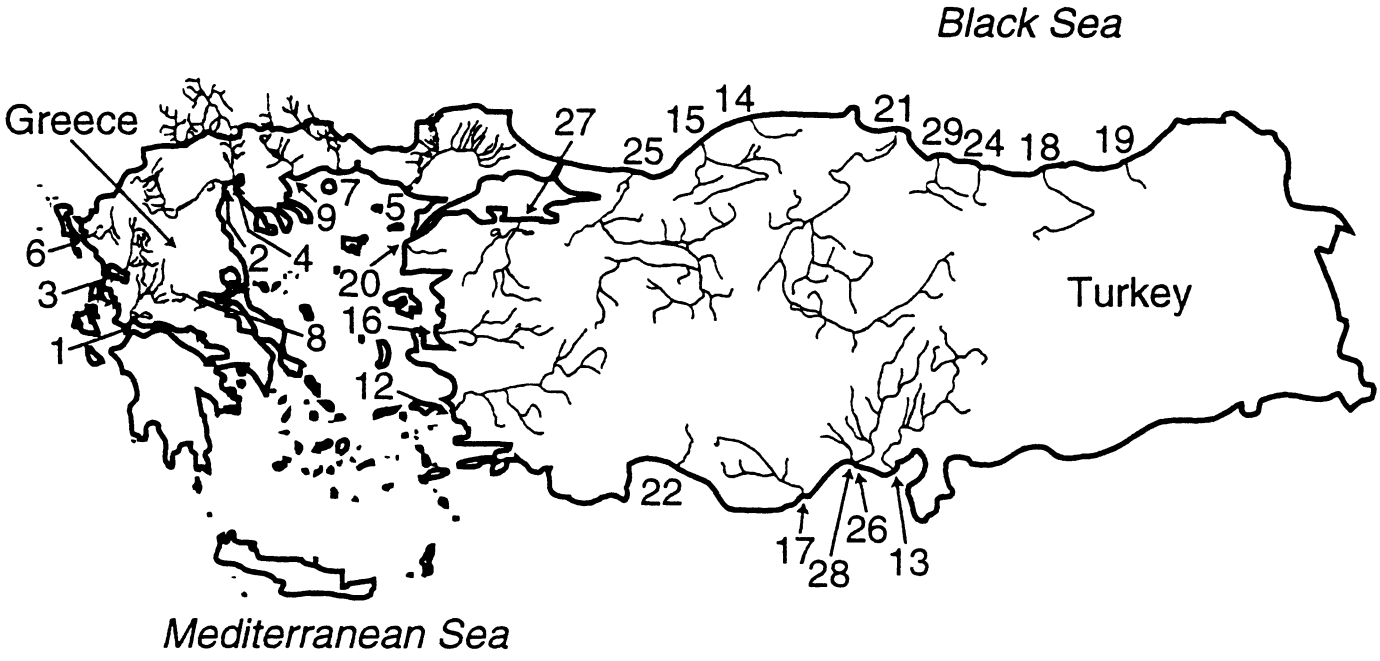

Global River Index - Greece

	Greece River	Ocean	Area(103km2	Length (km)	Max Elev(m)	Q (km3/yr)	TSS(106t/yr)	TDS(106t/yr)	Reference(s)
1	Acheloos	Med	1.3			**5.2**	0.83		1,2
2	Aliakmon	Med	23			4.2	2.3		2,3
3	Arachthos	Med	1.9				7.2		2
4	Axios	Med	25			5.8			3
5	Evros	Med	14			9.5			3
6	Kalamas/Thiam	Med	1.5				1.9		2
7	Nestos	Med	6.2			3	0.68		4
8	Sperkhios	Med	16			0.16			3
9	Strymon	Med	17			3.5			1

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4. Chorafas, Water for Peace, 1963

	Turkey River	Ocean	Area(103km2	Length (km)	Max Elev (m)	Q (km3/yr)	TSS(106t/yr)	TDS(106t/yr)	Reference(s)
10	Antalya		20			14			1
11	Asi		7.8			1.5			1
12	B.Menderes	Med	25	560		3.1		0.68	2
13	Ceyhan	Med	22			7.2	5.5		2,3
14	Devrakani	Black Sea	1.1			0.25	0.18		5
15	Filyos	Black Sea	13			2.9	4.1		5
16	Gedez	Med	18			2.3			2
17	Goksu	Med	10			4	2.5		3
18	Harsit	Black Sea	2.6			0.8	0.52		5
19	Iyidere	Black Sea	0.84			0.92	0.18		4,5
20	K. Menderes	Med	6.9			1			1
21	Kizil Irmak	Black Sea	74	1100		6	0.46(23)		1,5
22	Manavgat	Med	0.93	640		4.1		7.9	2
23	Marmara		24			5.8			1
24	Melet	Black Sea	1			0.34	0.27		5
25	Sakarya	Black Sea	58	790		6.4	6.2(8.8)		2,5,6
26	Seyhan	Med	22			5.9	5.2		2,3
27	Susurluk	Med	23			4.2			2
28	Tarsus	Med	1.4			0.1	0.13		5
29	Yesil Irmak	Black Sea	34			5	*44*		2

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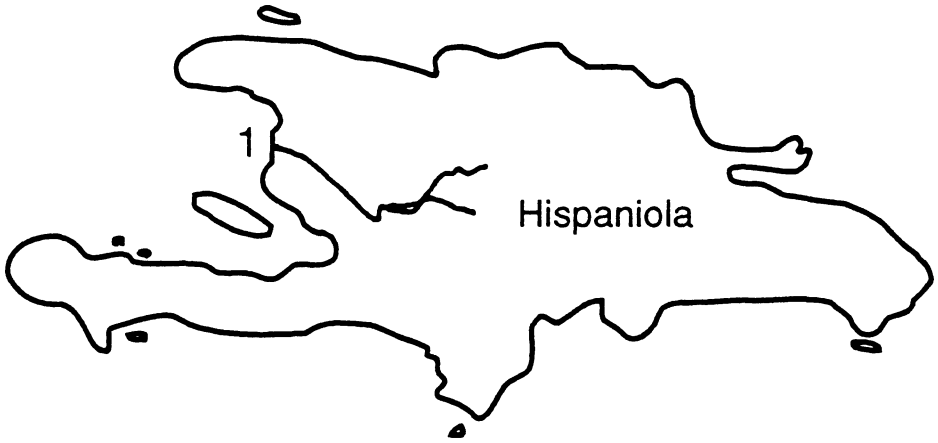

Caribbean Sea
(Atlantic)

Global RIver Index - Hispaniola

	Hispaniola River	Ocean	Area(103km2	Length (km)	Max Elev(m)	Q (km3/yr)	TSS(106t/yr)	TDS(106t/yr)	Reference(s)
1	Artibonite	Atl	6.9			3.2			1

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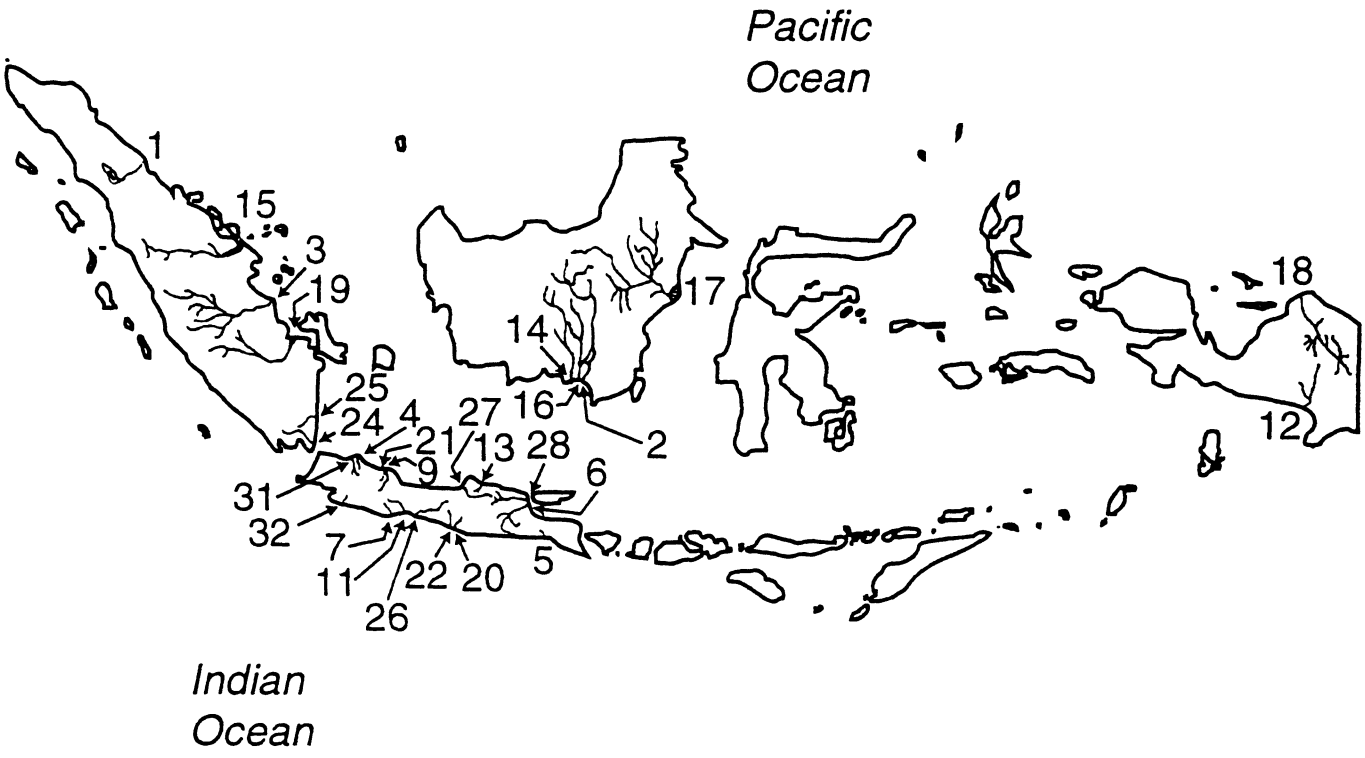
Indonesia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Global River Index - Indonesia

	Indonesia River	Ocean	Area(103km2	Length (km)	Max Elev(m)	Q (km3/yr)	TSS(106t/yr)	TDS(106t/yr)	Reference(s)
1	Asahan	Pac	7.5	100					1
2	Barito	Pac	57	650				1.4	1,2
3	Batang Hari	Pac	53						3
4	Bekasi	Pac	1.4	70					1
5	Bondojudo	Indian	1.8	35					1
6	Brantas	Pac	12	280		25			1,3
7	Cijolang	Indian	0.38				0.73		4
8	Cilutung	Pac	0.6				7.2		4
9	Cimanuk	Pac	3.2	150		40	25		1,4
10	Cimuntur		0.58				1.9		4
11	Citanduy	Indian	2.5				9.5		4
12	Digul	Pac	25						3
13	Djuana	Pac	1.3	80					1
14	Kahayan	Pac	26						3
15	Kampar	Pac	18						3
16	Kapuas	Pac	77	1000					1,2
17	Mahakam	Pac	65						2
18	Mamberamo	Pac	53						3
19	Musi	Pac	55			44		0.68	2,5
20	Opak	Indian	1.7	50					1
21	Pemali	Pac	1.4	65		7.6			1
22	Progo	Indian	2.5	100		11			1
23	Sampejan		1.3	95					1
24	Sekampung	Pac	4.9	140					1
25	Seputih	Pac	7.1	160					1
26	Seraju	Indian	3.7	110		5.2			1
27	Serang	Pac	4.8	120					1
28	Solo	Pac	16	350		14.6(239)	19		1,2,3
29	Tjipunagara		1.5	75		34			1
30	Tjitanduj		3.6	120		50			1

