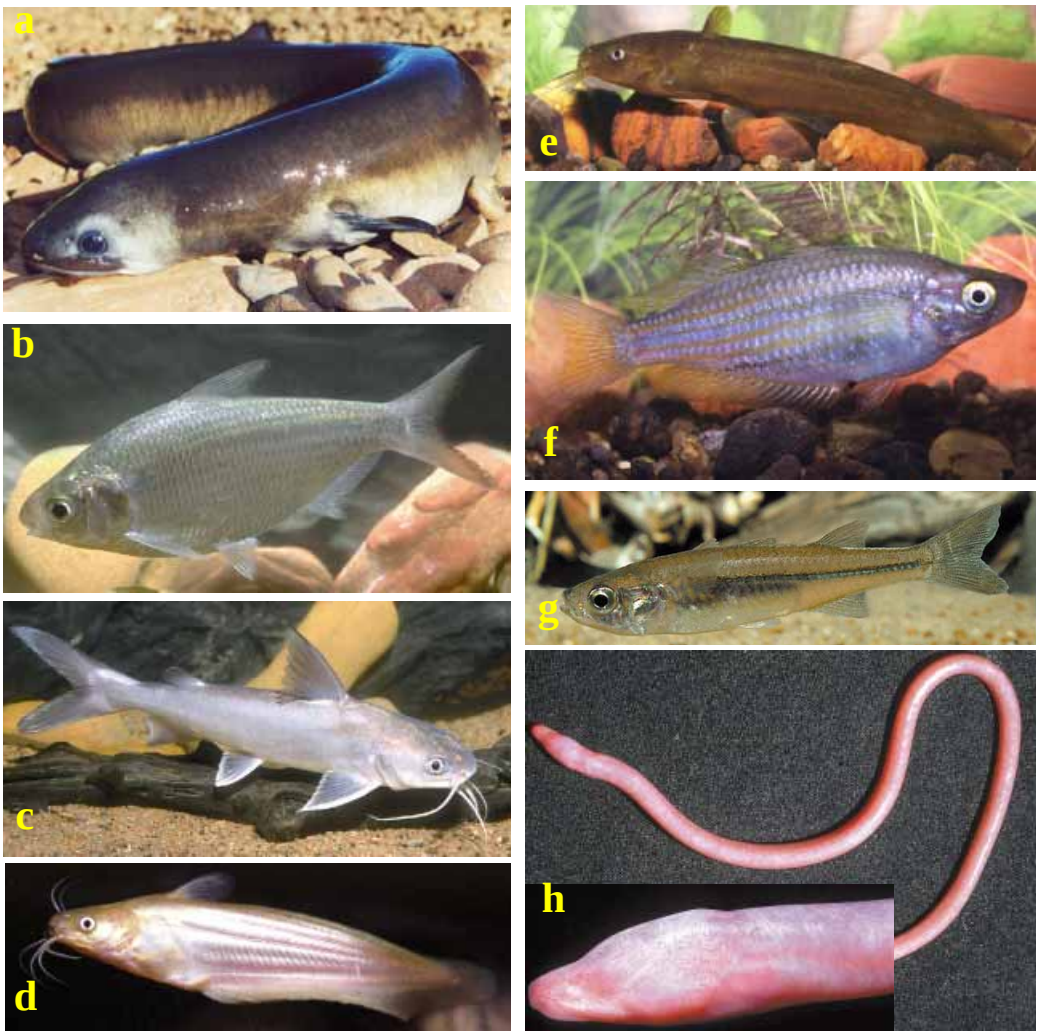

PLATE 1 (a–h). Freshwater fishes of the Pilbara: (a) *Anguilla bicolor*, (b) *Nematalosa erebi*, (c) *Arius graeffei*, (d) *Neosilurus hyrtlii*, (e) *Neosilurus* sp., (f) *Melanotaenia australis*, (g) *Craterocephalus cuneiceps*, (h) *Ophisternon candidum*. **Photographs:** D. Morgan (a, d–f), M. Allen (b, c, g), G. Allen (h).

