

Article

Supplementary Material for

Quantification of Temporal Variations in Base Flow Index Using Sporadic River Data: Application to the Bua Catchment, Malawi

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Figure S1. Pictures of the weir located on the Bua river downstream of gauge 5C1, taken January 2019 by Oliver Phiri.

Table S1. Results of the annual and seasonal BFI analysis (tabular) for the Bua river, gauge station 5D1, 1958–2007 (49 years).

Period	Annual BFI	Wet Season BFI	Dry Season BFI
1958/1959	-	-	-
1959/1960	0.82	0.81	0.99
1960/1961	0.93	0.92	1.00
1961/1962	0.94	0.93	1.00
1962/1963	0.92	0.92	0.98
1963/1964	0.92	0.92	0.99
1964/1965	0.93	0.92	1.00
1965/1966	0.85	0.85	0.96
1966/1967	0.69	0.68	0.96
1967/1968	0.66	0.66	0.67
1968/1969	0.86	0.86	0.97
1969/1970	0.83	0.83	0.78
1970/1971	-	-	0.99
1971/1972	0.87	0.86	0.98
1972/1973	0.92	0.92	0.98
1973/1974	0.88	0.87	0.93
1974/1975	0.83	0.82	0.97
1975/1976	0.53	0.51	0.97
1976/1977	0.81	0.80	0.95
1977/1978	-	-	0.98
1978/1979	0.73	0.73	1.00
1979/1980	-	-	1.00
1980/1981	-	-	-
1981/1982	-	-	-
1982/1983	-	-	-
1983/1984	0.47	0.47	1.00
1984/1985	-	0.84	-
1985/1986	-	-	0.99
1986/1987	-	0.84	-
1987/1988	0.55	0.51	0.91
1988/1989	-	0.74	-
1989/1990	0.73	0.73	0.74
1990/1991	-	-	0.92
1991/1992	0.43	0.41	0.95
1992/1993	0.44	0.41	0.93
1993/1994	0.71	0.70	0.83
1994/1995	0.49	0.47	0.85
1996/1997	-	-	-
1997/1998	-	-	-
1998/1999	-	-	-
1999/2000	-	-	-
2000/2001	-	-	-
2001/2002	-	-	-
2002/2003	-	-	-
2003/2004	-	-	-
2004/2005	-	-	-
2005/2006	-	0.55	-
2006/2007	-	-	0.55

- denotes no BFI determined due to insufficient data in the period.