31	Tjitarum	Pac	6	220	76	1
32	Tjiudjung	Indian	2	90	31	1

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Iraq

Global River Index - Iraq

	Iraq River	Ocean	Area(103km2	Length (km)	Max Elev(m)	Q (km3/yr)	TSS(106t/yr)	TDS(106t/yr)	Reference(s)
1	Shatt al Arab	Indian	3800	2800		46	100	18	1,2

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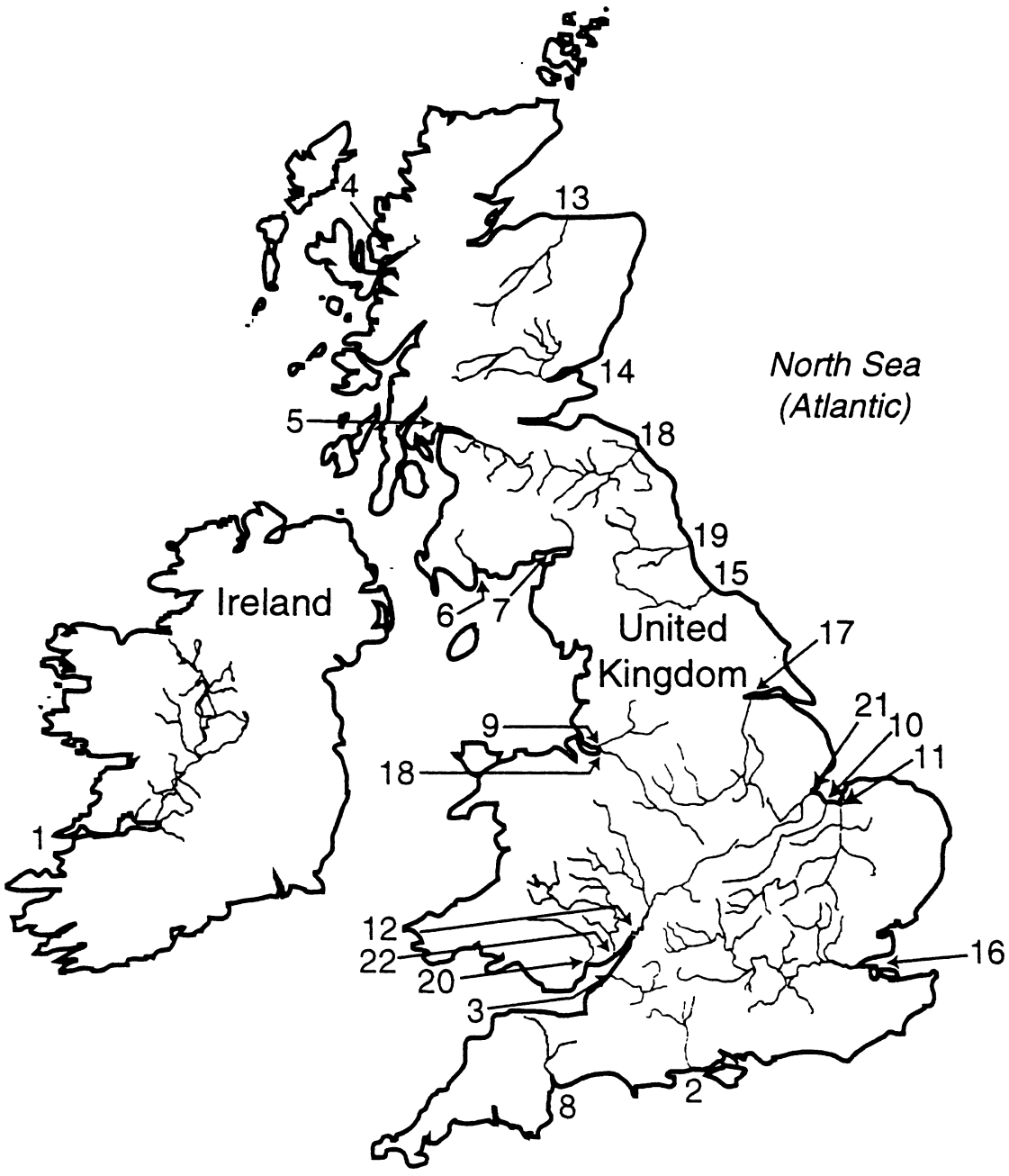

	Ireland River	Ocean	Area(103km2	Length(km)	Max Elev(m)	Q(km3/yr)	TSS(106t/yr)	TDS(106t/yr)	Reference(s)
1	Shannon	Atl	11	260	570	**5.7**			8,11
	U.K.								
2	Avon	Atl	2.2	120			0.42		1,2,8,10
3	Bristol Avon	Atl	0.67			0.27	0.02		3
4	Carron	Atl		23			0.008		9,11
5	Clyde	Atl	1.9	100			0.11		1,3,8
6	Creedy	Atl	0.26			0.13	0.01		3
7	Esk	Atl	0.31				0.18		2
8	Exe	Atl	0.6			0.52	0.01		3
9	Mersey	Atl	2			1.3			5
10	Nene	Atl	1.5			**0.29**	0.01		1,4,8
11	Ouse	Atl	3.3	180		2			5,10
12	Severn	Atl	6.8	210		**2.6**	0.44		1,3,8
13	Spey	Atl	2.7	140					1,8,10
14	Tay	Atl	6.5	110		6	1.6		6,10
15	Tees	Atl	2	100		0.63			5,10
16	Thames	Atl	15	400		**2.4**	0.08	0.23	1,7,8,9
17	Trent	Atl	8.2	150			0.08		1,7,8,9,10
18	Tweed	Atl	4.3	140			0.009		1,8,9,10
19	Tyne	Atl	2.2	89			0.13		1,3,8,10
20	Usk	Atl	0.91				0.44		1,3,8
21	Welland	Atl	0.53			0.11	0.01		4
22	Wye	Atl	4	220		**2.4**	0.2		1,3,8

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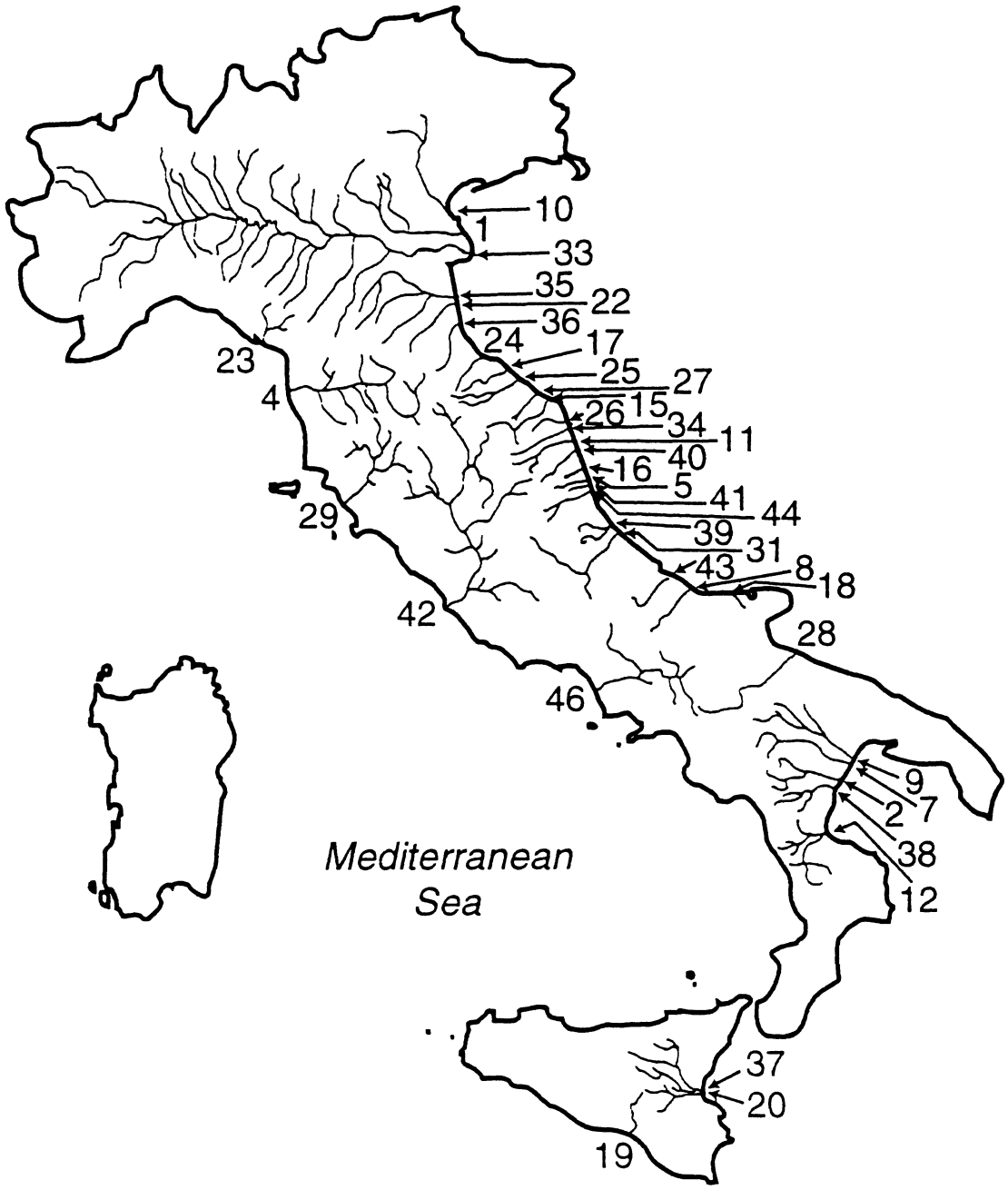
Italy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	Italy River	Ocean	Area(103km2	Length (km)	Max Elev(m)	Q (km3/yr)	TSS(106t/yr)	TDS(106t/yr)	Reference(s)
1	Adige	Med	12	400		**6.9**	0.5		1,2,8
2	Agri	Med	0.28			0.25	0.07		1
3	Arcidiaco Nato		0.12			0.02	0.08		1
4	Arno	Med	8.1	250				2.2	3,4,8
5	Aso	Med	0.28	70	1900		0.18		5
6	Atella		0.16			0.03	0.1		1
7	Basento	Med	1.4	24					
8	Biferno	Med	1.3				*2.2*		1,6
9	Bradano	Med	2.7			0.2	**2.8**		1
10	Brenta	Med	1.6				0.19		1,6
11	Chienti	Med	1.3	80	900	0.25	1.3		1,5
12	Crati	Med	1.3			0.85	1.2		1
13	Delia		0.14			0.02	0.04		1
14	Esaro		0.52			0.35	0.27		1
15	Esino	Med	1.2		1100		0.9		5
16	Ete Vivo	Med	0.18	30	580		0.29		5
17	Foglia	Med	0.7		1000	0.25	1.4		1,5
18	Fortore	Med	1.1			0.42	1.5		1
19	Gela	Med	0.24			0.02	0.13		1
20	Gornalunga	Med	0.23			0.005	0.03		1
21	Jato		0.16			0.4	0.05		1
22	Lamone	Med	0.52	95		0.28			1,5
23	Magra	Med	0.94			1.3			1
24	Marecchia	Med	0.36			0.31	1.6		1
25	Metauro	Med	1.4		1100	*0.43*	1.2		5,6
26	Misa	Med	0.38		790		0.47		5
27	Musona	Med	0.64	65	910		1.1		5
28	Ofanto	Med	2.7						1