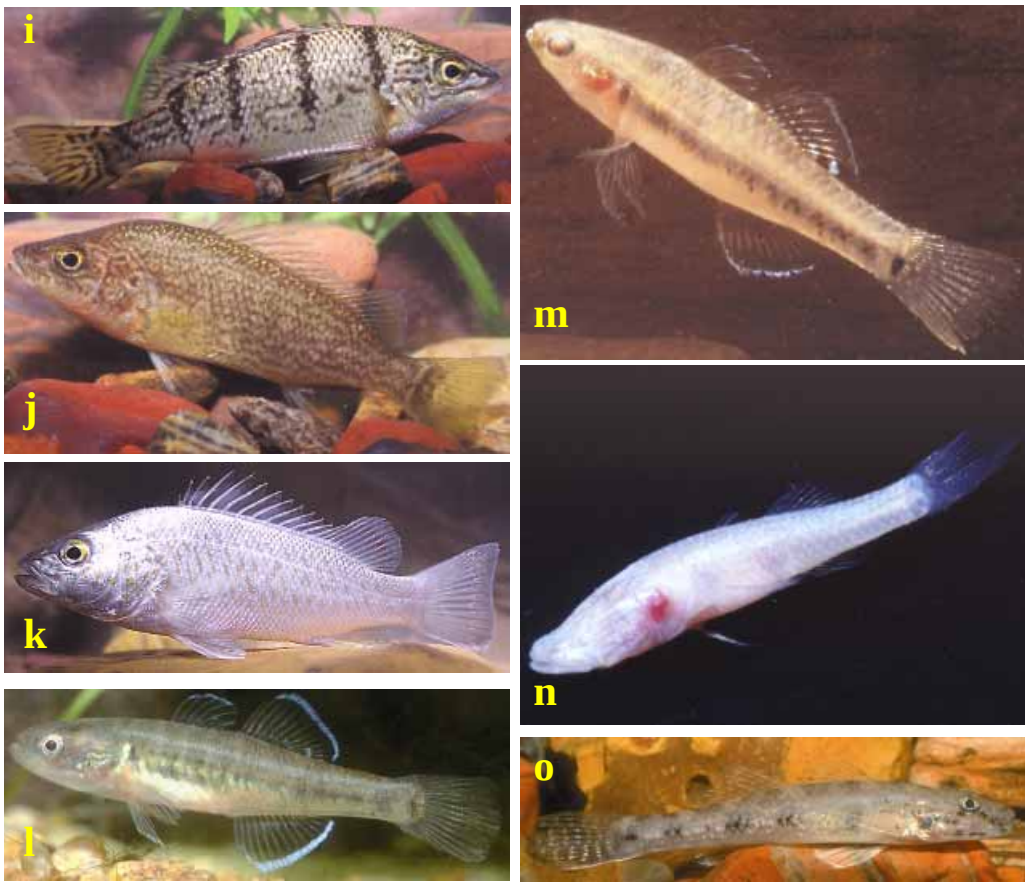

PLATE 1 (i–o). Freshwater fishes of the Pilbara: (i) *Amniataba percoides*, (j) *Leiopotherapon aheneus*, (k) *Leiopotherapon unicolor*, (l) *Hypseleotris aurea*, (m) *Hypseleotris compressus*, (n) *Milyeringa veritas* and (o) *Glossogobius giurus*. **Photographs:** D. Morgan (i, g, k, m), M. Allen (l, o) and G. Allen (n).

