Web Table 1: Modeled current and future discharge as computed by WaterGAP for mouths of large river systems. Results reflect the HadCM3 climate change model and "A2" scenario. WaterGAP discharge values shown here may differ from locally observed mean annual discharge values or virgin mean annual discharge values published in Nilsson *et al.* (2005). These differences may reflect actual shifts in discharge over time, or uncertainty of the model. Regardless, the relative change in discharge for each large river system provides useful indication of direction and magnitude of change in discharge expected to result from climate and social change between now and 2050s.

Africa – Dam Unimpacted

Large River System	Discharge 1960s-1990s (km^3/yr)	Discharge 2050s (km^3/yr)	Relative Change (%)
Cavally	25.7	29.4	14.5
Chari	29.1	34.3	17.9
Cross	59.9	61.8	3.1
Kouilou	28.4	20.0	-29.6
Mangoky	18.8	16.9	-10.2
Ntem	19.2	18.0	-6.2
Nyanga	17.6	14.6	-17.1
Rufiji	30.5	25.7	-15.7
Tsiribihina	33.2	31.2	-6.0

Africa – Dam Impacted

Large River System	Discharge 1960s-1990s (km^3/yr)	Discharge 2050s (km^3/yr)	Relative Change (%)
Betsiboka	29.2	31.8	9.0
Congo (Zaire)	1349.0	1267.5	-6.0
Cuanza	39.1	28.2	-28.0
Konkouré	13.1	15.7	20.1
Limpopo	8.7	7.2	-16.7
Niger	147.4	193.9	31.5
Nile	75.9	65.2	-14.1
Ogooué	155.1	147.0	-5.2
Orange	8.4	6.7	-20.6
Sanaga	63.8	53.8	-15.7
Sassandra	31.1	37.1	19.4
Save	11.3	9.7	-13.9
Sénégal	5.7	2.5	-56.0
Volta	32.8	48.1	46.7
Zambezi	120.4	105.2	-12.6

Asia – Dam Unimpacted

Large River System	Discharge 1960s-1990s (km^3/yr)	Discharge 2050s (km^3/yr)	Relative Change (%)
Abra	9.6	9.2	-4.1
Agusan	8.6	11.9	38.5
Anabar	15.8	20.9	32.2
Anadyr	32.2	48.2	49.9
Baram	34.8	34.0	-2.3
Cá, Chu	22.3	20.8	-6.7
Great Tenasserim	25.9	26.5	2.5
Indigirka	54.9	80.6	46.9
Kaladan	46.4	56.4	21.4
Kamchatka	28.9	33.2	15.1
Kelantan	17.3	16.4	-5.1
Kemena	10.1	9.9	-2.3
Khatanga, Popigay	37.3	50.2	34.7
Kinabatangan	22.6	23.2	3.0
Mã	23.6	24.5	3.9
Nadym	16.0	26.5	65.9
Olenek	32.4	44.0	36.1
Pahang	27.2	23.7	-12.7
Penzhina	23.3	31.8	36.6
Pur	29.8	46.0	54.2
Pyasina	32.5	45.5	40.2
Rajang	93.6	94.4	0.9
Salween (Thanlwin)	98.5	135.2	37.2
Tauy	3.5	4.7	34.4
Tavoy	17.0	18.5	8.7
Taymyra	13.7	20.0	46.0
Taz	37.2	51.6	38.7
Uda	14.5	16.5	13.6
Yana	29.4	40.1	36.3

Asia – Dam Impacted

Large River System	Discharge 1960s-1990s (km^3/yr)	Discharge 2050s (km^3/yr)	Relative Change (%)
Agano-Gawa	9.2	9.4	2.1
Amu-Dar'Ya	50.3	49.5	-1.7
Amur	330.5	412.7	24.9
Bengwan Solo	11.5	11.6	0.9
Boung, Thu Bon, Cái	11.0	10.0	-8.8
Cagayan	35.6	32.7	-8.1
Cauvery	7.6	5.0	-34.5