29 Ombrone	Med	2.6				1.9	1,6	
30 Orcia		0.58			0.13	1.1		1
31 Pescara	Med	3.1					1,6	
32 Petrace		0.41			0.3	*1.1*		1
33 Po	Med	70	680		**46**	18	16 1,2,5,8	
34 Potenza	Med	0.77		1600		0.45		5
35 Reno	Med	3.4	100				5,6	
36 Savio	Med	0.6	55		0.31		1,5	
37 Simento	Med	1.8			0.53	**3.5**		1
38 Sinni	Med	1.1			0.65	2.5		1
39 Tavo	Med	0.21			0.06	0.04		1
40 Tenna	Med	0.49	70	1200		0.45		5
41 Tesino	Med	0.11	35	750		0.12		5
42 Tevere(Tiber)	Med	17	400		**7.4**	7.5(3.1)	5.9 5,7	
43 Trigno	Med	0.54			0.25	0.42		1
44 Tronto	Med	1.2	100	1900		1.1	1,6	
45 Venosa		0.26			0.03	0.1		1
46 Volturno	Med	5.5			3.1	4.2	1,4	

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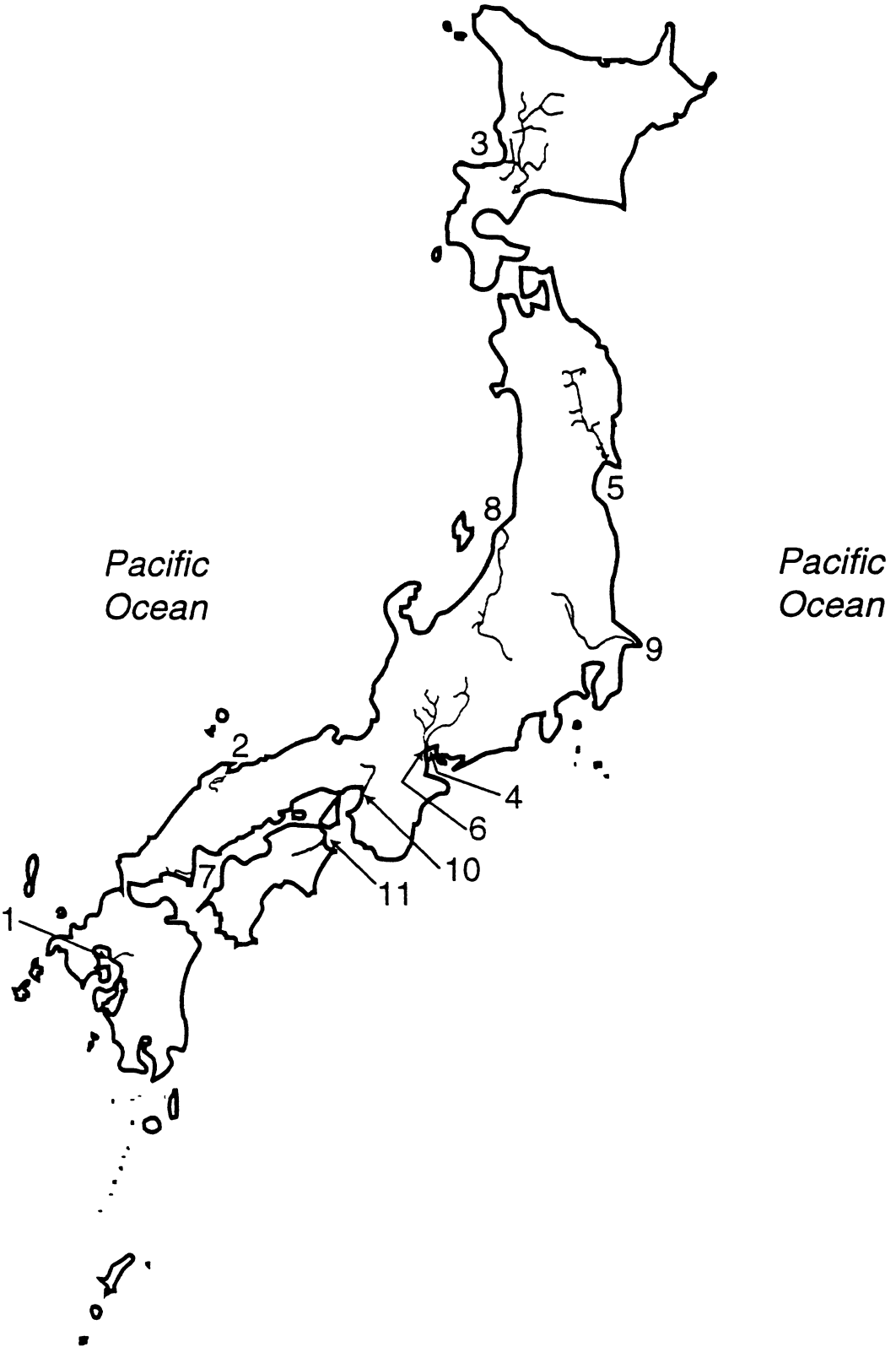
Japan



Global River Index - Japan

	Japan River	Ocean	Area(103km2	Length (km)	Max Elev (m)	Q (km3/yr)	TSS (106t/yr)	TDS (106t/yr)	Reference(s)
1	Chikugo	Pac	2.9	120		3.7			1
2	Hii	Pac	0.92			0.9	*0.9*		2
3	Ishikari	Pac	14	260		15	*1.8*		3
4	Kiso	Pac	9.1	190		10			1
5	Kitakami	Pac	10	250		9.4			1
6	Nagara	Pac	2			3.6	*0.4*		4
7	Ota	Pac	8.2	110		2.3			1
8	Shinano	Pac	12	370		16			1
9	Tone	Pac	17	300		15	*3.2*		2,3
10	Yodo	Pac	8.2	75		9.7	*1.9*		3
11	Yoshino	Pac	3.6	190		5.3			1

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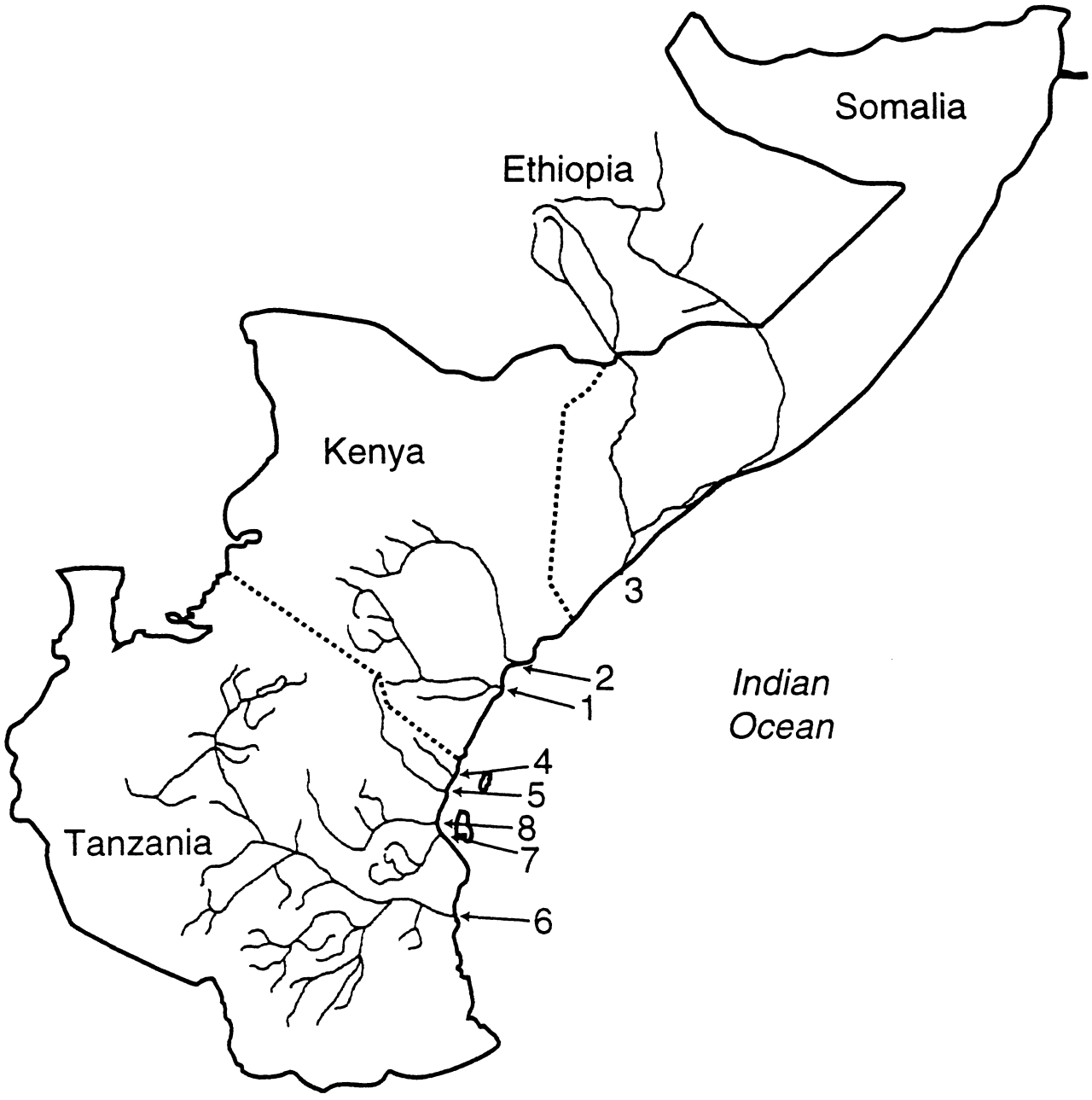
Kenya, Somalia, and Tanzania



GLORI - Kenya and Somalia

	River	Ocean	Area(103km2	Length(km)	Max Elev(m)	Q(km3/yr)	TSS(106t/yr)	TDS(106t/yr)	Reference(s)
Kenya									
1	Sabaki	Indian	40			1			2
2	Tana	Indian	42	800	5200	**4.7**			3,4,5
Somalia									
3	Shebelli	Indian	200	2000		2			1

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Global River Index - Tanzania

	Tanzania River	Ocean	Area(103km2	Length (km)	Max Elev (m)	Q (km3/yr)	TSS(106t/yr)	TDS(106t/yr)	Reference(s)
4	Mkomazi	Indian	3			*0.15*			1
5	Pangani	Indian	25						1
6	Rufiji	Indian	180	1400		*31*	17		1,2,3
7	Ruvu	Indian	15						1
8	Wami	Indian	36						1