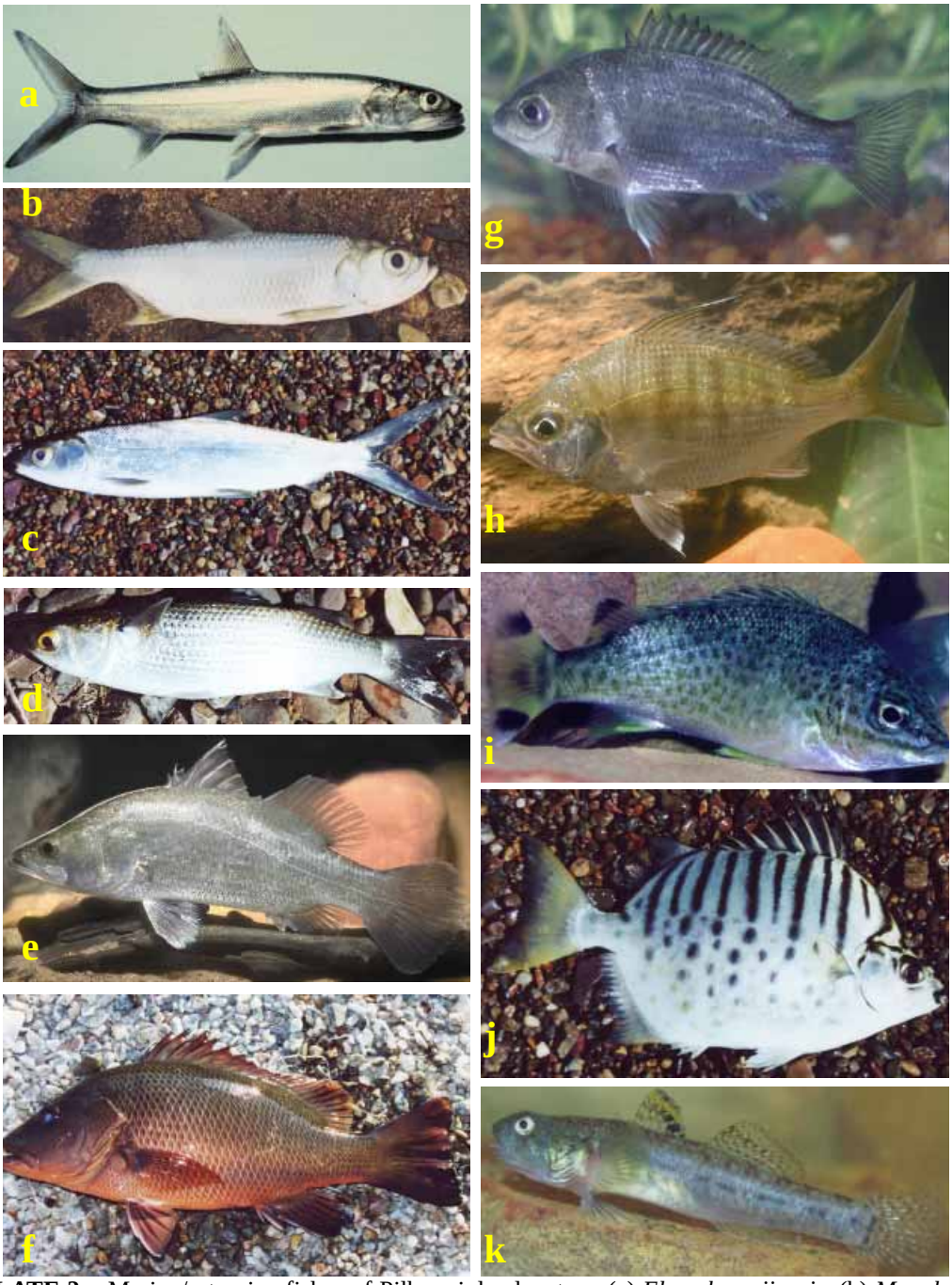

PLATE 2. Marine/estuarine fishes of Pilbara inland waters: (a) *Elops hawaiiensis*, (b) *Megalops cyprinoides*, (c) *Chanos chanos*, (d) *Mugil cephalus*, (e) *Lates calcarifer*, (f) *Lutjanus argentimaculatus*, (g) *Acanthopagrus butcheri*, (h) *Gerres filamentosus*, (i) *Amniataba caudavittata*, (j) *Selenotoca multifasciata*, (k) *Pseudogobius olorum*. **Photographs:** D. Morgan (b–d, f, g, i–k), M. Allen (e, h) and G. Allen (a).

PLATE 3. Introduced fishes of Pilbara inland waters: (a) *Gambusia holbrooki*, (b) *Poecilia reticulata*, (c) *Xiphophorus hellerii*, and (d) *Oreochromis mossambicus*. **Photographs:** D. Morgan.