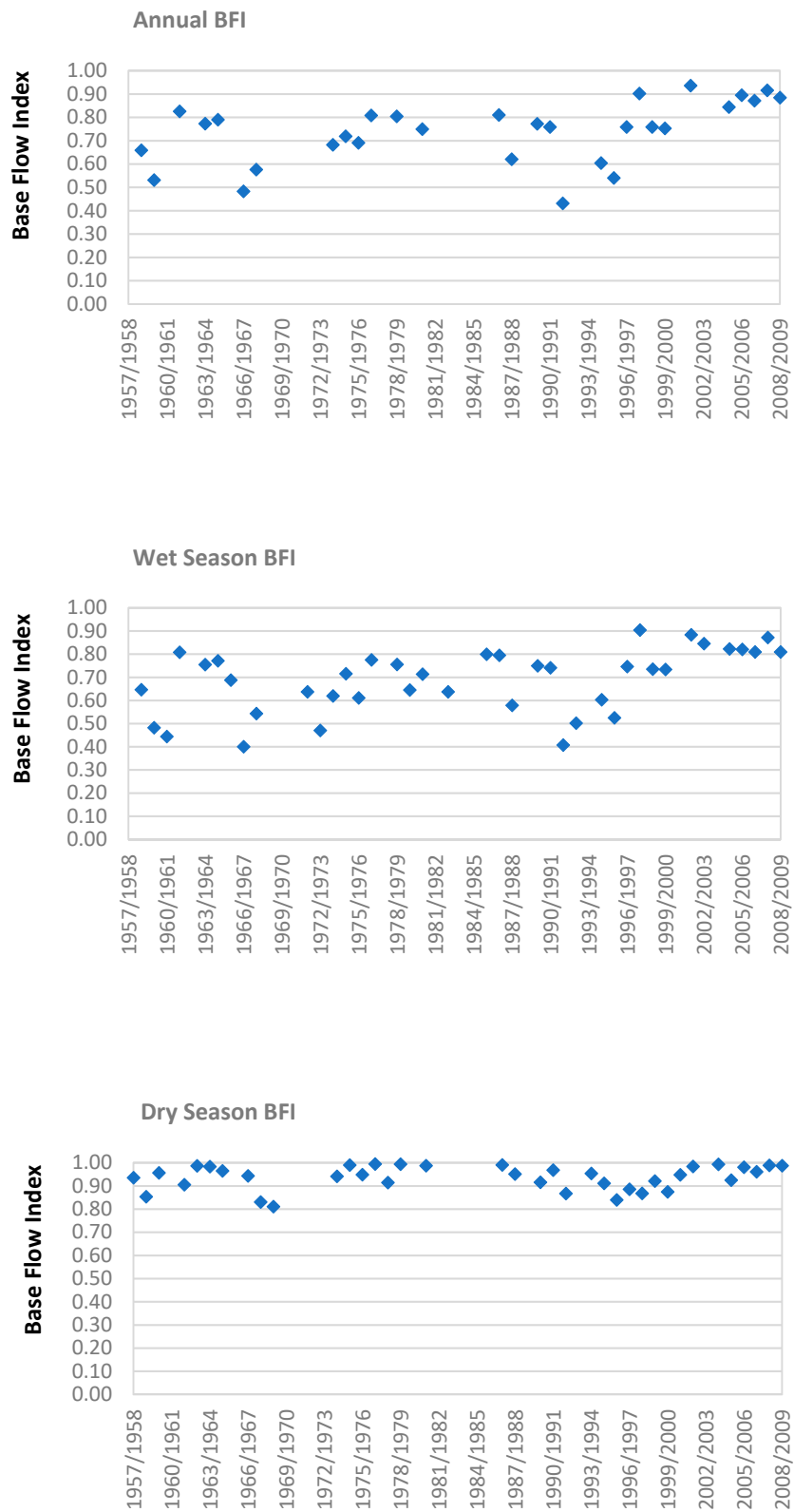


Figure S2. Results of the annual and seasonal BFI analysis (graphical) for the Bua River, gauge station 5C1, 1957–2009 (52 years).

Table S2. Results of the annual and seasonal BFI analysis (tabular) for the Bua river, gauge station 5D2, 1953–2005 (52 years).

Period	Annual BFI	Wet Season BFI	Dry Season BFI
1953/1954	-	-	0.95
1954/1955	0.96	0.98	0.79
1955/1956	0.96	0.95	1.00
1956/1957	0.95	0.95	0.96
1957/1958	0.98	0.98	0.93
1958/1959	0.89	0.89	0.93
1959/1960	0.74	0.71	0.99
1960/1961	0.92	0.92	0.94
1961/1962	0.88	0.87	0.91
1962/1963	0.97	0.97	0.99
1963/1964	0.86	0.85	0.98
1964/1965	0.72	0.70	0.96
1965/1966	0.80	0.79	0.96
1966/1967	0.48	0.46	0.54
1967/1968	0.88	0.86	0.98
1968/1969	0.36	0.32	0.70
1969/1970	0.14	0.12	0.94
1970/1971	0.69	0.69	0.91
1971/1972	0.67	0.68	0.59
1972/1973	0.73	0.74	0.69
1973/1974	0.87	0.86	0.94
1974/1975	0.88	0.88	0.90
1975/1976	0.89	0.87	1.00
1976/1977	-	0.72	-
1977/1978	-	-	-
1978/1979	-	-	-
1979/1980	0.54	0.49	0.83
1980/1981	-	0.63	-
1981/1982	0.74	0.77	0.47
1982/1983	-	0.72	-
1983/1984	-	-	-
1984/1985	-	-	-
1985/1986	0.96	0.96	-
1986/1987	0.90	0.89	1.00
1987/1988	-	-	-
1988/1989	-	-	-
1989/1990	-	-	0.86
1990/1991	-	0.62	-
1991/1992	-	-	0.00
1992/1993	-	0.64	-
1993/1994	0.11	0.11	-
1994/1995	-	0.78	-
1995/1996	-	0.58	-
1996/1997	-	-	-
1997/1998	-	0.88	-
1998/1999	-	-	-
1999/2000	-	-	-
2000/2001	-	-	-
2001/2002	-	-	-

2002/2003	-	-	-
2003/2004	-	-	-
2004/2005	-	-	-

- denotes no BFI determined due to insufficient data in the period.