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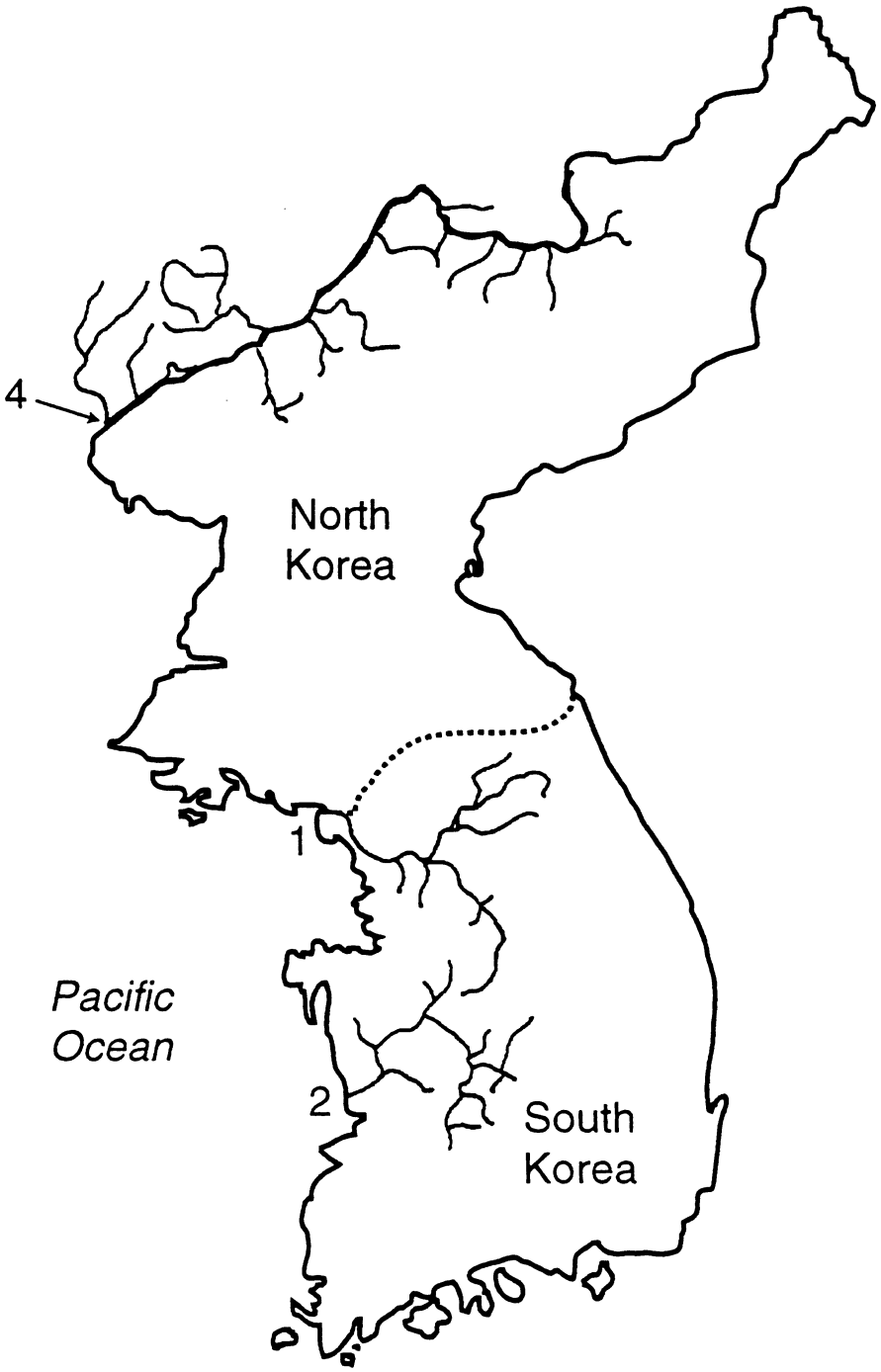
Korea



Global River Index - Korea

	Korea River	Ocean	Area(103km2	Length (km)	Max Elev (m)	Q (km3/yr)	TSS(106t/yr)	TDS(106t/yr)	Reference(s)
1	Han	Pac	25	470		15	3(>10)		1,2,5
2	Kum	Pac	10	250			5.6		1,3,5
3	Naktong		23			12	10		1,4
4	Yalu	Pac	64	800					

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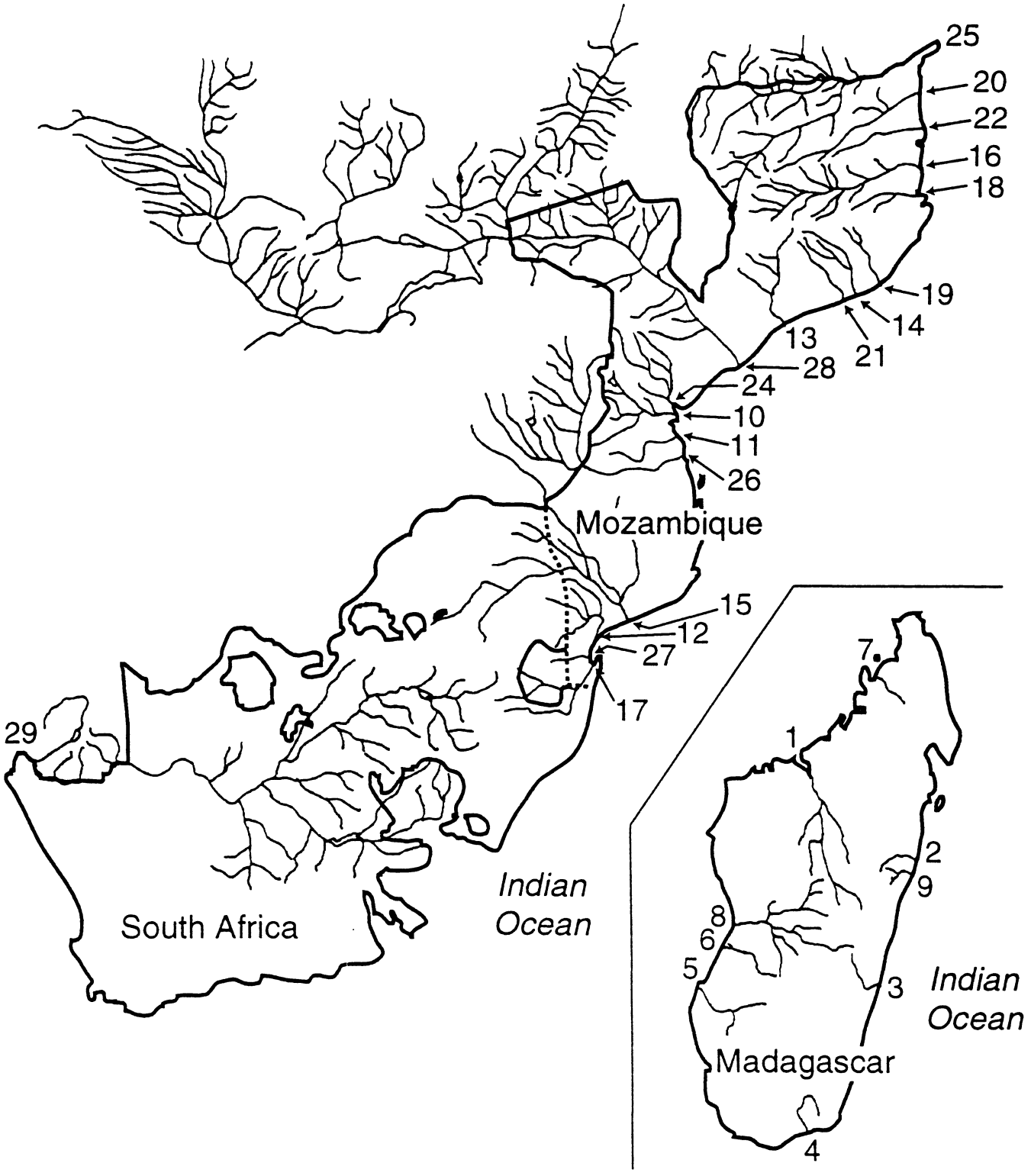

Global River Index - Madagascar

	Madagascar River	Ocean	Area(103km2	Length (km)	Max Elev(m)	Q (km3/yr)	TSS(106t/yr)	TDS(106t/yr)	Reference(s)
1	Betsiboka	Indian	1.8	520		9.4			1,4
2	Ivondro	Indian	2.8			3.3			1
3	Mananjary	Indian	2.3			3.1			1
4	Mandrare	Indian	12			3.1			1,4
5	Mangoky	Indian	50	560		15	10		1,2
6	Morondava	Indian	4.2			1.8	6.7		3
7	Sambirano	Indian	3			3.6			1
8	Tsiribihina	Indian	45	523		31			2,4
9	Vohitra	Indian	1.8			2.3			1

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	Mozambique River	Ocean	Area(103km2	Length (km)	Max Elev (m)	Q (km3/yr)	TSS(106t/yr)	TDS(106t/yr)	Reference(s)
10	Buzi	Indian	29			1.4			1
11	Gorongosa	Indian	13						1
12	Incomati	Indian	46			2.3			1
13	Licungo	Indian	28			1.2			1
14	Ligonha	Indian	16			0.82			1
15	Limpopo	Indian	410	1600		5.3	33	1.3	1,2,3,4,9
16	Lurio	Indian	61	560		7.3			1,2
17	Maputo	Indian	30			2.8			1
18	Mecuburi	Indian	8.9			0.46			1
19	Meluli	Indian	9.7			1.9			1
20	Messalo	Indian	24			1			1
21	Molocue	Indian	6.5			0.86			1
22	Montepuez	Indian	9.5			0.19			1
23	Nonapo		8.8			1			1
24	Pungoe	Indian	29			3.1			1
25	Ruvuma	Indian	150	800					1,2
26	Save	Indian	100	680		5			1,2,5
27	Umbeluzi	Indian	5.6			0.31			1
28	Zambeze	Indian	1,300	2700		100	20(48)	14	1,2,3,6,10
	South Africa								
29	Orange	Atl	1100	1900	1600	11(89)	17(89)	2.02	2,3,5,7,8

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Mexico

Global River Index - Mexico

	Mexico River	Ocean	Area(103km2	Length (km)	Max Elev (m)	Q (km3/yr)	TSS(106t/yr)	TDS(106t/yr)	Reference(s)
1	Ameca	Pac	12	230		3		0.56	1,6
2	Balsas	Pac	120	720		16			1,6
3	Colorado	Pac	640	3200		0(20)	0.1	120	3
4	Grijalva	Atl	36	320		23			4,5,6
5	Panuco	Atl	66	160		17			2,6
6	Santiago	Pac	130	960		7.4			2,6
7	Usumacinta	Atl	100	430		53			1,2,6