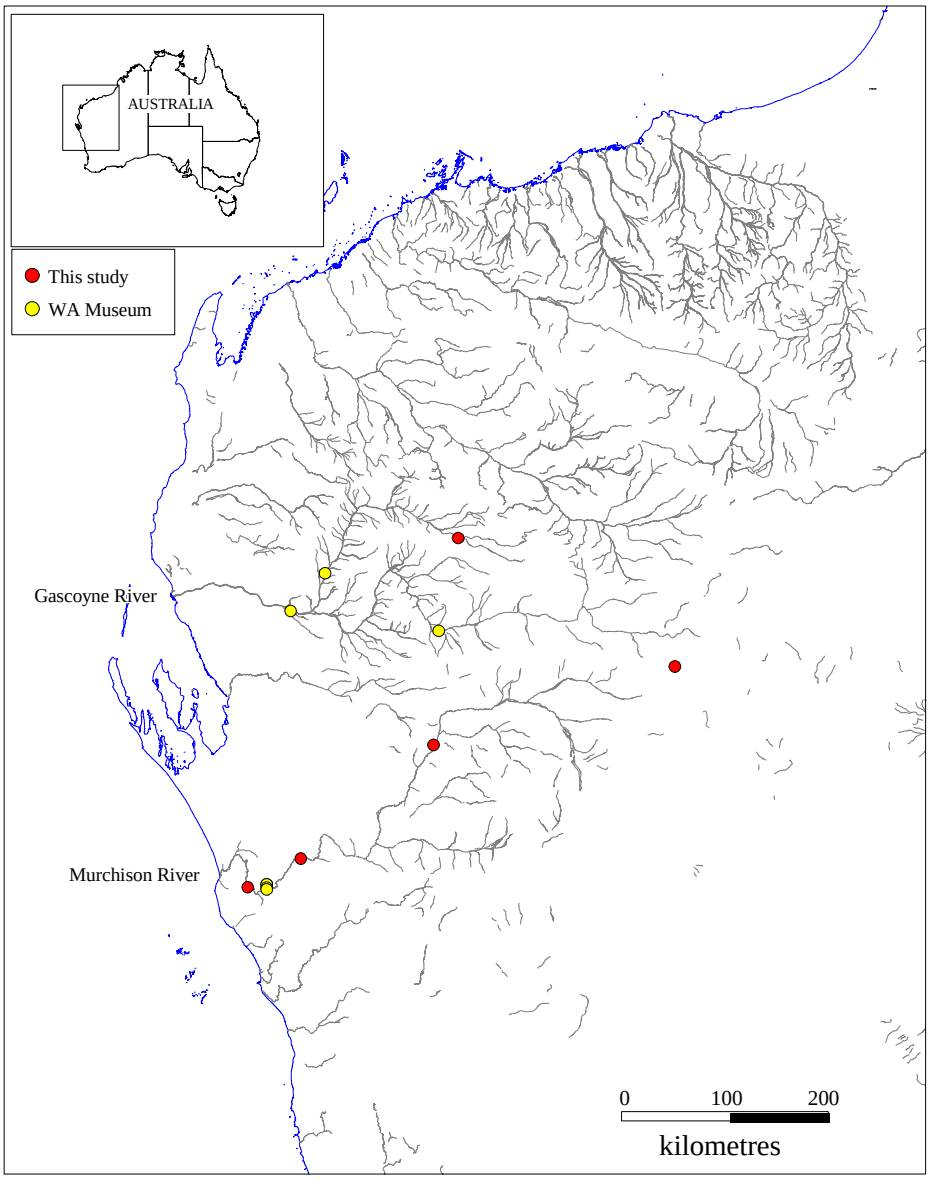

FIGURE 12. The sites in the Pilbara Drainage Division where the golden gudgeon (*Hypseleotris aurea*) was captured. Also included are the Western Australian Museum records for the species.

Empire gudgeon (Eleotridae)
Hypseleotris compressus (Krefft 1864)

The empire gudgeon is another species that exhibited a disjunct distribution in this region. In the south, 25 and 11 specimens were caught in the Chapman (2.6 ppt) and Murchison rivers (0.1–2.5 ppt), respectively, and in the north, 36, one, six, 69, 13 and 32 individuals

were captured from sites in the Fortescue (0.5 ppt), Harding (0.5 ppt), Sherlock (0.7 ppt), Yule (0.3–0.5 ppt), Turner (1.1–2.3 ppt) and DeGrey (0.4–0.8 ppt) rivers, respectively (Plate 1, Table 1, Fig. 13). In addition, the Western Australian Museum records have documented the occurrence of this species at a single site in the Robe River. The record for the Chapman River represents a southerly range extension for the species. This southerly extension (and that of the mangrove jack *Lutjanus argentimaculatus* (Forsskål 1775) to the Murchison River (see below)) may parallel that of the mud crab *Scylla serrata* (Forsskål 1755) which Gopurenko *et al*. (2003) attributed to the recruitment of larvae via a particularly strong southerly flowing Leeuwin Current in 1999/2000.

