Gellibrand catchment values and threats

The following slides detail known values and threats to FLOWS study reaches.

Values and threats in **black text** were identified by the Environmental Flows Technical Panel (EFTP) during their desktop review. In some cases, values and threats were summarised (i.e. Reach 1 has a significant fish assemblage but not all identified species were listed).

Values and threats in **green *italics* text** were identified by PAG representatives during the workshop. PAG input was captured through sticky notes and direct annotations to a large format catchment map, and via annotation of printed EFTP values / threats tables.

This compilation of values and threats will be provided to the EFTP to inform development of the site paper. The flow recommendations will focus on flow-dependent values and threats. Broader (non-flow dependent) catchment values / threats identified by the PAG will inform the development of supporting recommendations and complementary actions (in the flow recommendations report).

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Reach 1 – Love Creek

Values	Threats
• Significant fish assemblage: River blackfish (high abundance, broad range of size classes), native galaxiids (resident and migratory), shorthead lamprey (value expanded) • Freshwater crayfish (New) • Platypus • Very high macroinvertebrate diversity (New) • Wet microclimate (New) • Submerged and floating-leaved plant communities (New) • Algal biofilms on submerged surfaces (New) • *Otway crayfish* • *Significant EVCs (Riparian Forest, Sedgy Riparian Woodland, Riparian Scrub / Swamp Riparian Woodland)*	• Low risk Acid Sulfate Soils are known to be present Porcupine Creek (a Love Creek tributary) (New) • Willows and blackberries (invasive and exotic plant species) continue to be a threat (Old) • High litter input from surrounding non-flow dependent riparian vegetation (from wet sclerophyll forest) has potential to impact water quality (New) (*litter supports blackfish*) • High numbers of brown trout (introduced) in Ten Mile Creek. • *Pesticide use north of Karwarren, Yahoo Creek catchment (chemical testing done as part of PhD project, citizen science informed).*

Reach 1 – Love Creek

Values	Threats
• *Instream wood and flow diversity (fast and slow flowing habitat niches)*	• *Siltation - PAG noted blackfish not recruiting well, maybe due to silts in system* • *Livestock access* • *Clear-felling of large areas surrounding Karwarren / Love Creek Reserve resulting in ongoing massive remnant tree fall into / across Love Creek.*

Reach 2a – Gellibrand River u/s Gellibrand

Values	Threats

• Platypus (New) (*PAG note fewer platypus than 30 yrs ago*)
• Freshwater crayfish (New)
• Diverse native fish assemblage (Broad-finned galaxiids, short-finned eels, Flat headed gudgeons, River blackfish, Australian grayling, shorthead lamprey and small-bodied fish (Extended) (*PAG note poor reproduction/recruitment of blackfish – Silt? Chemicals?*)
• Macroinvertebrate diversity (New)
• Wet microclimate (New)
• Submerged and floating-leaved plant communities (New)
• Algal biofilms on submerged surfaces (New)
• *Riparian Forests*
• *Southern pygmy perch*
	• Exotic vegetation (willows, blackberries)
	• Land use change
	• Potential for nutrient enrichment
	• Regulated reach and subject to Bulk Entitlement (with passing flows)
	• *Silts filling river bed following rainfall (PAG noted blackfish not recruiting well, maybe due to silts).*
	  • *Silts due to grazing on bank*
	  • *Plantations*
	  • *Recreational vehicles*
	• *Removal of billabong soaks (+ poor LGA compliance/enforcement of current laws. Laws are no deterrent to significant billabong/soak removal. Enforcement officers are 'vegetation blind' and lack awareness of environmental destruction).*

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Reach 2a – Gellibrand River u/s Gellibrand

(continued)

Values	Threats

• *Burrowing crayfish*
• *Rakali*
• *Mussels*
• *Rich riverine flora and fungal communities*
• *Tree Ferns (PAG note ferns are drying on discharge area due to lowered water table)*
• *Otway black snail*
• *Instream wood and flow diversity (fast and slow flowing habitat niches)*
	• *Stock access to river (stock exclusion fencing is not continuous)*
	• *Decreased inundation of river flats – observed that river flats saturated, but river not as full as in the past. In the 1980's the river broke its bank multiple times.*
	• *Expansion of plantations:*
	  • *land parcels alongside Gellibrand River – circled on Map*
	  • *between Lardners Creek and Asplin Creek – circled on Map*
	  • *between West Gellibrand Dam and Olangolah Creek – circled on Map*
	  • *alongside Barramunga Creek – circled on Map*
	• *Chemical runoff from plantations*

Reach 2a – Gellibrand River u/s Gellibrand

(continued)

Values	Threats
	• *4WD tracks (contributing to erosion, sediments/silts)* • *Insufficient monitoring and lack of baseline monitoring data* • *Poor understanding of complex hydrology (i.e. river flows, groundwater flows, floodplain dynamics, buffering capacity of alluvial aquifers)* • *Impacts from historic groundwater pumping activities* • *Brown trout*

Reach 2a – Gellibrand River u/s Gellibrand

(continued)

Values	Threats
	• *Disengaged, absentee landowners* • *Climate change – poor rainfall and flows not clearing silt.* • *Historical water management attitudes / policies / actions* • *Anthropocentric interpretation of data, resource focussed policy and regulation – eroding of environmental values of the river and multiple groundwater-dependent ecosystems*