Table 3. Results of the annual and seasonal BFI analysis (tabular) for the Mtiti river, gauge station 5D3, 1958–2003 (45 years).

Period	Annual BFI	Wet Season BFI	Dry Season BFI
1958/1959	-	-	0.88
1959/1960	0.20	0.19	0.90
1960/1961	0.18	0.13	0.89
1961/1962	0.13	0.09	0.91
1962/1963	0.37	0.36	0.91
1963/1964	0.25	0.23	0.88
1964/1965	0.20	0.18	0.88
1965/1966	0.13	0.13	0.39
1966/1967	0.18	0.15	0.82
1967/1968	0.18	0.17	0.56
1968/1969	0.21	0.21	0.81
1969/1970	0.05	0.05	0.19
1970/1971	0.77	0.67	0.97
1971/1972	0.81	0.74	0.95
1972/1973	0.70	0.60	0.96
1973/1974	0.82	0.67	0.98
1974/1975	-	-	0.98
1975/1976	-	-	0.90
1976/1977	0.80	0.73	0.96
1977/1978	-	-	-
1978/1979	-	-	0.86
1979/1980	0.76	0.64	0.97
1980/1981	-	0.72	-
1981/1982	-	-	0.98
1982/1983	0.84	0.77	0.98
1983/1984	0.75	0.65	0.98
1984/1985	-	0.69	-
1985/1986	0.83	0.77	0.96
1986/1987	0.79	0.73	0.96
1987/1988	-	0.27	-
1988/1989	0.30	0.28	0.71
1989/1990	0.33	0.34	0.00
1990/1991	-	-	0.90
1991/1992	0.49	0.49	0.88
1992/1993	0.60	0.60	0.72
1993/1994	-	-	0.85
1994/1995	0.79	0.77	1.00
1995/1996	0.44	0.37	0.81
1996/1997	-	-	-
1997/1998	-	-	0.94
1998/1999	-	-	-
1999/2000	-	-	0.96
2000/2001	-	-	-
2001/2002	-	-	-

2002/2003	-	-	-
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- denotes no BFI determined due to insufficient data in the period.

Table S4. Results of the annual and seasonal BFI analysis (tabular) for the Bua river, gauge station 5E6, 1970–2008 (38 years).

Period	Annual BFI	Wet Season BFI	Dry Season BFI
1970/1971	-	-	0.93
1971/1972	0.70	0.61	0.90
1972/1973	0.57	0.53	0.88
1973/1974	0.64	0.55	0.90
1974/1975	0.54	0.47	0.86
1975/1976	0.58	0.50	0.94
1976/1977	0.54	0.45	0.95
1977/1978	0.54	0.41	0.98
1978/1979	0.60	0.51	0.95
1979/1980	0.54	0.41	0.98
1980/1981	0.56	0.41	0.97
1981/1982	-	-	0.90
1982/1983	0.44	0.36	0.92
1983/1984	0.38	0.32	0.94
1984/1985	-	0.36	-
1985/1986	0.61	0.50	0.97
1986/1987	0.59	0.47	0.97
1987/1988	0.50	0.40	0.87
1988/1989	0.63	0.50	0.96
1989/1990	0.61	0.50	0.91
1990/1991	0.53	0.50	0.91
1991/1992	0.41	0.41	0.47
1992/1993	-	0.33	-
1993/1994	-	0.90	-
1994/1995	-	-	-
1995/1996	0.37	0.35	0.53
1996/1997	0.45	0.38	0.87
1997/1998	-	-	-
1998/1999	0.56	0.25	0.93
1999/2000	0.44	0.30	0.94
2000/2001	-	-	-
2001/2002	-	-	-
2002/2003	-	-	-
2003/2004	-	-	-
2004/2005	-	0.70	-
2005/2006	-	-	-
2006/2007	-	-	0.98
2007/2008	-	-	-

- denotes no BFI determined due to insufficient data in the period.