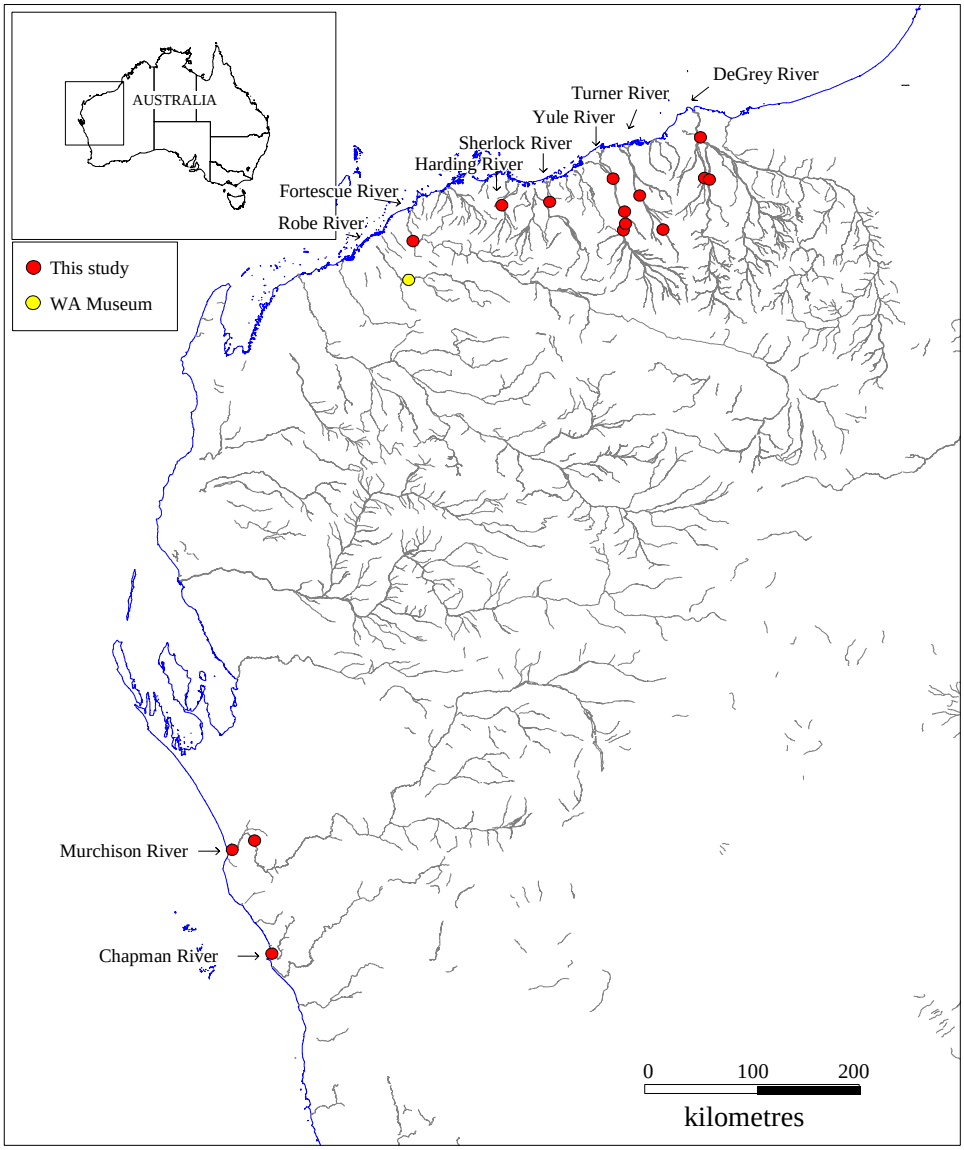

FIGURE 13. The sites in the Pilbara Drainage Division where the empire gudgeon (*Hypseleotris compressus*) was captured. Also included is the Western Australian Museum record for the species.

While not captured during this study, the species is endemic to the Pilbara and is restricted to the North West Cape and Barrow Island (Fig. 14) (Humphreys & Adams 1991; Allen *et al*. 2002). This is one of Australia's most restricted and vulnerable fish species, a fact that has seen it listed as *VULNERABLE* in the Environment Protection and Biodiversity Conservation Act 1999 and *DATA DEFICIENT* by the IUCN.

