



Lower Ovens River. Courtesy NECMA

North East Region

The river basins of Victoria's north east are characterised by the steep, rugged and naturally forested Victorian Alps in the south that give way to open plains and the rich, productive land that adjoins the River Murray in the north. Agriculture (dairy, beef, lamb, wool, cropping and horticulture) and forestry dominate land use across the region.

Three river basins form the region – Upper Murray (basin 1), Kiewa (basin 2) and Ovens (basin 3).

The Upper Murray basin, which includes the Mitta Mitta River, Lake Dartmouth and Lake Hume, is the most heavily forested of the three basins (approximately 80% forest coverage) and is largely undeveloped. Most of the stream length in the Upper Murray basin was in good or excellent condition (52%). The basin features the Heritage listed Mitta Mitta River (from Glen Valley to Lake Dartmouth), noted for its significant natural, scenic and cultural heritage values. Of the remainder, 30% of stream length was in moderate condition and only 7% of stream length was classified as poor or very poor.

Although not as heavily forested as Upper Murray, the Kiewa basin is characterised by large tracts of natural forest in the south and intensively farmed, highly productive land in the north where the Kiewa River and its tributaries feed into the River Murray. The good condition of streams in the Kiewa basin reflects the relative high forest coverage and low level of hydrological development. A quarter of the stream length was rated in good or excellent condition. The remaining stream length was predominately in moderate condition.

In the Ovens basin, numerous small creeks flow into the basin's major waterways - the Ovens, Buffalo, Catherine and King Rivers. Like the Kiewa basin, the Ovens basin has extensive forest coverage in the south, giving way to alluvial river flats and rich agricultural land in the north. The basin features the Heritage listed Ovens River (in the reach from Killawarra to Lake Mulwala), noted for its significant natural, scenic and cultural heritage values. Nearly one-third (28%) of the stream length in the Ovens basin was rated in good or excellent condition, with most of the remaining stream length in moderate condition (69%). Two reaches were in excellent condition - the upper King River (reach 25) and Buffalo River West Branch (reach 57).



Kiewa River. Courtesy Alison Pouliot

Water Quality

Water quality was monitored at 19 reaches across the North East region. Results ranged from moderate (21% of reaches) to excellent (36% of reaches), with the majority rated in good condition (43%). The results correlate with the extensive forest coverage across the region.

Water quality was assessed at seven reaches in the Upper Murray basin. With the exception of reach 41 on Morass Creek, a highly modified reach in an area of unforested land, all were rated in excellent condition. Reach 41 showed elevated levels of phosphorus, salinity and turbidity.

In the Kiewa basin, four reaches were assessed for water quality. Reach 19, in the densely forested headwaters of the Kiewa River West Branch, was in excellent condition. At the bottom of the Kiewa basin, reaches 1 and 11 were in moderate condition. Both reaches showed elevated levels of phosphorus and turbidity, which in the past have been attributed to on-going sediment issues associated with earlier gold-mining in the district.

Water quality was monitored at eight reaches in the Ovens basin. With the exception of one reach, results were either good or excellent. Reach 9 (Fifteen Mile Creek) scored moderately, showing elevated levels of phosphorus and turbidity, which may be attributed to run-off from the surrounding cleared sloping river valleys.

Of note is reach 1, located toward the mouth of the Ovens River, which retains excellent vegetation cover in otherwise cleared surrounds. Importantly, water quality at this reach has improved significantly since 2003, when the reach scored only a moderate rating for water quality. At that time, water quality at reach 1 had been severely impacted by the 2003 bushfires, resulting in elevated phosphorus levels. No evidence of this remains and the reach is now in excellent condition.

Hydrology

The extensive forest coverage and the low proportion of hydrological development across the North East region, particularly in the Upper Murray basin and large sections of the Kiewa and Ovens basins, is reflected in the flow stress scores. Scores ranged from moderately altered flow regimes to near natural flow regimes.

Within the Upper Murray basin, flow stress scores indicated moderate to minor variations in natural flow regimes, with many streams in a near natural hydrological state. The exception was the lower Mitta Mitta River (reaches 1-3), which is highly regulated to handle water transfers between Lake Dartmouth and Lake Hume. As a result, this stretch of river had extended periods of low flow, reduced summer high flows and stressed flows in both summer and winter.

