

## APPENDIX 1. Geology and Geomorphology of Worm Environments on the Headwaters of Foster Creek

### Context

The area studied lies inside the Strzelecki Ranges (also referred to as the South Gippsland Hills), a major geomorphological subunit of the Southern Uplands of Victoria. The Southern Uplands (including the Otway and Hoddle Ranges), is a distinctive geological and topographical domain in Victoria. They are comprised dominantly of Mesozoic (Lower Cretaceous) terrestrial volcanogenic sandstones (sediments derived from rapid denudation of nearby erupting volcanoes), deposited in wide, shallow river channels and on bordering floodplains, swamps and small lakes. They are rich in volcanic rock fragments and feldspar minerals and contain only minor quartz fragments. They occur as fault-bounded, northeast-trending structural blocks with well-defined geological and topographical boundaries. They are landscapes of hills and elongate ridges, typically soil-covered with narrow alluvial valleys. The best rock exposure is on coastal cliffs and shore platforms between San Remo and Inverloch, Inland, apart from road and rail cuttings and quarries, outcrop is restricted to occasional upper slopes and stream channels.

### The Strzelecki Ranges

The Strzelecki Ranges is a well-defined structural and geomorphological region east of Westernport Bay and south of the LaTrobe Valley (Appendix 1.1). There are two main geological units elongated northeasterly and bounded by faults and monoclines - the Narracan Block and the Balook Block. These form three broad landform subunits: (a) the western Strzeleckis, a dissected area of rounded ridges and straight to convex valley slopes, comprising the catchment of the Bass River to the west and the Powlett River to the south; (b) a central zone of more diverse topography including tablelands and areas of subdued relief of the catchment of the Tarwin River; (c) the eastern Strzeleckis between Morwell and Yarram, an area of deep dissection with narrow interfluves and very steep valley slopes of the Morwell River and Albert River catchments.

The basement geology of all three units is Strzelecki Group sedimentary rock of Lower Cretaceous age. The dominant material is coarse to fine-grained sandstone with minor siltstone and mudstone and thin, discontinuous black coal seams. Beds are thin (10cm) to massive (1 metre or more) with little variation in composition and structure. As a broad geological unit, the rocks have traditionally been referred to as arkose, suggesting that feldspar is the dominant mineral. Although feldspar is an important component, the major clastic constituent is lithic (rock) fragments of various volcanic rocks, apparently derived from contemporaneous explosive volcanic activity and deposited rapidly in subsiding terrestrial basins. Hence the term volcanogenic sediments or volcanic litharenites are more correct to describe the Strzelecki Group. Post-deposition, the Strzelecki Group beds have been uplifted and undergone east-west compression. This has resulted in doming and tilting of the rocks producing gently dipping beds and broad monoclinial folds and the elongate faults that define the margins of the structural blocks.

Extensive, deeply weathered basalt lava flows occur along the northern margins of the Narracan Block around Warragul and Thorpdale, and as scattered remnants in the central Strzeleckis northeast of Leongatha and around the northeastern edge of the Balook Block at Carrajung. There are no basalt remnants at Korumburra or in the Strzeleckis to the west and south including the present study area.

The composition of the Strzelecki Group beds (high proportions of feldspar and low silica minerals and with only minor quartz), means the beds weather rapidly. Slope form is straight to convex and slope angles of 25° to 30° are common. Thicker, resistant beds produce minor escarpments. Although there is a widespread regolith cover one to 1.5 metres thick, soils are relatively thin as the steep slopes and high rainfall combine to produce rapid rates of mass movement at various spatial and temporal scales. Topsoils are light silty clay loam, predominantly with light to medium clay subsoils. Elongate, sub-parallel and converging terracettes ("sheep tracks") with treads up to one metre wide and risers 30cm to 70 cm high are common. Terracettes are of compound origin, and while animal treading certainly maintains

a flattened and bare upper surface, the incipient patter was probably formed prior to clearing and introduction of grazing animals. This suggests that slow surficial movement has been a long-term process in this landscape. Upper hillslope scars and blocky debris fans indicate sites of larger slope failures.

Appendix 1.1. Geology of South Gippsland showing study area.