Reach 2b – Gellibrand River d/s Gellibrand

Values	Threats
• Platypus (New) • Freshwater crayfish (New) • Native fish assemblage (including River blackfish, Australian grayling, Shorthead lamprey and small-bodied fish (Extended) • Diverse macroinvertebrates, including threatened Otway Stonefly (New) • Wet microclimate (New – noting that the Otway Black Snail is present in reach 2b, but is not directly flow-dependent) • Submerged and floating-leaved plant communities (New) • Algal biofilms on submerged surfaces (New) • *Mussels, fish and eels (PAG note poor numbers)*	• Exotic vegetation (willows, blackberries) • Land use change • Potential for nutrient enrichment • Regulated reach and subject to Bulk Entitlements (with and without passing flows) • *Reduced/loss of flow in springs (recommendations to check Wye River study)* • *Removal of billabong soaks (+ poor LGA compliance/enforcement of current laws. Laws are no deterrent to significant billabong/soak removal. Enforcement officers are 'vegetation blind' and lack awareness of environmental destruction).*

Reach 2b – Gellibrand River d/s Gellibrand

(continued)

Values	Threats
• *Instream wood and flow diversity (fast and slow flowing habitat niches)*	• *Increasing 'fast water' flowing off land cleared of soaks / billabongs each year during winter, resulting in a drier catchment in summer*

Reach 3 – Carlisle River

Values	Threats
• Platypus (New) • Freshwater crayfish (New) • Native fish assemblage (River blackfish, Australian grayling and small-bodied fish, Short-finned eel, Short-headed lamprey, Spotted galaxias and Common galaxias) (Extended) • Instream vegetation, including diatoms (New) • Algal biofilms on submerged surfaces (New) • *Significant EVCs (Riparian Scrub, Riparian Woodland, Riparian Forest, Wet Forest, Sedgy Riparian Woodland)* • *Mussels, Blackfish and crayfish – considered by PAG to be under threat.* • *Instream wood and flow diversity (fast and slow flowing habitat niches)*	• Exotic vegetation (blackberry) • Reach subject to diversions into North Otway pipeline using weirs at East Arkins, West Arkins and First Creeks • *Livestock access* • *Lack of passing flow requirement for weirs in East Arkins, West Arkins and First Creeks* • *Increased plantations (land use)*

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Reach 4 – Gellibrand River d/s Carlisle River

Values	Threats
• Platypus (New) • Spiny crayfish (New) • Native fish assemblage (10 native fish species including River blackfish, Australian grayling and small-bodied (migratory and resident) (Extended) • Algal biofilms on submerged surfaces (New) • Instream vegetation, including diatoms (New) • *Estuary perch noted in bottom end of the river (increased relative to historical numbers – species did not used to be present)*	• Exotic vegetation – blackberry, introduced pasture grasses • Agricultural activity – cattle access to stream • Erosion • Regulated reach, subject to extraction under Bulk Entitlements. No stipulated passing flows • *Agricultural runoff / cattle near Sandy Creek*

Reach 4 – Gellibrand River d/s Carlisle River

(continued)

Values	Threats
• *Blackfish caught recently below Carlisle River (2.5 lb)* • *Tupong noted in Reach 4 near Chapple Vale* • *Eels sighted in lower reaches* • *Instream wood and flow diversity (fast and slow flowing habitat niches)*	• Exotic vegetation – blackberry, introduced pasture grasses • Agricultural activity – cattle access to stream • Erosion • Regulated reach, subject to extraction under Bulk Entitlements. No stipulated passing flows • *Agricultural runoff / cattle near Sandy Creek*

Reach 5 – Kennedys Creek

Values	Threats

• Platypus (New)
• Native fish assemblage including River blackfish, Australian grayling (new), short-finned eel, and small-bodied fish species (migratory and resident) including Broad finned galaxias, Flat headed gudgeon, Common galaxias, Spotted galaxias and Southern Pygmy Perch
• Instream vegetation including *Vallisneria spp*,
• Fringing Phragmites (New)
• Algal biofilms on submerged surfaces (New)
• *Instream wood and flow diversity (fast and slow flowing habitat niches)*
	• Exotic vegetation – willows, blackberries and pasture grasses
	• Potential for salinity impacts
	• Land use change (plantation expansion)
	• *Future blue gum plantations*
	  • *alongside Kennedys Creek.*
	  • *north and south of Tomahawk Creek*
	• *Effluent runoff from dairy farms*

Gellibrand estuary

Values	Threats
• Princetown wetlands are of national significance • Submerged sea grass bed • Extensive and floristically diverse non-woody, emergent, saline and semi-saline vegetation (floodplain of the lower estuary) - mosaic of EVC 10 Estuarine Wetland and EVC 952 Estuarine Reedbed • 19 fish species, including Australian grayling • Platypus (likely foraging habitat) • Waterbirds (not typically considered in FLOWS study) • *Short finned eels* • *Bream* • *Perch (numbers have increased massively in the past 5 years)*	• Current recommendations do not capture Estuarine wetland and Estuarine Reedbed EVCs. These EVCs are in good condition, require freshwater inflows and may contribute to the risk of fish kill events. • Artificial estuary openings • Upstream catchment impacts (receiving waters), including extractions under Bulk Entitlements • Grazing • *Acid sulfate soils* • *Development on the floodplain impacting water quality and increasing pressure on artificial estuary openings* • *Increased salinity – indicated by more salt tolerant species of vegetation (salt-tolerant grasses circled on map)*

Gellibrand estuary (continued)

Values	Threats
	• *Infrastructure associated with potential new resorts (raised roads acting as levee affecting flood flows, new bridge)* • *Poor oxygen levels in the water (exacerbated when estuary is closed)* • *Locations of Blackwood deaths noted on map.*