In the Kiewa basin, reaches demonstrated moderate to extreme changes to flow regimes. The most impacted reach, was reach 12 (Yackandandah Creek) which had extended periods of summer low flows.

In the Ovens basin results ranged from near natural flow regimes for streams in the densely forested south of the basin to streams under considerable flow stress in the north, where land use is dominated by agriculture and urban development. Reaches with near natural flow regimes included King River (reach 25), Buffalo River (reaches 34-35), Catherine River (reach 36), Rose River (reaches 37-38), Yarrarabula Creek (reach 55) and Dandongadale River (reach 56) - these results are consistent with forested headwater streams.

In contrast, Black Dog Creek (reaches 13-15), Reedy Creek (reaches 17-20), King River below Lake William Hovell (reaches 21-24), Barwidgee Creek (reaches 39-40), and Indigo Creek (reaches 46-47) had highly modified flow regimes, reflecting the ephemeral systems as well as seasonal demands for agricultural and urban water supply.

The majority of stress on flow regimes within the Ovens basin was caused by extended periods of low flows during summer.

Drought had a very heavy impact across nearly all reaches in the North East region, most notably on the Little Snowy Creek (reach 4), Sandy Creek (reach 7), Johnston Creek (reach 12), and Gibbo River (reach 39) in the Upper Murray basin, and House Creek (reach 7) and Back Creek (reach 13) in the Kiewa basin.

Vegetation

The condition of streamside vegetation varied considerably across the North East region. In the south, where densely vegetated alpine terrain dominates, the majority of reaches were in good or excellent condition. Tributaries of the Murray River in the north, where land has been extensively cleared, were generally rated in poor or moderate condition.

Of the 139 reaches assessed across the region, 43 (31%) were found to be in excellent condition. Of these, 13 were in reference condition - reaches 11, 24, 48, 57 and 59 in the Upper Murray basin; reach 18 in the Kiewa basin; and reaches 36, 38, 44, 53, 54, 56 and 57 in the Ovens basin. Not surprisingly, all of these reaches were located in densely forested areas.

The majority of reaches across the region (34%) were in good condition. While scores for vegetation width, continuity, structure and overhang were generally good to excellent, the lack of large trees was notable along most reaches.

At the other end of the scale, 16 reaches (12%) rated poorly for streamside vegetation. The majority of these (13 reaches) were located in the Upper Murray catchment, where streams feeding into the River Murray had few remaining streamside large trees and a fragmented, narrow band of vegetation.

Rubicon River. Courtesy Alison Pouliot



The poorest reaches were Tallangatta Creek (reach 8) and Walwa Creek (reach 15), both in the Upper Murray basin. Also rating poorly was Livingstone Creek (reach 30), located in the south of the Upper Murray basin in a cleared pocket of land above Lake Dartmouth. Vegetation along this reach was narrow, fragmented and included a number of invasive willows.

Physical Form

Physical form was assessed at 139 reaches in the North East region. Of these, almost a third (32% or 45 reaches) were in excellent condition, with the remainder in good (48% or 67 reaches) or moderate (20% or 27 reaches) condition.

Within the North East region, the Kiewa basin had the greatest proportion of reaches in reference or near reference condition. Of the 20 reaches assessed, six were in reference condition (1, 11, 14, 15, 17 and 19) and a further 11 in near reference condition. Notably, with the exception of reach 19 located in the densely forested highlands on the western branch of the Kiewa River, all other reaches in reference condition are located in areas predominantly cleared of native vegetation, yet retained high levels of large woody habitat, stable banks and had no major downstream barriers to fish migration.

Three reaches in the Kiewa were assessed as being in good physical condition. Scores on reaches 6 and 9 reflected the barriers to fish passage posed by the presence of regulating ponds for hydro power generation, while reach 4 lacked instream woody habitat.

In both the Upper Murray and Ovens basins, scores for physical form ranged from moderate to excellent. In both basins, over half of the reaches assessed were in good condition.

Specifically, in the Upper Murray basin, 34 of the 61 reaches assessed were in good condition (56%), 17 (28%) were in excellent condition and ten (16%) were in moderate condition. Of the 17 reaches classified as excellent, ten were in reference condition (13, 18, 23, 24, 44, 54, 55, 57, 60 and 61). Reaches 2 and 3 on the stretch of the Mitta Mitta River between Lake Dartmouth and Lake Hume scored moderately as a result of low levels of instream woody habitat and the major downstream fish barriers created by the two lakes.