Chang Jiang (Yangtze)	955.4	1121.9	17.4
Chao Phraya	21.1	27.7	31.4
Ganges-Brahmaputra	1186.9	1388.4	17.0
Haihe	20.6	28.5	38.2
Han Jiang	23.0	31.2	36.1
Han-Gang	21.8	29.8	36.7
Hong Ha (Red River)	68.2	78.1	14.6
Huang He	56.0	78.0	39.4
Ili	12.5	13.7	9.2
Indus	121.2	174.6	44.1
Irrawaddi (Ayeyarwadi)	564.4	713.0	26.3
Ishikari-Gawa	15.3	17.6	15.6
Karnafuli	17.4	22.3	28.0
Kiso-Ibi-Nagara	9.0	9.5	5.6
Kolyma	115.2	164.3	42.6
Krishna-Godavari	107.3	122.3	14.0
Kura	22.0	13.7	-37.8
Lena	540.1	694.8	28.6
Liao He	24.5	35.1	43.3
Mae Khlong	21.1	23.4	11.0
Mae Nam Ta Pi, Khlong Phum Duang, Khlong Yan	9.6	10.1	5.4
Mahanadi-Brahmani	70.9	81.0	14.2
Mahi	11.9	13.4	12.6
Mekong	421.8	417.5	-1.0
Min Jiang	47.0	58.5	24.5
Mindanao	10.4	11.9	14.4
Mogami-Gawa	5.3	5.3	-0.4
Nakton-Gang	10.5	13.2	25.6
Narmada	47.5	50.5	6.3
Ob	413.2	489.3	18.4
Ou Jiang	9.7	11.5	18.2
Pampanga	16.3	17.3	6.0
Perak	16.3	15.6	-4.7
Periyar, Pambiyar, Vembanad Lake	7.4	7.6	3.0
Qiantanjiang	30.5	36.8	20.6
Shatt Al Arab (Euphrates-Tigris)	69.7	45.5	-34.7
Shinano-Gawa	17.7	18.4	3.6
Syr-Dar'Ya	21.3	18.8	-11.8
Tapi	16.2	16.6	1.9

Yalu Jiang	19.0	27.3	43.8
Yenisey	597.3	728.8	22.0
Zhu Jiang (Pearl River)	270.5	330.3	22.1

Australasia – Dam Unimpacted

Large River System	Discharge 1960s-1990s (km^3/yr)	Discharge 2050s (km^3/yr)	Relative Change (%)
Bian	6.4	5.3	-17.8
Buller	7.2	8.0	11.5
Derewo, Owa	18.9	20.3	7.4
Digul	87.3	95.0	8.9
Eilanden, Lorentz, Kampong, Nordwest	26.0	29.2	12.0
Fly	135.4	147.5	9.0
Grey	13.3	14.7	10.7
Kikori	61.4	67.3	9.7
Laluai	3.6	3.9	9.7
Mamberamo	118.8	154.0	29.6
Markham	7.3	8.7	18.3
Merauke	1.5	0.9	-40.6
Omba	5.9	5.8	-2.8
Purari	47.0	52.8	12.3
Sepik	100.7	133.6	32.7
Timoforo, Kamoendan	21.1	23.4	11.2
Turama	30.1	31.0	3.2

Australasia – Dam Impacted

Large River System	Discharge 1960s-1990s (km^3/yr)	Discharge 2050s (km^3/yr)	Relative Change (%)
Clutha	19.6	20.0	2.2
Murray	11.1	9.5	-14.3
Ramu	32.7	40.1	22.8
Waiau	9.9	10.2	3.8
Waikato	15.5	17.9	15.4
Waitaki	15.3	16.1	4.9

Europe – Dam Unimpacted

Large River System	Discharge 1960s-1990s (km^3/yr)	Discharge 2050s (km^3/yr)	Relative Change (%)
Adour	6.5	6.2	-4.9
Kalixälven, Torneälven	3.9	4.4	13.7