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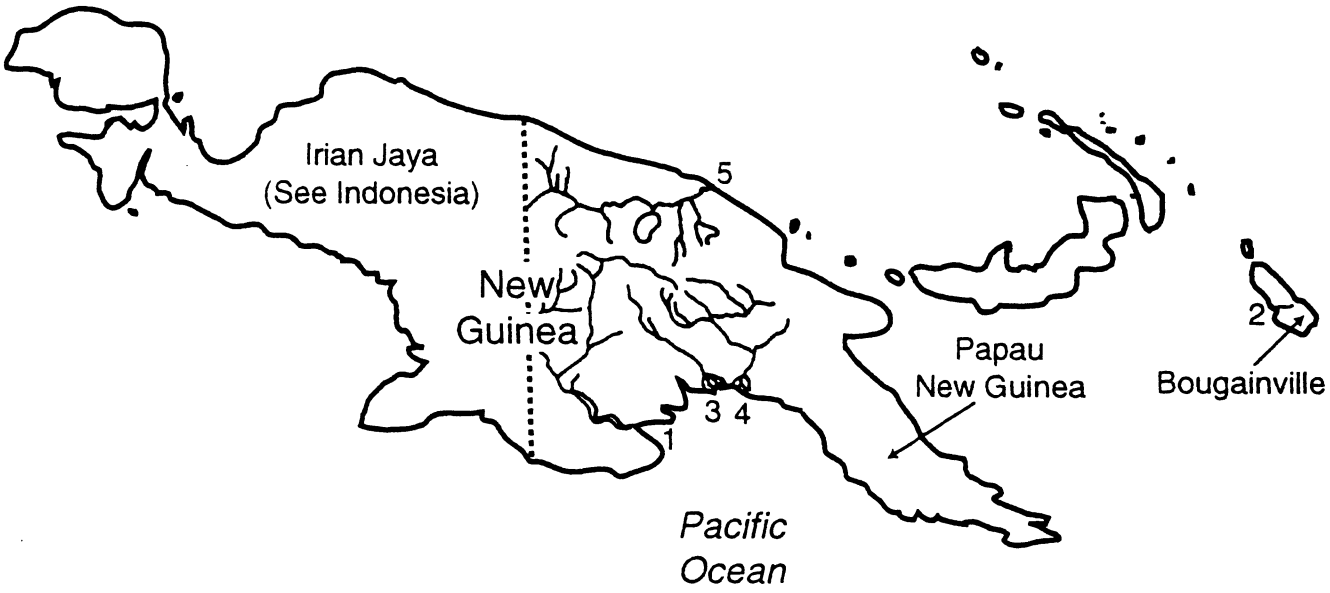
New Guinea


Irian Jaya
(See Indonesia)
New
Guinea
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Papau
New Guinea
Bougainville
Pacific
Ocean

GLORI - New Guinea

	New Guinea River	Ocean	Area (l03km2	Length (km)	Max Elev(m)	Q (km3/yr)	TSS (106t/yr)	TDS (106t/yr	Reference(s)
1	Fly	Pac	76	620		77	110 (80)	9	1,2,3
2	Jaba (Bougain	Pac	0.46	50	2200	1.3	26		4
3	Kikori	Pac	13			40			5
4	Purari	Pac	33	630		85	100		1,6
5	Sepik	Pac	78	700		120		13	2

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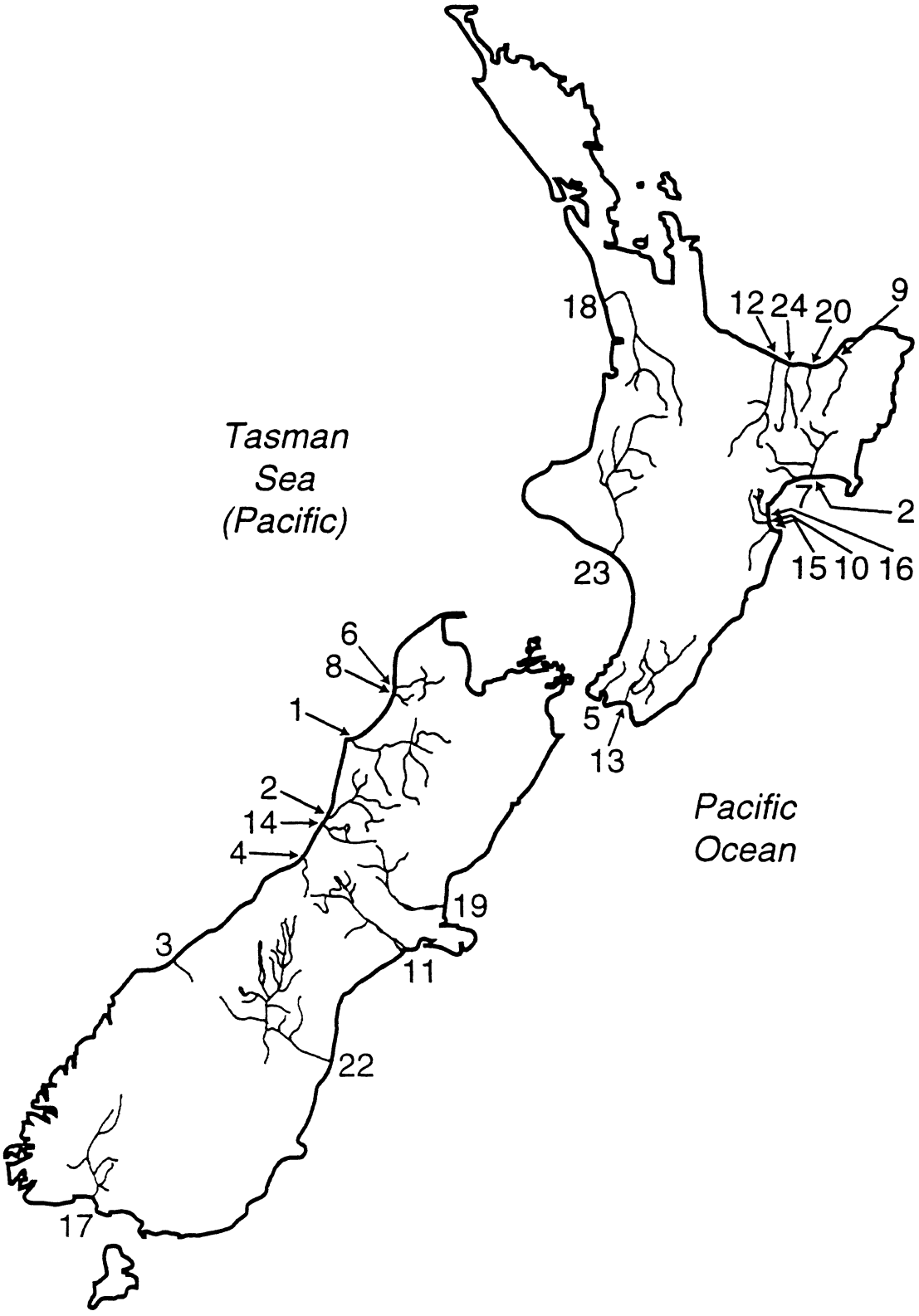
Tasman
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(Pacific)
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	New Zealand River	Ocean	Area(103km2	Length (km)	Max Elev(m)	Q (km3/yr)	TSS(106t/yr)	TDS(106t/yr)	Reference(s)
1	Buller	Pac	6.4	130	700	16	1.7		1,2
2	Grey	Pac	3.9	120		9.3	3.1		3,5,6
3	Haast	Pac	1	74	1500	6	17		2
4	Hokitika	Pac	1.1		1300	3.1	12		2
5	Hutt	Pac	0.64			2.6	0.49		2
6	Karamea	Pac	1.2	69	800	3.5	0.39		2,5
7	Mohaka	Pac	2.4		700		0.89		3
8	Mokihinui	Pac	0.75				2.9		2
9	Motu	Pac	1.4		800		2.7		3
10	Ngaruroro	Pac	1.9		800		0.88		3
11	Rakaia	Pac	2.6	89	1300	6.2	4.3		2
12	Rangitaiki	Pac	0.23				0.02		3
13	Ruamahanga	Pac	0.64		600		0.23		3
14	Taramakau	Pac	1				9.9		3
15	Tukituki	Pac	2.4		600		1.1		3
16	Tutaekuri	Pac	0.79				0.33		3
17	Waiau	Pac	8.2	97	2000	17	2.6		1,2,5
18	Waikato	Pac	19			13	1.6		1,4
19	Waimakariri	Pac	3.2	150	1300	3.8	5.3		2
20	Waioeka	Pac	0.64		600		0.38		3
21	Waipaoa	Pac	1.6		600		9.3		3
22	Waitaki	Pac	9.7			7.4			1
23	Wanganui	Pac	6.6				2.2		3
24	Whakatane	Pac	1.6		600		0.38		3

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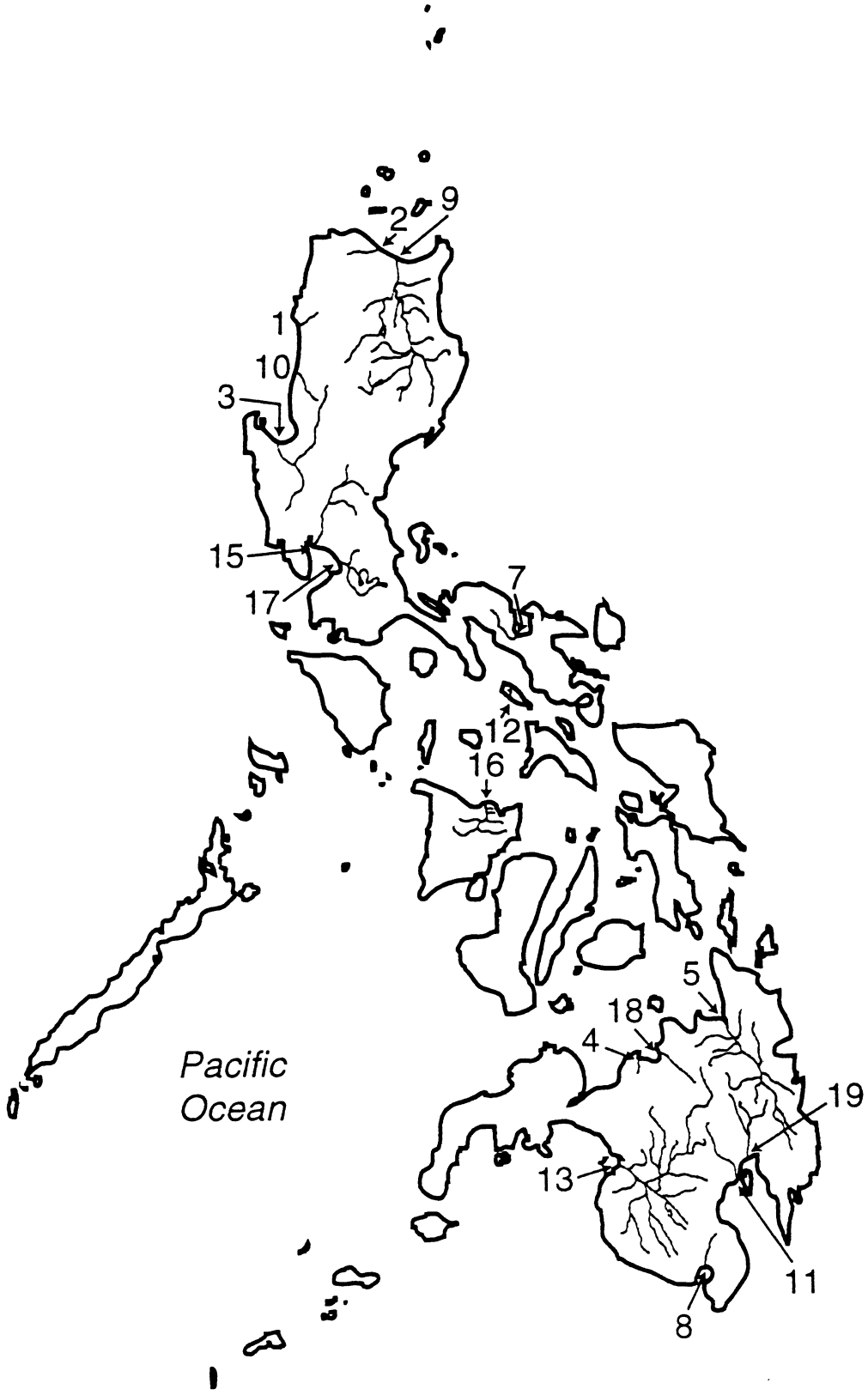
Philippines