In the Ovens basin, 30 reaches (52%) were found to be in good physical condition. Although no reaches were in reference condition, 11 (19%) were in near reference condition. Of these, reach 12 had no major downstream barriers to fish migration but scored moderately for levels of instream woody habitat. In contrast, reaches 3, 10, 15, 21, 31, 49 and 50 scored well for presence of instream woody habitat but moderately for fish access.

Reaches 5-6, 9 and 34 (on the Ovens River, Fifteen Mile Creek and Buffalo River respectively) rated moderately, due to a lack of instream woody habitat and the presence of major downstream fish barriers associated with agricultural and urban water supply.

Aquatic Life

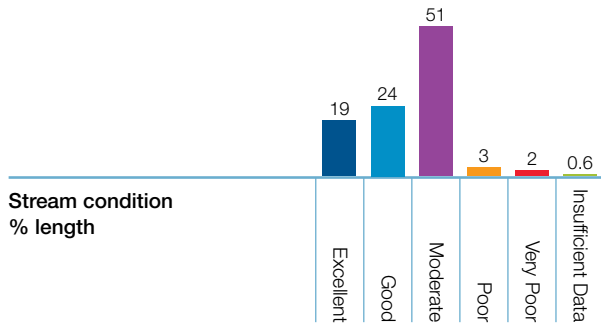
Every reach across the North East region was assessed for aquatic life. Almost 10% of reaches were in reference condition - all of these reaches were located in the densely vegetated regions of the upper catchments. A further 15% of reaches were in near reference condition. Reaches with lower scores were clustered along sections of cleared land or around townships and while none in the North East region were classed as very poor, 8% were assessed as poor for aquatic life. Across the region, 26% of reaches were classed in moderate condition and 42% in good condition.

Scores varied considerably between basins. For example, whilst 24% of reaches across the whole North East region were classed as excellent, the majority of these are located in the Upper Murray basin where 44% of reaches were found to be in excellent condition compared to 16% and 12% in the Kiewa and Ovens basins respectively. The relatively pristine environment of the Upper Murray's headwater streams is associated with a healthy macroinvertebrate population.