Mezen	26.5	32.8	23.8
Onega	16.2	20.1	23.7
Pechora	142.0	174.1	22.6

Europe – Dam Impacted

Large River System	Discharge 1960s-1990s (km^3/yr)	Discharge 2050s (km^3/yr)	Relative Change (%)
Ångermanälven	16.8	18.5	9.7
Dalälven	7.3	7.5	2.0
Danube	215.5	192.4	-10.7
Daugava	23.0	23.1	0.6
Dnepr	48.2	40.9	-15.2
Don	29.7	23.6	-20.4
Drin	14.5	11.3	-22.1
Duero (Douro)	23.1	21.6	-6.5
Ebro	16.2	15.1	-6.9
Elbe	29.5	28.8	-2.3
Garonne, Dordogne	30.9	30.8	-0.3
Glommavassdr.	21.9	24.0	9.4
Göta Älv	17.5	17.6	1.1
Indalsälven	4.6	4.8	5.6
Kemijoki	17.8	21.5	20.8
Kuban	13.0	9.7	-25.1
Loire	31.7	32.9	3.7
Luleälven	15.9	17.5	9.8
Narva	11.6	11.9	2.7
Nemunas	19.7	18.5	-5.9
Neretva	7.1	6.1	-13.5
Neva	79.7	96.0	20.5
Oder	19.8	19.2	-2.6
Ölfusá	4.2	3.9	-7.1
Po	52.0	49.5	-5.0
Rhein, Maas	2.9	2.8	-2.8
Rhone	54.3	53.0	-2.5
Rioni	16.2	12.5	-23.1
Seine	17.1	17.3	1.0
Severn, Dvina	101.2	123.4	21.9
Tajo/Tejo	18.3	14.2	-22.6
Thjorsa	6.4	6.0	-6.0
Umeälven	9.8	10.5	8.0
Volga	234.0	246.3	5.2
Weser	29.5	28.8	-2.3
Wisla	35.9	34.5	-3.9

North and Central America – Dam Unimpacted

Large River System	Discharge 1960s-1990s (km^3/yr)	Discharge 2050s (km^3/yr)	Relative Change (%)
Alsek	13.1	14.4	10.3
Arnaud	15.8	18.0	13.4
Attawapiskat	9.5	16.6	75.5
Back	16.2	23.8	47.1
Broadback	6.9	8.1	17.1
Coatzacoalcos	15.4	10.2	-33.4
Coco (Segovia)	27.0	8.2	-69.8
Colville	0.3	0.5	67.0
Copper	41.0	48.7	18.8
Coppermine	2.1	3.0	41.7
Escondido	14.0	2.3	-83.2
George	24.7	26.5	7.4
Harricana	10.1	11.9	17.6
Hayes	6.1	10.7	29.8
Kobuk	0.2	0.8	212.2
Kuskokwim	38.4	63.4	65.1
Kvichak	7.9	10.3	31.0
Moisie	14.1	15.4	9.5
Nass	27.1	28.6	5.5
Natashquan	12.0	13.3	10.7
Noatak	0.3	0.8	124.5
Nushagak	3.4	5.8	72.9
Pascagoula	13.8	13.0	-5.9
Patuca	12.3	3.4	-72.0
Petit Mécatina	17.2	18.9	10.0
Povungnituk	5.8	6.6	13.5
Prinzapolca, Bambana	16.2	6.1	-62.2
R. à la Baleine	17.5	18.9	8.4
R. Aux Feuilles	20.9	23.4	12.1
Rupert	25.8	29.8	15.3
Seal	4.3	5.5	27.9
Severn	18.7	35.7	91.3
Skeena	47.2	49.7	5.4
Stikine	40.6	45.3	11.7
Susitna	8.3	11.5	38.1
Taku	11.5	13.0	12.9
Thaanne, Thlewaitza	5.5	6.4	16.7
Thelon, Kazan	29.6	37.8	27.6