Global River Index-Philippines

	Philippines River	Ocean	Area (103km2	Length (km)	Max Elev (m)	Q (km3/yr)	TSS (106t/yr)	TDS (106t/yr)	Reference(s)
1	Abra	Pac	5.1		>900	13			1
2	Abulug	Pac	3.4			7.1			1
3	Agno	Pac	2.2	270		4	5		1,2,3
4	Agus	Pac	1.6			1.9			1
5	Agusan	Pac	11			28			1,3
6	Angat		0.57				4.6		2
7	Bicol	Pac	3.8		2,400	5.1			1
8	Buayan-Malung	Pac	1.4		2,300	2.9			1
9	Cagayan	Pac	26			54			1,3
10	Chico	Pac	3.3			6.5			3
11	Davao	Pac	1.6			3.2			1
12	Ilog	Pac	1.5			1.8			3
13	Mindanao	Pac	23			27			1
14	Pamanga		0.83			1.5	1.1		2
15	Pampanga	Pac	9.7			11	1		1,2,3
16	Panay	Pac	2.2			2.3			1
17	Pasig-Laguna	Pac	4.7	17		7.5			1
18	Tagoloan	Pac	1.7			4.3			1
19	Tagum-Libugan	Pac	3.1			6.1	1		

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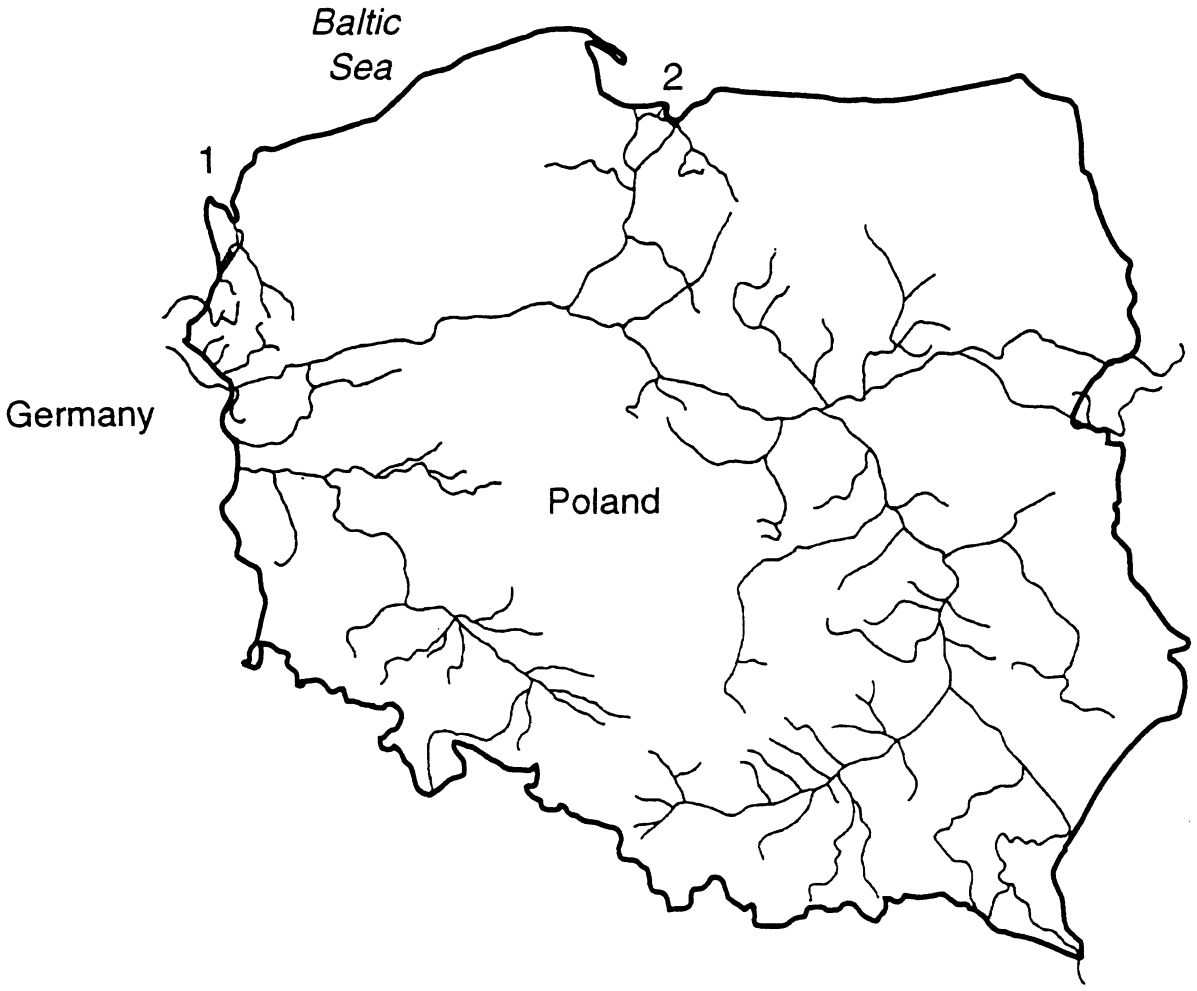
Poland



Global River Index - Poland

	Poland River	Ocean	Area(103km2	Length (km)	Max Elev(m)	Q (km3/yr)	TSS(106t/yr)	TDS(106t/yr)	Reference(s)
1	Oder	Baltic Sea	120	910		16	0.13		1,3
2	Vistula	Baltic Sea	200	1100		33	2.5		2,3

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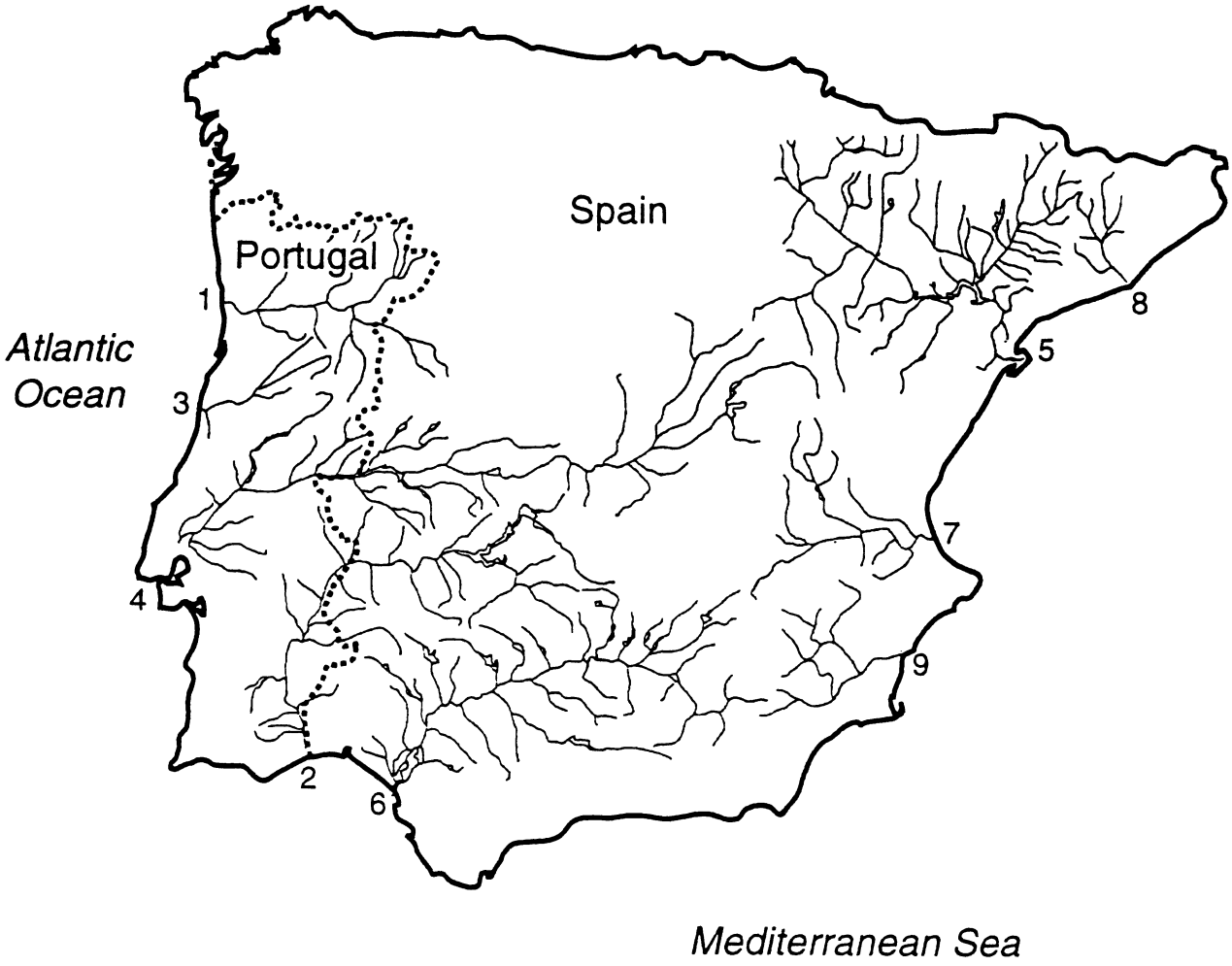

	Portugal River	Ocean	Area(103km2	Length (km)	Max Elev(m)	Q(km3/yr)	TSS(106t/yr)	TDS(106t/yr)	Reference(s)
1	Douro	Atl	98	780		20			5
2	Guadiana	Atl	72	830			0.07		5
3	Mondego	Atl	4.9			2.6			4
4	Tagus	Atl	76	1000		96	0.09		2,5,6
	Spain								
5	Ebro	Med	85	930		17	1.5(18)		1,2,3
6	Guadalquivir	Atl	56	560		7.3			1,2,4
7	Jucar	Med	2.1			1.6			1,2
8	Llobregat	Med	4.9			0.69			2,4
9	Segura	Med	15			0.95			2