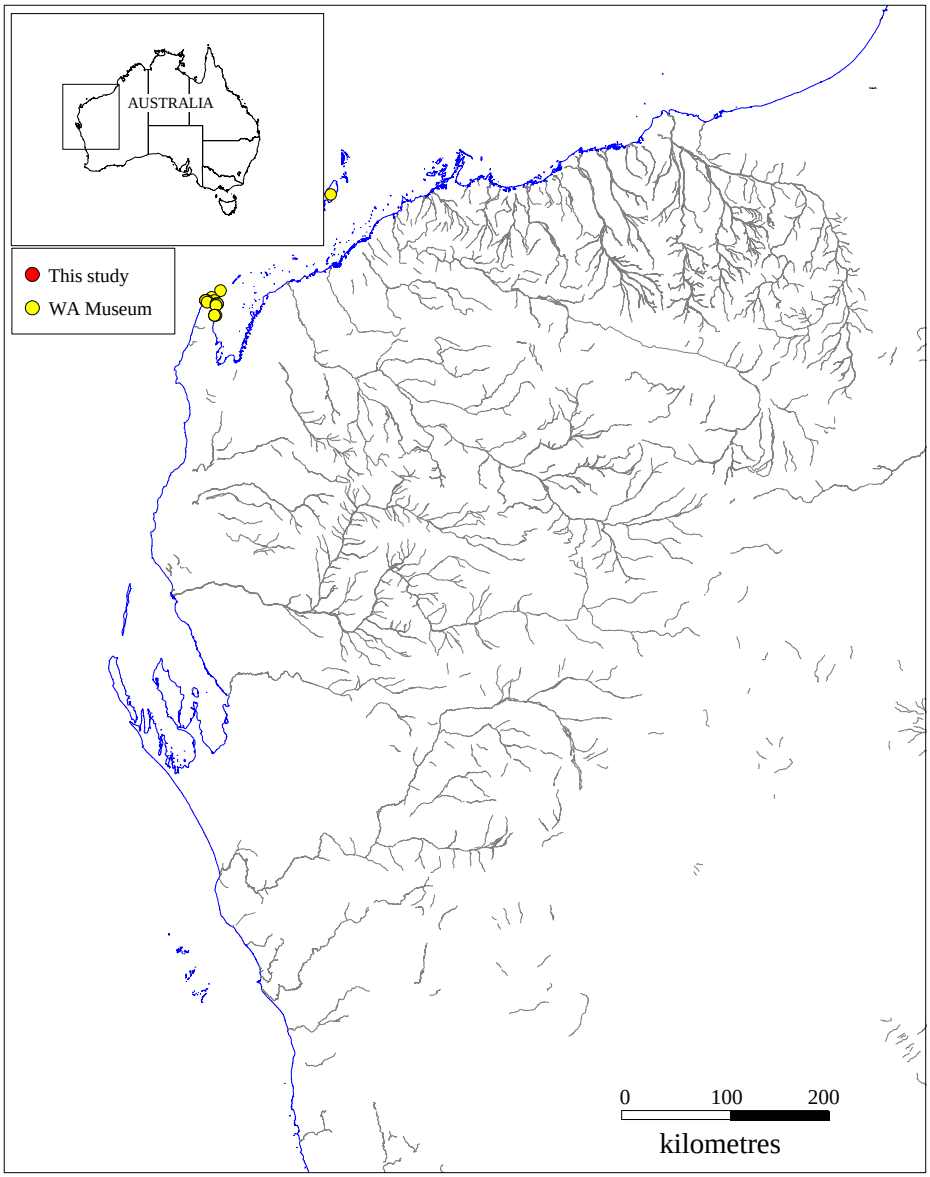

FIGURE 14. The sites in the Pilbara Drainage Division where the Western Australian Museum has records for the blind gudgeon (*Milyeringa veritas*).