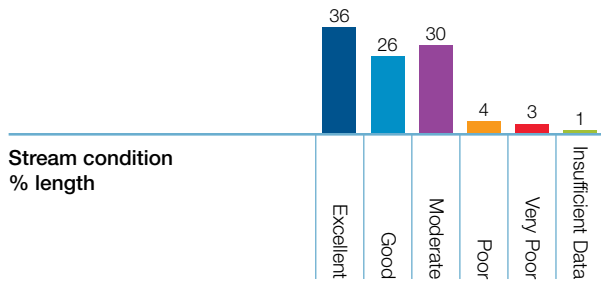


Lower Ovens River wetland. Courtesy NECMA

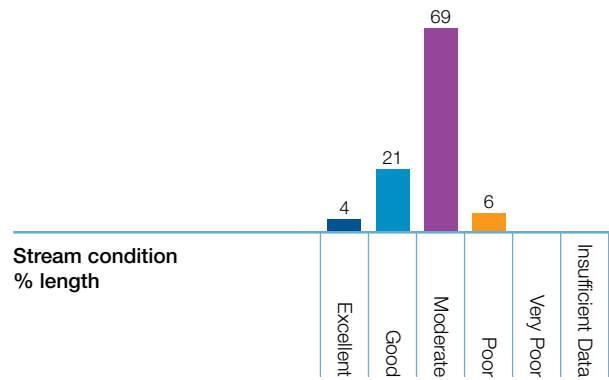
/ North East Region



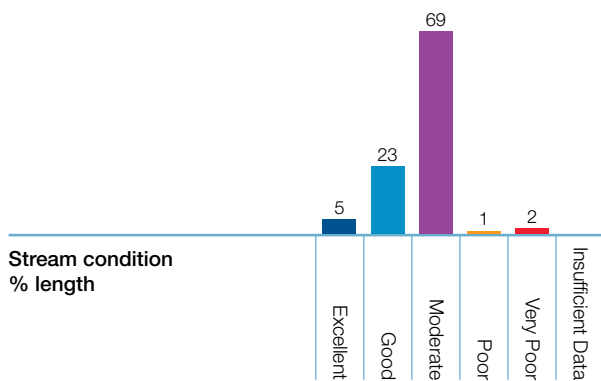
/ Upper Murray



/ Kiewa



/ Ovens



Environmental Condition

● Excellent

● Good

● Moderate

● Poor

● Very Poor

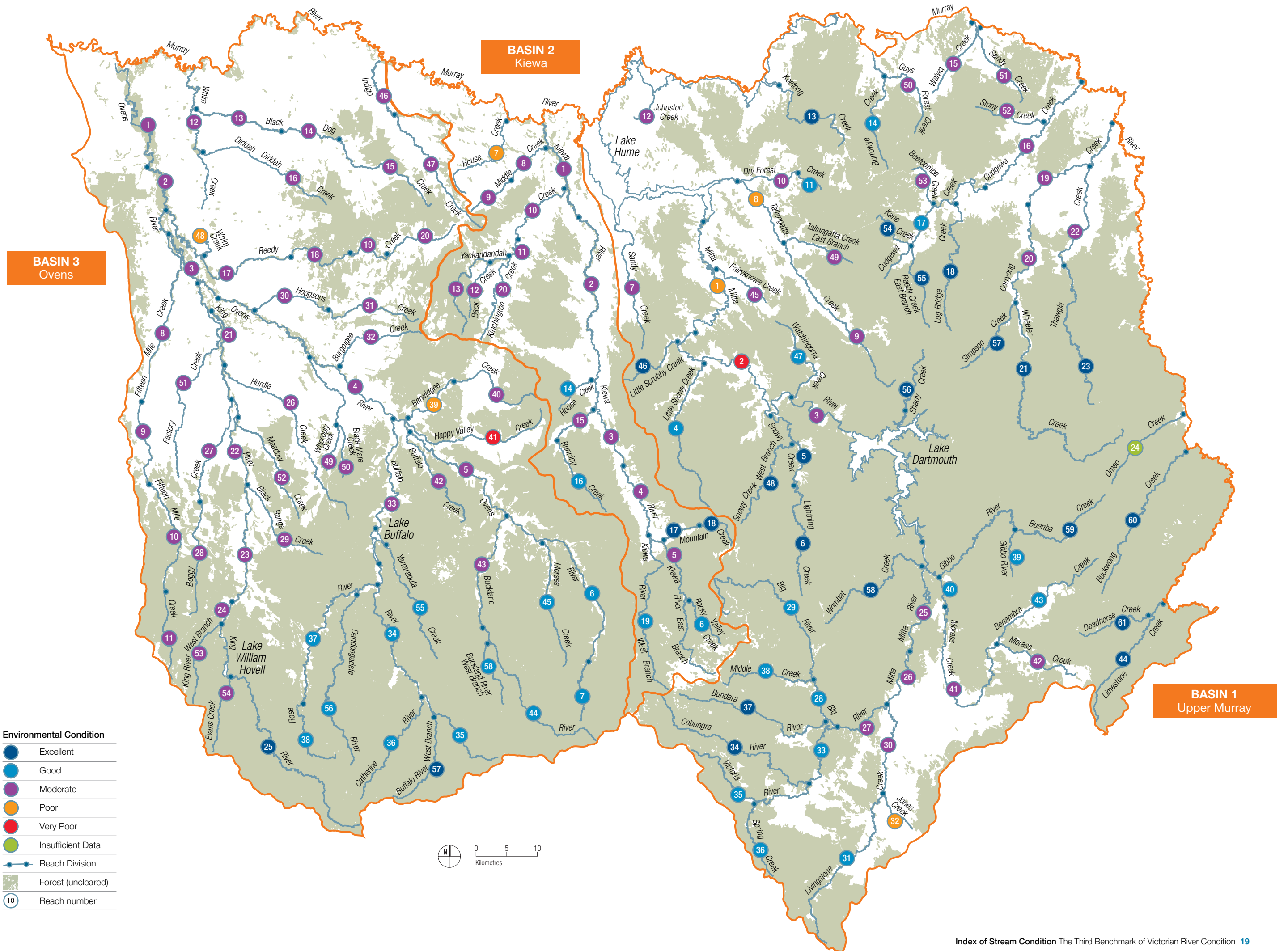
● Insufficient Data



North East

- / Upper Murray – basin 1
- / Kiewa – basin 2
- / Ovens – basin 3





BASIN 2
Kiewa

BASIN 3
Ovens

BASIN 1
Upper Murray

- Environmental Condition**
- Excellent
 - Good
 - Moderate
 - Poor
 - Very Poor
 - Insufficient Data
 - Reach Division
 - Forest (uncleared)
 - Reach number