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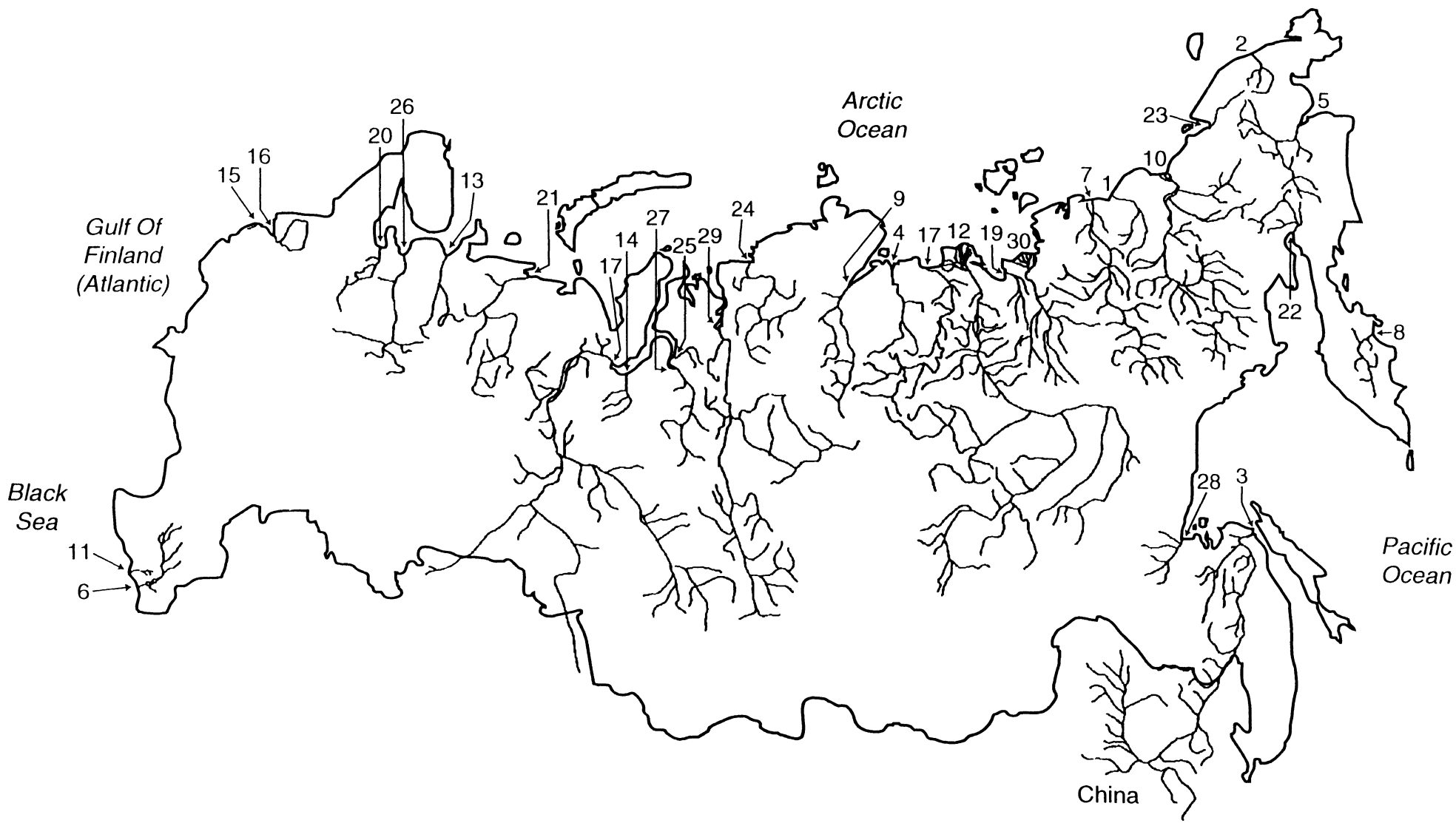
Arctic
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Global River Index- Russia

	Russia River	Ocean	Area(103km2	Length (km)	Max Elev(m)	Q (km3/yr)	TSS(106t/yr)	TDS(106t/yr)	Reference(s)
1	Alazeya	Arctic	68			8.8	0.7		1,11
2	Amgyema	Arctic	30			9.2	0.35	0.16	1,2
3	Amur	Pac	1800	4400		320	52	24	3,4
4	Anabar	Arctic	100	2800		17	0.4	0.87	1,11
5	Anadir	Bering Sea	190	1100		60		19	3
6	Don	Black Sea	420	2000	200	26	6.4	8.53	2,5,6,12
7	Indigirka	Arctic	360	2000		61	13	3.6	1,11
8	Kamtchatka	Pac	47			1.5			6
9	Khatanga	Arctic	360	1600		85	1.7	7.9	1,10,11
10	Kolyma	Arctic	660	2600		130	16	6.5	1,10,11
11	Kuban	Black Sea	48	870	2000	13	7.7	2	3,7,12
12	Lena	Arctic	2500	4400		520	18	60	1,11
13	Mezen	Arctic	78	970		27	0.9	3.5	1
14	Nadym	Arctic	64			18	0.4		1,11
15	Narva	Baltic				14			9
16	Neva	Atl	280	1100		80			3
17	Ob	Arctic	2500	5400		430	16	47	1,11
18	Olenjok	Arctic	220	2300		36	1.1	14	1,11
19	Omoloy	Arctic	39			7	0.13		1,11
20	Onega	Arctic	57	420		18	0.3	3	1,3,10
21	Pechora	Arctic	320	1900		130	13	8.7	1
22	Penshina	Pac	71	710		22			3
23	Polyavaam	Arctic	6.8				0.05		11
24	Pyasina	Arctic	180	710		86	3.4		1
25	Pyr	Arctic	110	400		34	0.6	1.3	1,11
26	Severnay Dvina	Arctic	360	1800		120	4.5	24	1,7,8,9,10
27	Taz	Arctic	150			44	0.9	4.3	1,11
28	Uda	Pac	61	460		25			3,9
29	Yana	Arctic	320	1400		34	3.5	3.1	1,6,8,11
30	Yenisei	Arctic	2600	5500		620	13	60	1,7,11

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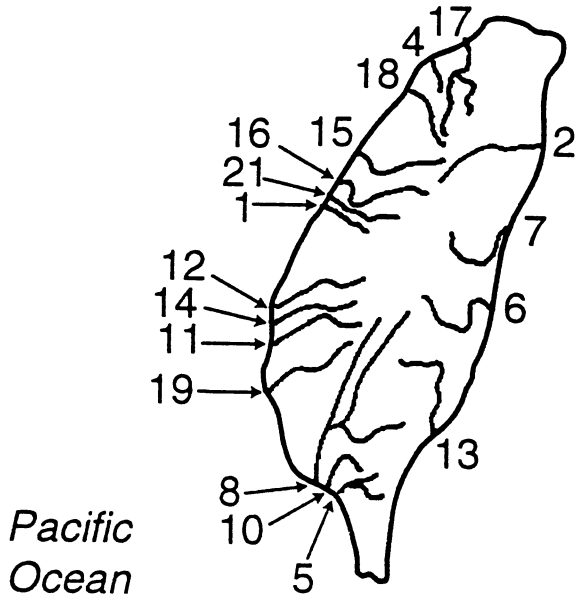

Global River Index - Taiwan

	Taiwan River	Ocean	Area (103km2	Length (km)	Max Elev. (m)	Q (km3/yr)	TSS(106t/yr)	TDS(106t/yr)	Reference(s)
1	Chishui	Pac	3.8	65	550	5.2	2.1		1
2	Choshui	Pac	3.1	190	3400	6.1	64		1
3	Erhjen		0.35	65	460	0.5	13		1
4	Houtung	Pac	0.54	58	2600	0.9	4.4		1
5	Hsiatanshui	Pac	3.3	170	4000				1
6	Hsiukuluan	Pac	1.8	81	2400	4.2	20		1
7	Hualien	Pac	1.5	57	2300	3.8	21		1
8	Kaoping	Pac	3.3	170	4000	8.5	36		1
9	Lanyang		9.8	73	3500	2.8	8		1
10	Linpian	Pac	0.34	42	2900	0.86	1.8		1
11	Pachang	Pac	0.47	80	1900	0.74	3.2		1
12	Peikang	Pac	0.64	82	520	1	2.3		1
13	Peinan	Pac	1.6	84	3700		24		1
14	Potzu	Pac	0.43	76	1400	0.55	0.83		1
15	Taan	Pac	0.76	96	3300	1.6	4.9		1
16	Tachia	Pac	1.2	140	2600	2.6	4		1
17	Tanshui	Pac	2.7	160	3500	7	11		1
18	Touchien	Pac	0.6	63	2200	0.99	2.6		1
19	Tsengwen	Pac	1.2	140	2400	2.4	31		1
20	Tungkang		0.47	47	1100	1.1	0.61		1
21	Wu	Pac	2.1	120	2600	3.7	6.8		1
22	Yenchui		0.22	87	140	0.3	2.2		1

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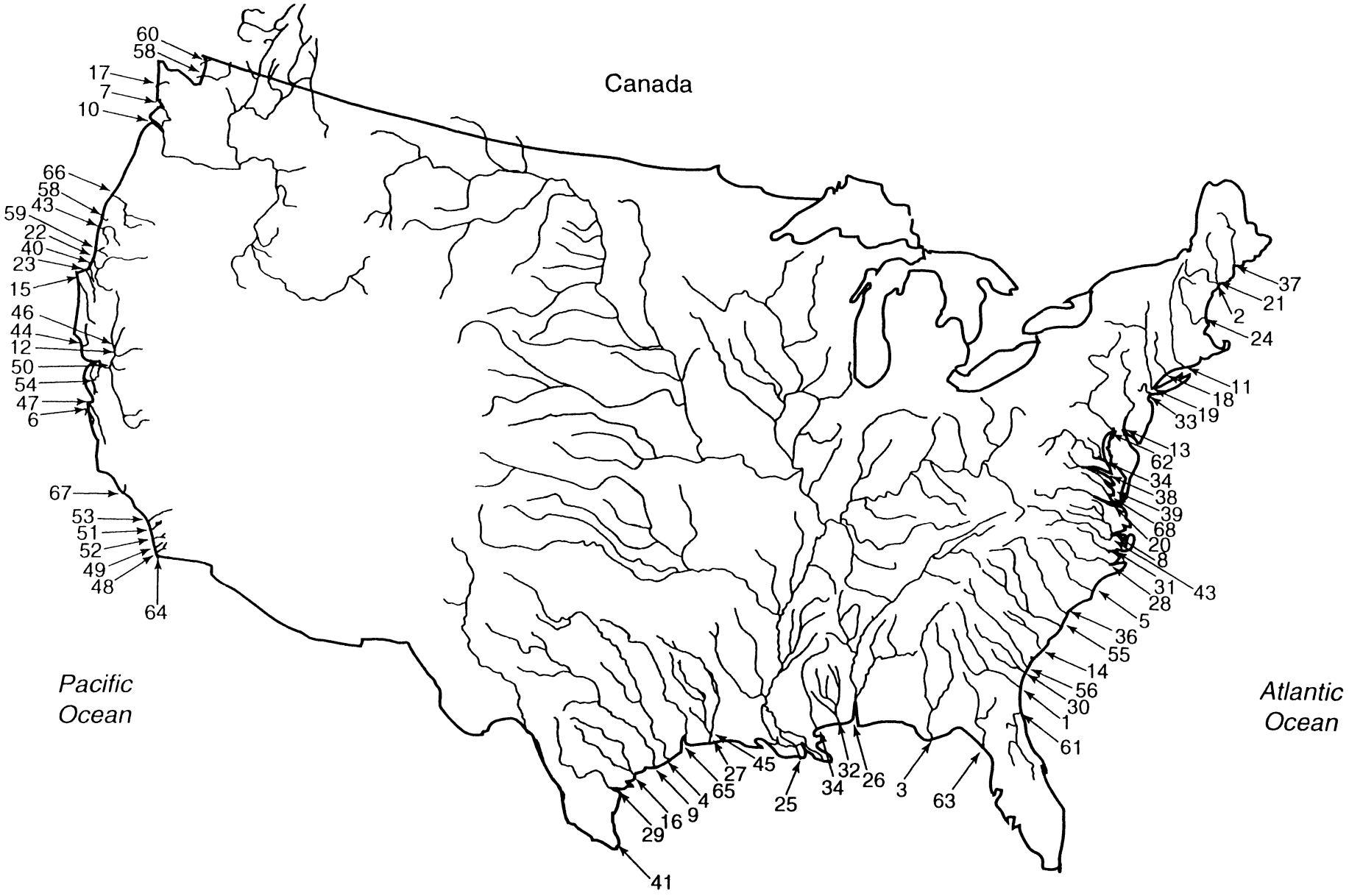
United States Of America
(not including Alaska)