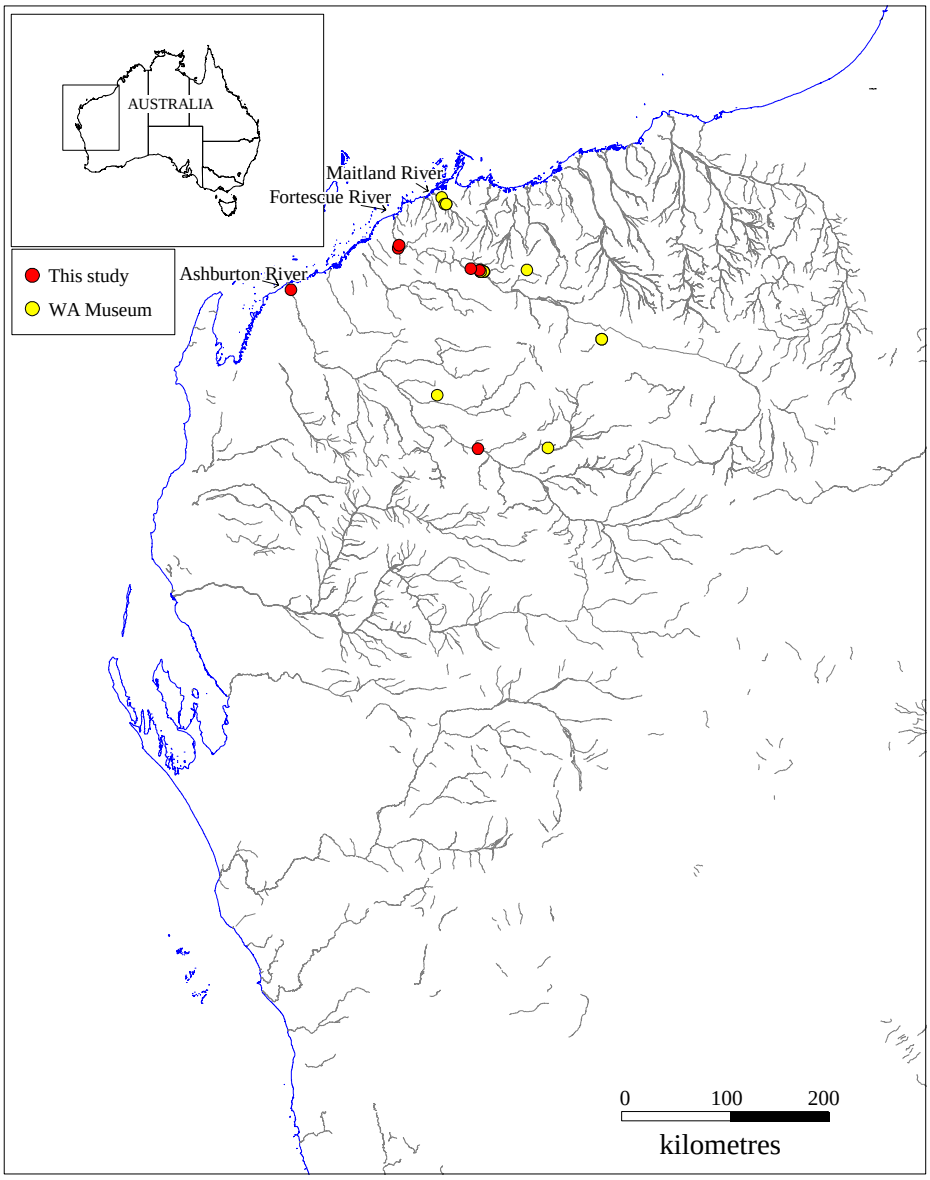

FIGURE 15. The sites in the Pilbara Drainage Division where the flathead goby (*Glossogobius giurus*) was captured. Also included are the Western Australian Museum records for the species.

Flathead goby (Gobiidae)
Glossogobius giurus (Hamilton 1822)

Eleven flathead gobies were caught at two sites in the Ashburton River (0.9–1.0 ppt) and a further 39 were captured at four sites in the Fortescue River (0.5–1.4 ppt) (Plate 1, Table 1, Fig. 15). This species is recorded at an additional two, four and two sites in the Ashburton,

Fortescue and Maitland rivers, respectively, in the Western Australian Museum records. It is widely distributed throughout northern Australia from the Ashburton River (WA) to the Burdekin River in North Queensland (Allen *et al.* 2002). It is also found throughout the Indo-West Pacific (Allen *et al.* 2002). The maximum size attained by the species is ~20 cm TL. Although this species is thought to have a marine larval stage (Allen *et al.* 2002), larvae, juveniles and adults were captured during this study in the freshwaters of the Pilbara and were also found in the headwaters of the Fitzroy River above waterfalls (Morgan *et al*. 2002, 2004).