Index of Stream Condition

/ Upper Murray Basin

Basin	Reach	Reach Length (Km)	River	Hydrology	Physical Form	Streamside Zone	Water Quality	Aquatic Life	ISC Score	Condition
1	1	43.3	Mitta Mitta River	2	7	4	9	4	20	Poor
1	2	42.9	Mitta Mitta River	2	5	4		7	19	VPoor
1	3	17.4	Mitta Mitta River	2	5	7	9	6	24	Moderate
1	4	38.4	Little Snowy Creek	7	7	8		10	38	Good
1	5	23	Snowy Creek	9	7	9		9	42	Excellent
1	6	31.7	Lightning Creek	9	8	9		10	44	Excellent
1	7	30.6	Sandy Creek	7	7	5		7	32	Moderate
1	8	20.8	Tallangatta Creek	7	6	3			23	Poor
1	9	43.3	Tallangatta Creek	7	7	7		6	30	Moderate
1	10	12.9	Dry Forest Creek	8	6	4		8	30	Moderate
1	11	6.6	Dry Forest Creek	8	7	10			39	Good
1	12	8.4	Johnston Creek	6	8	4		5	26	Moderate
1	13	29.4	Koetong Creek	9	10	9		10	47	Excellent
1	14	29.2	Burrowye Creek	9	9	8		7	39	Good
1	15	20	Walwa Creek	7	8	3		6	26	Moderate
1	16	37.8	Cudgewa Creek	8	9	4		6	30	Moderate
1	17	36.2	Cudgewa Creek	9	9	5		8	36	Good
1	18	38.8	Log Bridge Creek	8	10	9			44	Excellent
1	19	32.2	Corryong Creek	8	8	4		8	32	Moderate
1	20	24	Corryong Creek	8	7	6		8	34	Moderate
1	21	69.2	Wheeler Creek	8	9	9	9	9	43	Excellent
1	22	32	Thawgla Creek	8	9	4		8	32	Moderate
1	23	39.8	Thawgla Creek ⁴	8	10	9		9	44	Excellent
1	24	22.8	Omeo Creek ⁴		10	10				Insufficient Data
1	25	28.4	Mitta Mitta River ⁴	7	6	7		9	34	Moderate
1	26	13.7	Mitta Mitta River ⁴	7	6	6	9	9	34	Moderate
1	27	13.2	Big River ⁴	9	6	7			34	Moderate
1	28	11.9	Big River ⁴	9	6	7	9	7	35	Good
1	29	48	Big River ⁴	9	6	8		9	38	Good

⁴ No instream woody habitat score available

Basin	Reach	Reach Length (Km)	River	Hydrology	Physical Form	Streamside Zone	Water Quality	Aquatic Life	ISC Score	Condition
1	30	21.6	Livingstone Creek	7	8	3		5	25	Moderate
1	31	47.8	Livingstone Creek	9	8	7		8	39	Good
1	32	10	Jones Creek	3	7	4		5	21	Poor
1	33	19.5	Cobungra Creek ⁴	9	7	8		9	39	Good
1	34	43.6	Cobungra Creek ⁴	9	7	8		10	41	Excellent
1	35	42.3	Victoria River ⁴	9	7	8	8	9	39	Good
1	36	21	Spring Creek ⁴	9	7	8		9	39	Good
1	37	37.1	Bundara River ⁴	9	7	8		10	41	Excellent
1	38	20.9	Middle Creek ⁴	9	7	8		7	37	Good
1	39	48.2	Gibbo River	7	8	9		9	39	Good
1	40	7	Morass Creek ⁴	7	7	8			35	Good
1	41	45.6	Morass Creek ⁴	7	5	5	5	6	26	Moderate
1	42	22.6	Morass Creek ⁴	7	7	6		8	34	Moderate
1	43	3.2	Benambra Creek ⁴	7	7	8		7	35	Good
1	44	37.1	Limestone Creek ⁴	10	10	9		10	48	Excellent
1	45	15.4	Fairyknowe Creek	7	7	4		5	26	Moderate
1	46	17.6	Little Scrubby Creek	9	8	9			43	Excellent
1	47	25.3	Watchingorra Creek	9	8	7			39	Good
1	48	32.3	Snowy Creek West Branch	10	8	10			44	Excellent
1	49	14.9	Tallangatta Creek East Branch	8	7	6			34	Moderate
1	50	21.2	Guys Forest Creek	9	9	6		5	31	Moderate
1	51	20.1	Sandy Creek	8	9	4			31	Moderate
1	52	15.7	Stony Creek	7	8	6			34	Moderate
1	53	12.5	Beetoomba Creek	8	8	6			34	Moderate
1	54	12.7	Kane Creek	7	10	9		10	43	Excellent
1	55	18.4	Reedy Creek East Branch	10	10	9			48	Excellent
1	56	23.7	Shady Creek	10	7	9			42	Excellent
1	57	22.1	Simpson Creek	8	10	10			44	Excellent
1	58	37.2	Wombat Creek	9	8	9		9	43	Excellent