Global River Index - USA

	USA River	Ocean	Area (103km2	Length (km)	Max Elev(m)	Q (km3/yr)	TSS (106t/yr)	TDS (106t/yr)	Reference(s)
1	Altamaha	Atl	35		300	12	<1(2.5)	0.9	2,3,5,6,15
2	Androscoggin	Atl	8.8			5			14..
3	Apalachicola	Atl	44	800	400	22	0.17	1.1	2,3,5,7,15
4	Brazos	Atl	120	2000	1400	7.1	16	2.8	1,3,9,15
5	Cape Fear	Atl	13		200	2.9	0.29	0.17	1,2,3,15
6	Carmel	Pac	0.63			0.1	0.11		1,14
7	Chehalis	Pac	3.3			0.1	0.12	0.05	1,2,3,15
8	Chowan	Atl	13			8.8			2
9	Colorado	Atl	110	1300	900	2.4	1.6	0.6	1,3,8,13,15
10	Columbia	Pac	670	2000	2800	250	9.7 (15)	21	1,9,10
11	Conneticut	Atl	28	650	700	14			5,15
12	Cosumnes	Pac	1.4				0.14		1
13	Delaware	Atl	17	210	570	10	0.65	0.94	1,3,5,15
14	Edisto	Atl	7			2.4	0.02		1,15
15	Eel	Pac	7.8			7	21	1	1,3,15
16	Guad-S. Antoni	Atl	23			2.1		0.6	2,3,15
17	Hoh	Pac	0.65			2.2	0.72		1,14
18	Housitanic	Atl	2.5		250	2.3	0.5		1,4,15
19	Hudson	Atl	34	500	500	12	0.2	1.3	1,2,3,9,15
20	James	Atl	16	540	900	6.2	0.11	0.75	1,3,4,15
21	Kennebeck	Atl	14			7.9			14
22	Klamath	Pac	31			15	2.4	1.6	3,5,11,15
23	Mad	Pac	1.2			1.3	2.4		14
24	Merrimack	Atl	12	180	900	6.5	0.2	0.46	1,3,5,15
25	Mississippi	Atl	3300	5900	1200	490	210(400)	140	10,12,15,17
26	Mobile	Atl	110	1200	300	52	4.5	63	1,3,5
27	Neches	Atl	21			0.73		0.67	2,3,15
28	Neuse	Atl	6.9			2.5	0.08	0.17	3,13
29	Nueces	Atl	43			0.72	0.71	0.18	2,3,8,15

30	Ogeeche	Atl	6.8			4.2	*0.06*	0.48	1,2,3
31	Pamlico	Atl	11		700		0.21		3,8
32	Pascagoula	Atl	17			**8.5**			15,16
33	Passaic	Atl	1.9			**1**	*0.01*		1,15
34	Patuxent	Atl	0.9		65	0.3	0.02		1,14
35	Pearl	Atl	17			**6.6(5.4)**	**1.6**	0.32	1,2,3,15
36	Peedee	Atl	23		500	**6.9**	0.5	0.39	1,3,8,15
37	Penobscott	Atl	17			**10**		0.55	3,4,15
38	Potomac	Atl	30	460	450	9.2	*1.4*	0.17	1,3,5
39	Rappahannock	Atl	1.6	340	100	2.1	**0.087**		1,4,12
40	Redwood	Pac	0.73			8.8	1.2		1,19
41	Rio Grande	Atl	670	2800	3600	3.9	0.56	2.2	1,3,5
42	Roanoke	Atl	25	660		**6.8(7.1)**	<1(2.0)	0.49	3,5,6,15
43	Rouge	Pac	1.8			2.6	0.006	0.19	1,2,3
44	Russian	Pac	3.4			**2.1**	1.3		1,2,15
45	Sabine	Atl	13		100	**7.3**	0.75	0.6	1,3,5,15
46	Sacramento	Pac	70	610		**17**	**2.3**	1.6	1,2,3,15
47	Salinas	Pac	11			0.3	0.531		14,18
48	San Diego	Pac	1.1			0.04	*0.0006*		1,2
49	San Dieguito	Pac	8.6				*0.002*		1
50	San Joaquin	Pac	35	560		**4**	0.35	1.3	3,5,15,18
51	San Juan Capis	Pac	0.3			0.01	0.11		1,14
52	San Luis Ray	Pac	1.4			0.02	0.06		1,14
53	Santa Ana	Pac	4.3			**0.05**	0.3		1,2,15
54	Santa Clara	Pac	4.1			0.05(0.03)	5.3		1,2,15
55	Santee	Atl	36			13	*0.86*		1,5
56	Savannah	Atl	25	500	300	**11**	<1(2.8)	0.5	5,6,15
57	Sixes	Pac	0.3				*0.39*		1
58	Skagit	Pac	8			**15**	*0.33*	0.52	1,2,3,15
59	Smith	Pac	1.6			3.4	*0.28*		1,2
60	Snoqualamie	Pac	1.5			3.2	*0.23*		1,14
61	St. John's (FL)	Atl	7.9	220		2.9			2,15

	USA - Alaska Rivers	Ocean	Area(103km2	Length (km)	Max Elev(m)	Q (km3/yr)	TSS(106t/yr)	TDS(106t/yr)	Reference(s)
1	Alsek	Pac	28			27			1,2
2	Chilikat	Pac	1.9			7.2	*2.4*		3,4
3	Colville	Arctic	50			25	*6*		4,5,6
4	Copper	Pac	63	460		32	*(70)131*		1,3,7,8
5	Knik Arm	Pac	2.9			6	10		3,4
6	Kobuk	Arctic	31			16			1,2
7	Kuskokwim	Pac	130	1100		60	*5-10(?)*		1,2,5,7,9
8	Kvichak	Pac	25			13			1,2
9	Ninilchik	Pac	0.33			3.1	*0.004*		3,4
10	Noatak	Arctic				11			2
11	Nushagak	Pac	32			31			1,2
12	Speel	Pac	0.58			3.1	*2.4*		3,4
13	Stikine	Pac	51	610		50	*44*	3.8	1,3,6
14	Susitna	Pac	16	600		40	*21*	7.6	1,3,5,6,7,12
15	Yukon	Pac	840	3700	2040	210	60	34	1,7,10,11,12

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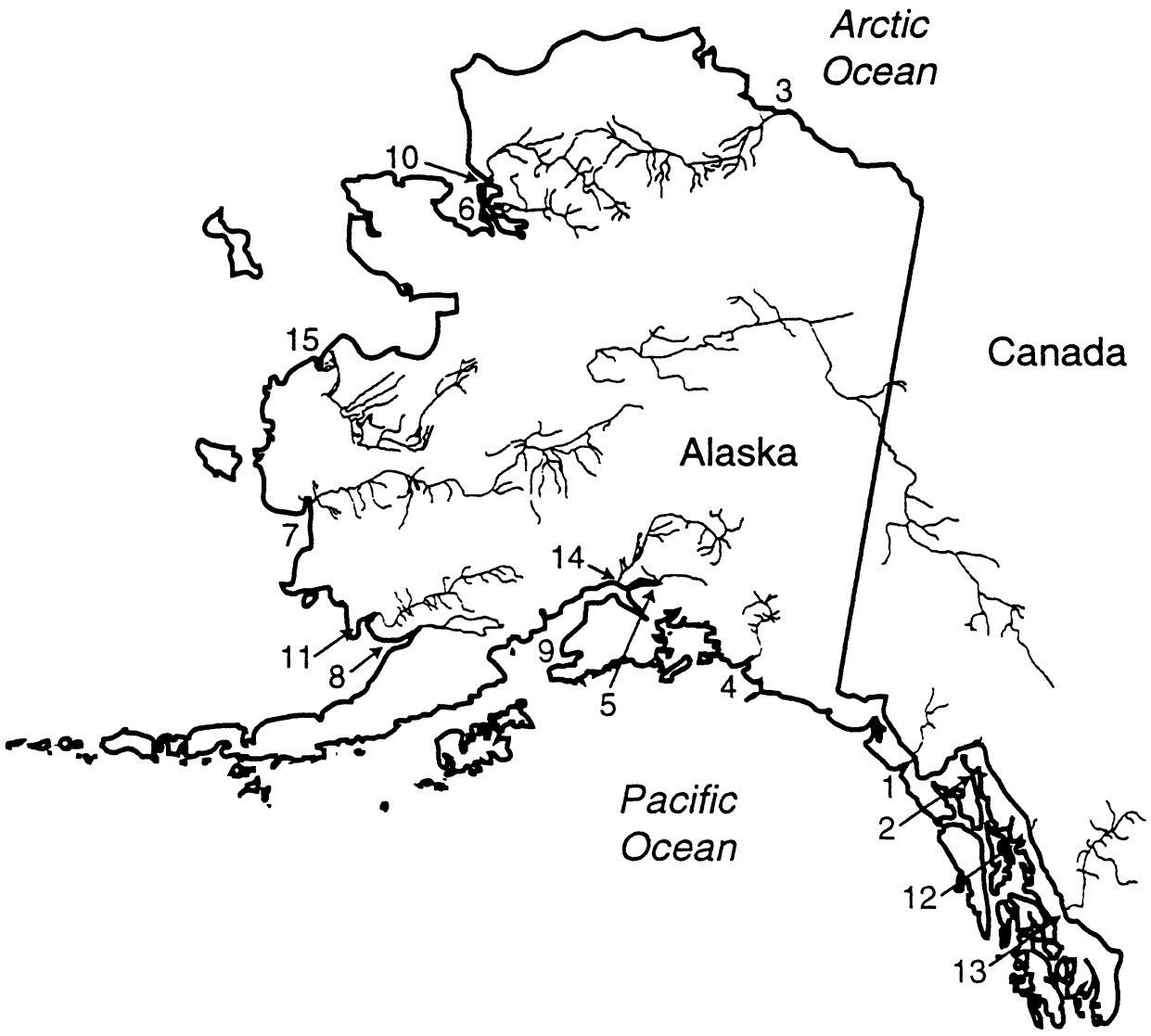
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	USA - Alaska Rivers	Ocean	Area(103km2	Length (km)	Max Elev(m)	Q (km3/yr)	TSS(106t/yr)	TDS(106t/yr)	Reference(s)
1	Alsek	Pac	28			27			1,2
2	Chilikat	Pac	1.9			7.2	*2.4*		3,4
3	Colville	Arctic	50			25	*6*		4,5,6
4	Copper	Pac	63	460		**32**	*(70)131*		1,3,7,8
5	Knik Arm	Pac	2.9			6	10		3,4
6	Kobuk	Arctic	31			16			1,2
7	Kuskokwim	Pac	130	1100		60	*5-10(?)*		1,2,5,7,9
8	Kvichak	Pac	25			12			1,2
9	Ninilchik	Pac	0.33			3.1	*0.004*		3,4
10	Noatak	Arctic				11			2
11	Nushagak	Pac	32			31			1,2
12	Speel	Pac	0.58			3.1	*2.4*		3,4
13	Stikine	Pac	51	610		50	*44*	3.8	1,3,6
14	Susitna	Pac	16	500		40	*21*	7.6	1,3,5,6,7
15	Yukon	Pac	840	3200	2040	210	60	34	1,7,10,11

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