Marine/estuarine fishes of the Pilbara (Plate 2)

Many Australian marine species utilise estuaries, and to a lesser extent freshwaters of rivers, as nursery grounds as they are relatively 'safe' and protected habitats (Potter *et al.* 1988; Gaughan *et al* 1990). During this study 12 species of marine fishes were found in the riverine (freshwater) environment (see Plate 1) and included giant herring *Elops hawaiiensis* Regan 1909 (Elopidae), tarpon or oxeye herring *Megalops cyprinoides* (Broussonet 1782) (Megalopidae), milkfish *Chanos chanos* (Forsskål 1775) (Chanidae), sea mullet *Mugil cephalus* Linnaeus 1758 (Mugilidae), barramundi *Lates calcarifer* (Bloch 1790) (Centropomidae), mangrove jack *Lutjanus argentimaculatus* (Lutjanidae), black bream *Acanthopagrus butcheri* (Munro 1949) (Sparidae), whipfin silver-biddy *Gerres filamentosus* Cuvier 1829 (Gerreidae), roach *Gerres subfasciatus* Cuvier 1829 (Gerreidae), yellow-tail trumpeter *Amniataba caudavittata* (Richardson 1845) (Terapontidae), striped butterfish *Scatophagus multifasciatus* Richardson 1845 (Scatophagidae) and Swan River goby *Pseudogobius olorum* (Sauvage 1880) (Gobiidae). Whilst many of these species utilise the river as a nursery (e.g. mullet and mangrove jack), some individuals of species, such as barramundi and oxeye herring, appear to spend extensive periods (if not years) in the river well beyond their juvenile stage. Other salt water species encountered in the river can be referred to as 'marine or estuarine stragglers' and this group comprises those species that are usually found within the marine or estuarine environment but may occasionally enter rivers (e.g. giant herring, striped butterfish, whipfin silver-biddy and roach). A number of other marine/estuarine species were captured at the estuarine/freshwater interface, i.e. upper tidal limit, but have not been included in this paper, e.g. Blackburn's herring *Herklotsichthys blackburni* (Whitley 1946) (Clupeidae), crescent perch *Terapon jarbua* (Forsskål 1775) (Terapontidae) and Telkara perchlet *Ambassis vachellii* Richardson 1846 (Ambassidae).

Giant herring (Elopidae)
Elops hawaiiensis Regan 1909

Three, two and 65 giant herring were caught at a single site in each of the Greenough (33.7 ppt), Harding (0.5 ppt) and Yule (0.3 ppt) rivers, respectively (Plate 2, Table 2). This species is common and widespread throughout sub-tropical and tropical waters of Australia and throughout much of the Indo-Pacific (Allen *et al.* 2002).

Oxeye-herring or tarpon (Megalopidae)
Megalops cyprinoides (Broussonet 1782)

Twenty three, 10, 51 and 18 oxeye herring were caught at two, one, two and four sites in the Fortescue (0.6 ppt), Harding (0.5 ppt), Yule (0.3–0.4 ppt) and DeGrey (1.1 ppt) rivers, respectively (Plate 2, Table 2). The adults are usually associated with coastal seas while the juveniles and small adults are often found long distances up rivers (e.g. DeGrey River) (Allen *et al*. 2002).

Milkfish (Chanidae)
Chanos chanos (Forsskål 1775)

The milkfish was only caught in the lowermost reaches of the Ashburton (1, 0.9 ppt), Fortescue (164, 0.6 ppt), Yule (50, 0.3 ppt) and DeGrey (25, 1.1 ppt) rivers (Plate 2, Table 2). All of the 240 milkfish captured were less than 40 cm TL.

Sea mullet (Mugilidae)
Mugil cephalus Linnaeus 1758

A total of 605 sea mullet was captured in the lower reaches of the Irwin (2.3–13.7 ppt), Greenough (33.7 ppt), Chapman (2.6 ppt), Bowes (0.1 ppt), Hutt (3.1 ppt), Murchison (0.1–1.4 ppt), Ashburton (0.9 ppt), Fortescue (0.6 ppt) and DeGrey (1.1 ppt) rivers, and at an upstream site in the Turner River (1.1 ppt) (Plate 2, Table 2). This species is widespread throughout tropical, subtropical and warm temperate waters of the world (Harrison & Senou 1999).