⁴ No instream woody habitat score available

/ Upper Murray Basin

Basin	Reach	Reach Length (Km)	River	Hydrology	Physical Form	Streamside Zone	Water Quality	Aquatic Life	ISC Score	Condition
1	59	30.9	Buenba Creek ⁴	10	7	10			43	Excellent
1	60	41.7	Buckwong Creek ⁴	9	10	9		10	47	Excellent
1	61	19.5	Dead Horse Creek ⁴	7	10	9			43	Excellent

/ Kiewa Basin

Basin	Reach	Reach Length (Km)	River	Hydrology	Physical Form	Streamside Zone	Water Quality	Aquatic Life	ISC Score	Condition
2	1	30.9	Kiewa River	6	10	6	6	6	31	Moderate
2	2	52.2	Kiewa River	6	9	6		6	29	Moderate
2	3	19.6	Kiewa River	5	9	5	8	7	30	Moderate
2	4	16.3	Kiewa River	5	8	6	8	7	28	Moderate
2	5	39.7	Kiewa River East Branch	5	9	8		7	33	Moderate
2	6	13.4	Rocky Valley Creek ⁴	5	8	9		8	35	Good
2	7	25.3	House Creek ³	7	9	4	3	3	21	Poor
2	8	12	Middle Creek	6	9	5		5	28	Moderate
2	9	10.2	Middle Creek	6	7	4		5	26	Moderate
2	10	17.7	Yackandandah Creek	5	9	5		7	30	Moderate
2	11	5.2	Yackandandah Creek	5	10	6	5	7	29	Moderate
2	12	27.9	Yackandandah Creek	3	9	9		8	31	Moderate
2	13	12	Back Creek	6	9	7			34	Moderate
2	14	11.8	House Creek	7	10	7		7	37	Good
2	15	12.1	Running Creek	6	10	5		7	31	Moderate
2	16	20.3	Running Creek	6	9	9		7	36	Good
2	17	7.9	Mountain Creek	7	10	8		10	41	Excellent
2	18	9.6	Mountain Creek	7	9	10		9	42	Excellent
2	19	36.9	Kiewa River West Branch	5	10	7	10	9	37	Good
2	20	22.4	Kichington Creek	6	9	5		5	28	Moderate

³ Only 1 year water quality data available ⁴ No instream woody habitat score available