Table S5. Results of the annual and seasonal BFI analysis (tabular) for the Rusa river, gauge station 5F1, 1964–2005 (41 years).

Period	Annual BFI	Wet Season BFI	Dry Season BFI
1964/1965	-	-	0.87
1965/1966	0.85	0.85	0.81
1966/1967	0.82	0.83	0.75
1967/1968	0.88	0.87	0.89
1968/1969	0.88	0.88	0.88
1969/1970	0.84	0.83	0.86
1970/1971	-	-	-
1971/1972	-	-	0.95
1972/1973	0.90	0.86	0.97
1973/1974	-	-	-
1974/1975	0.88	0.86	0.97
1975/1976	0.94	0.92	1.00
1976/1977	0.78	0.76	0.97
1977/1978	0.94	0.94	0.99
1978/1979	0.72	0.70	0.97
1979/1980	0.66	0.60	0.91
1980/1981	0.89	0.87	0.96
1981/1982	-	-	0.98
1982/1983	0.86	0.86	0.87
1983/1984	0.89	0.89	0.91
1984/1985	-	-	-
1985/1986	0.98	0.95	0.88
1986/1987	0.93	0.93	0.96
1987/1988	0.59	0.55	0.93
1988/1989	-	0.83	-
1989/1990	-	0.78	-
1990/1991	0.68	0.68	0.77
1991/1992	0.36	0.35	0.61
1992/1993	0.88	0.87	0.94
1993/1994	0.83	0.83	0.65
1994/1995	0.92	0.85	0.94
1995/1996	0.26	0.24	0.92
1996/1997	-	0.83	-
1997/1998	-	0.92	-
1998/1999	-	-	-
1999/2000	-	-	-
2000/2001	-	-	-
2001/2002	-	-	-
2002/2003	-	-	-
2003/2004	-	-	-
2004/2005	-	-	-