Winisk	12.5	25.6	104.6
Yukon	187.2	246.0	31.4

North and Central America – Dam Impacted

Large River System	Discharge 1960s-1990s (km^3/yr)	Discharge 2050s (km^3/yr)	Relative Change (%)
Alabama, Mobile	60.7	64.5	6.3
Albany	30.7	42.9	39.7
Altamaha	13.3	14.0	4.9
Apalachicola	24.2	24.6	1.4
Balsas	24.8	21.9	-11.9
Betsiamites	11.1	12.6	12.9
Churchill	29.2	38.4	31.5
Churchill	57.9	63.0	8.7
Colorado	1.3	2.4	81.6
Columbia	232.8	247.3	6.2
Conneticut	17.6	21.2	20.1
Delaware	15.3	19.0	24.0
Eastmain	28.3	32.6	15.4
Fraser	112.6	122.0	8.3
Gr. R. Baleine	17.0	19.4	14.4
Grande De Matagalpa	30.1	7.7	-74.3
Hudson	18.5	22.7	22.7
Kanairiktok	6.4	6.8	6.6
Kennebec, Androscoggin	17.9	21.4	19.2
Klamath	19.8	16.0	-19.0
Koksoak	69.1	76.0	10.1
La Grande	53.7	62.1	15.6
Lempa	13.4	7.0	-47.8
Mackenzie	267.3	336.8	26.0
Manicouagan	30.6	33.8	10.3
Mississippi	530.6	540.0	1.8
Moose	33.0	39.9	20.8
Naskaupi	9.6	10.3	7.1
Nelson	72.6	93.2	28.4
Nottaway	61.1	70.6	15.5
Panuco	17.2	11.0	-35.8
Papaloapan, San Juan	19.3	14.3	-26.2
Pee Dee	13.6	13.8	1.6
Penobscot	12.6	14.8	17.8

Potomac	11.0	13.4	21.5
R. aux Outardes	12.4	13.9	11.6
Rio Grande De Santiago	10.4	9.9	-5.2
Sacramento, San Joaquin	36.8	27.5	-25.2
Saguenay	57.5	65.4	13.7
San Juan	40.5	11.1	-72.6
Santee	2.7	3.1	13.0
Savannah	11.2	12.3	9.6
Skagit	10.2	10.1	-0.3
St. John	38.0	43.2	13.5
St. Lawrence	366.8	457.2	24.7
Susquehenna	34.3	42.1	22.7
Ulua	16.8	6.6	-60.4
Usumacinta, Grijalva	75.6	44.3	-41.4

South America – Dam Unimpacted

Large River System	**Discharge 1960s-1990s (km^3/yr)**	**Discharge 2050s (km^3/yr)**	**Relative Change (%)**
Atrato	78.6	66.4	-15.5
Baker	5.0	5.2	3.3
Bueno	16.6	15.0	-9.9
Catatumbo	18.6	7.1	-61.9
Coppename	10.7	0.7	-93.4
Courantyne	46.0	19.9	-56.6
Esmeraldas	15.9	15.9	-0.4
Essequibo	155.1	78.8	-49.2
Gurupi	21.0	16.2	-22.5
Jequitinhonha	18.5	21.9	18.0
Maroni (Suriname)	11.1	0.8	-92.4
Oyapock	40.2	15.3	-62.0
Palena	12.5	12.0	-3.8
Pascua	4.4	4.6	4.5
Patia	21.8	23.9	9.7
Puelo	8.7	8.1	-6.3
San Juan	66.7	68.5	2.6
Santa Cruz	0.9	1.0	17.3
Santiago, Cayapas	9.3	10.6	14.1
Valdivia	9.3	8.1	-13.6

South America – Dam Impacted

Large River System	Discharge 1960s-1990s (km^3/yr)	Discharge 2050s (km^3/yr)	Relative Change (%)
Amazonas, Orinoco	6802.4	5536.5	-18.6
Araguari	51.5	23.4	-54.6
Bío-Bío	32.3	26.2	-19.1
Doce	24.4	33.4	37.1
Futaleufu	9.6	9.1	-4.7
Guayas	27.6	29.2	5.8
Itajai	15.0	12.2	-18.7
Itata, Maule	10.6	7.7	-27.4
Jacuí, Camaquã, Jagarão	101.8	97.2	-4.5
Juquiá, Ribeira	11.5	9.4	-18.4
Magdalena	218.4	154.5	-29.3
Mearim, Grajaú, Pindaré	9.3	3.9	-58.4
Paraiba do Sul	24.2	29.3	21.3
Parnaiba	26.6	5.0	-81.2
Río de la Plata	601.9	639.5	6.2
Río Negro	26.8	23.5	-12.4
Sao Francisco	79.3	100.7	27.0
Sinú	11.8	7.1	-40.2