/ Ovens Basin

Basin	Reach	Reach Length (Km)	River	Hydrology	Physical Form	Streamside Zone	Water Quality	Aquatic Life	ISC Score	Condition
3	1	40.8	Ovens River	5	7	8	9	4	29	Moderate
3	2	15.2	Ovens River	5	7	9		7	31	Moderate
3	3	36.1	Ovens River	5	9	7			32	Moderate
3	4	52.2	Ovens River	5	7	7	8	7	32	Moderate
3	5	34.8	Ovens River	6	5	7	8	7	31	Moderate
3	6	38.8	Ovens River	8	5	8	8	9	35	Good
3	7	15.7	Ovens River ⁴	8	8	9			40	Good
3	8	36.6	Fifteen Mile Creek	6	7	7		7	30	Moderate
3	9	17.3	Fifteen Mile Creek	6	5	5	6	7	27	Moderate
3	10	26	Fifteen Mile Creek	6	9	7		7	34	Moderate
3	11	19.1	Fifteen Mile Creek	6	7	9		4	29	Moderate
3	12	39.1	Whim Creek	4	9	7		6	29	Moderate
3	13	30.8	Black Dog Creek	4	6	8			27	Moderate
3	14	15.5	Black Dog Creek	4	6	7		8	28	Moderate
3	15	35.3	Black Dog Creek	4	9	7			31	Moderate
3	16	34.6	Diddah Diddah Creek	4	9	6			28	Moderate
3	17	46.3	Reedy Creek	3	9	7			27	Moderate
3	18	15.7	Reedy Creek	3	7	8			26	Moderate
3	19	10.2	Reedy Creek	3	8	8		6	27	Moderate
3	20	18.4	Reedy Creek	3	7	5		7	25	Moderate
3	21	38.5	King River	4	9	7	7		31	Moderate
3	22	20.5	King River	4	7	7		8	28	Moderate
3	23	26.3	King River	4	7	7		6	27	Moderate
3	24	13.8	King River	4	7	8	8	6	30	Moderate
3	25	54	King River	10	6	9		10	41	Excellent
3	26	47.9	Hurdle Creek	4	7	7		4	24	Moderate
3	27	26.7	Boggy Creek	6	7	6			30	Moderate

⁴ No instream woody habitat score available

/ Ovens Basin

Basin	Reach	Reach Length (Km)	River	Hydrology	Physical Form	Streamside Zone	Water Quality	Aquatic Life	ISC Score	Condition
3	28	24.8	Boggy Creek	6	7	9			34	Moderate
3	29	23.7	Black Range Creek	7	7	7		5	29	Moderate
3	30	16.1	Hodgsons Creek	5	8	5		6	28	Moderate
3	31	20.6	Hodgsons Creek	5	9	8		5	30	Moderate
3	32	22.3	Burgoigee Creek	5	7	5		8	28	Moderate
3	33	26.4	Buffalo River	4	6	7		6	24	Moderate
3	34	36.8	Buffalo River	9	5	9		7	35	Good
3	35	27.1	Buffalo River	9	6	9		8	38	Good
3	36	29.4	Catherine River	9	6	10		9	40	Good
3	37	38.7	Rose River	9	6	9	8	6	35	Good
3	38	19.5	Rose River	9	7	10		6	37	Good
3	39	14.1	Barwidgee Creek ³	4	8	5	3	7	23	Poor
3	40	23.1	Barwidgee Creek ³	4	8	6	3	7	24	Moderate
3	41	35.4	Happy Valley Creek ³	4	7	5		7	17	VPoor
3	42	28	Buffalo Creek	5	7	8			32	Moderate
3	43	23.7	Buckland River	6	6	9		6	32	Moderate
3	44	37.1	Buckland River ⁴	6	8	10		8	37	Good
3	45	28	Morses Creek	7	7	9		8	37	Good
3	46	20.8	Indigo Creek	4	8	7			28	Moderate
3	47	37.6	Indigo Creek	4	7	6		6	27	Moderate
3	48	6.6	Whim Creek	4	8	4			23	Poor
3	49	30	Whorouly Creek	5	9	6			31	Moderate
3	50	14.5	Black Mare Creek	6	9	7			34	Moderate
3	51	45.4	Factory Creek	6	8	5			29	Moderate
3	52	30.4	Meadow Creek	5	8	6		4	25	Moderate
3	53	18.4	King River West Branch	8	6	10		3	29	Moderate

³ Only 1 year water quality data available ⁴ No instream woody habitat score available

Basin	Reach	Reach Length (Km)	River	Hydrology	Physical Form	Streamside Zone	Water Quality	Aquatic Life	ISC Score	Condition
3	54	16	Evans Creek	8	6	10		3	29	Moderate
3	55	30.6	Yarrarabula Creek	9	6	9		9	39	Good
3	56	49	Dandongadale River	9	6	10		6	35	Good
3	57	27.6	Buffalo River West Branch ⁴	10	7	10		10	44	Excellent
3	58	14.4	Buckland River West Branch ⁴	10	9	9		6	40	Good

⁴ No instream woody habitat score available



Buffalo River. Courtesy NECMA