- denotes no BFI determined due to insufficient data in the period

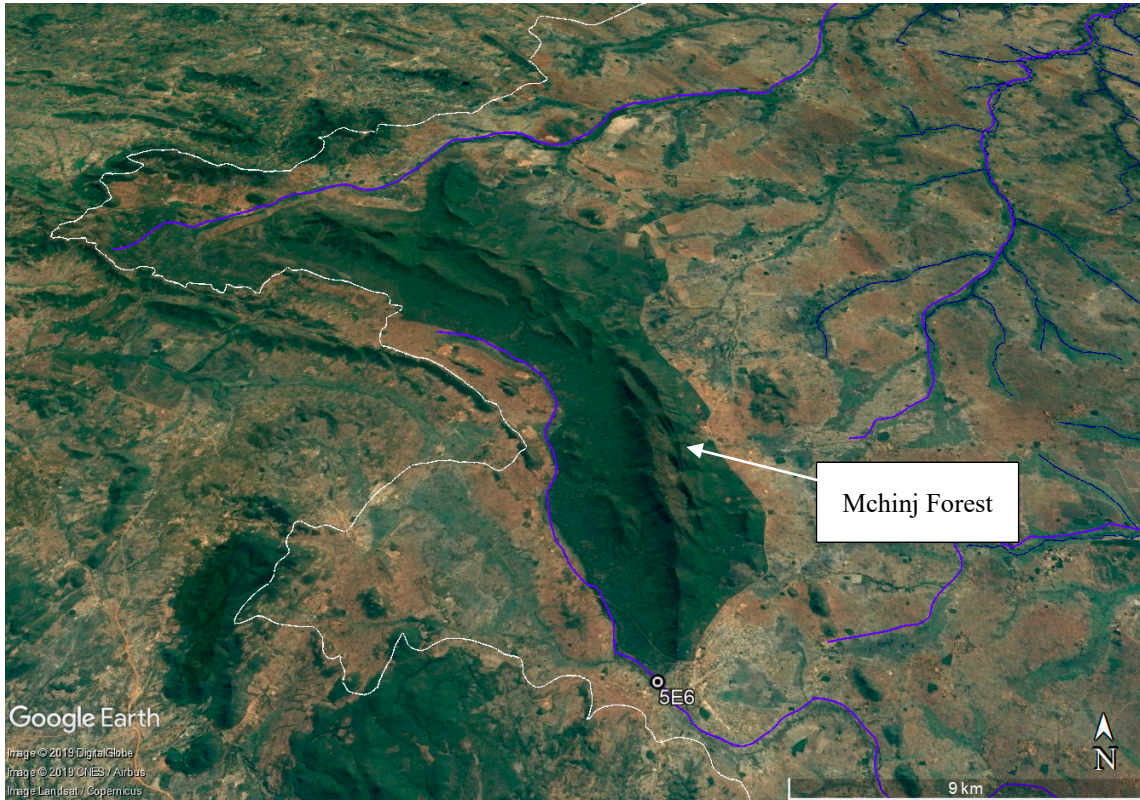


Figure S3. River gauge 5E6 on the Bua river, draining Mchinji Forest Reserve, Google Earth Image, February 2019.

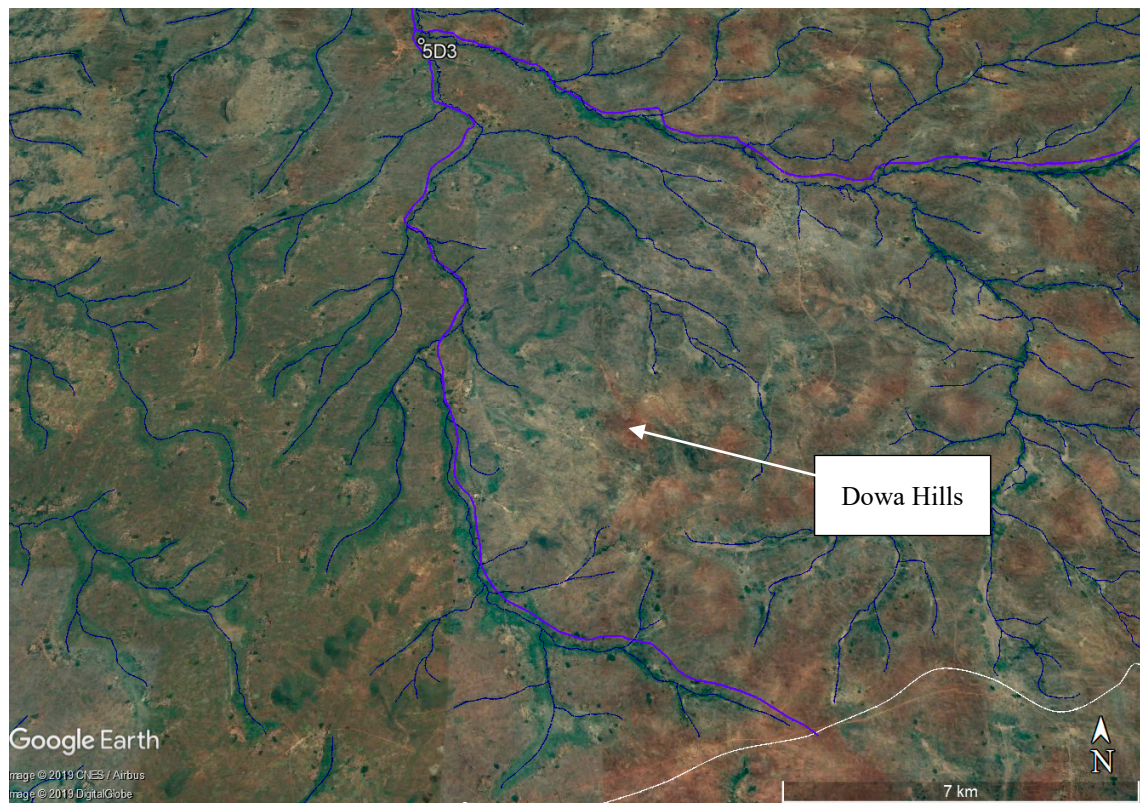


Figure S4. River gauge 5D3 on the Mtiti river, draining part of the Dowa Hills, Google Earth Image, February 2019.

