

What (small) fish is that?

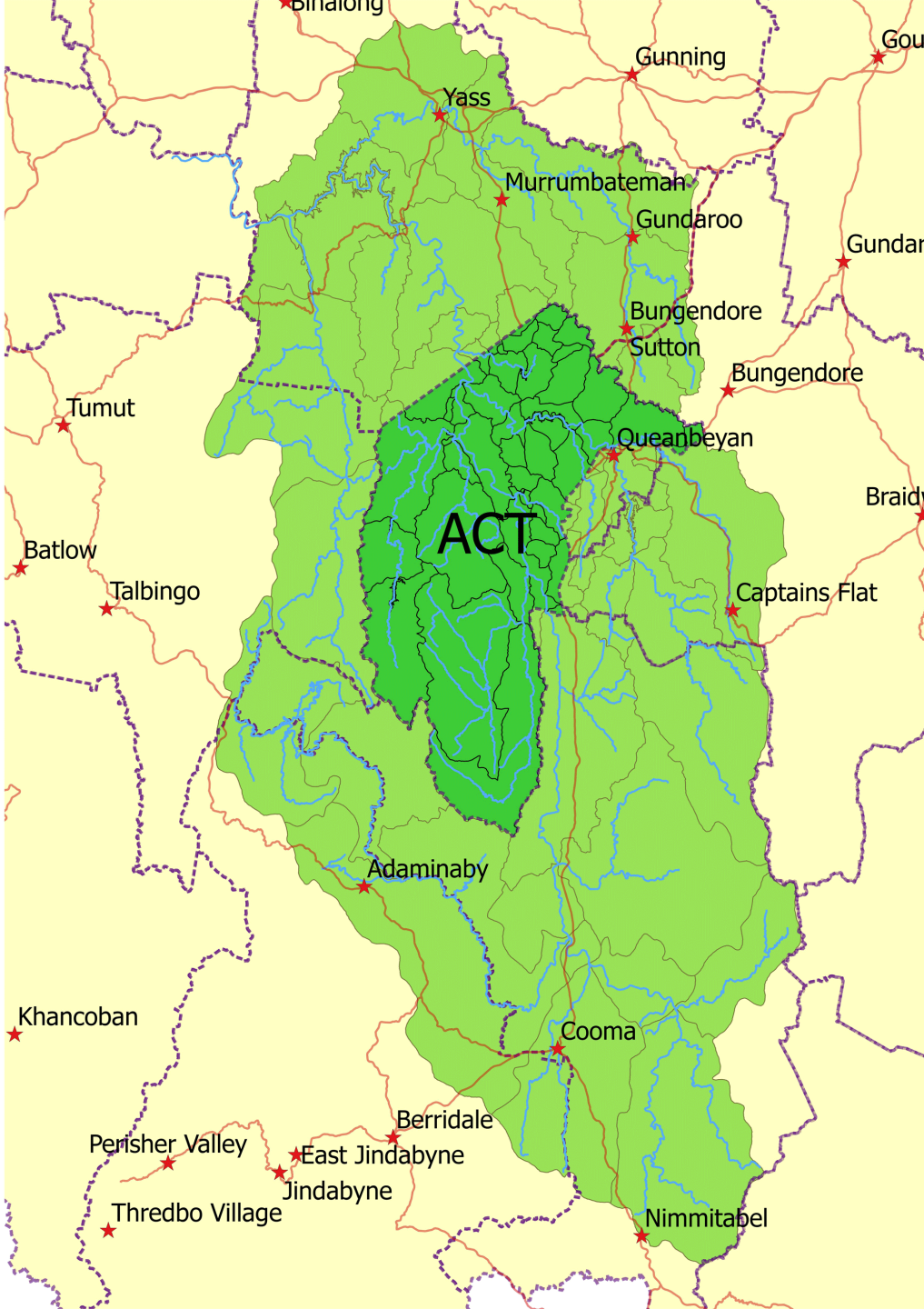
Upper Murrumbidgee Waterwatch

Danswell Starrs

About me

As well as scientific officer of the Upper Murrumbidgee Waterwatch program, Dr Danswell Starrs is a freshwater fish ecologist. I specialise in the ecology of fish larvae, and I do this by extracting information from the ear bones of fish. I have previously worked on Macquarie perch in the Cotter River, and numerous other fishy projects around the ACT and region. More information regarding my primary research can be found on my personal website: www.danswell.org





- 12 species of native fish
- 1 species locally extinct: Silver perch
- 5 species threatened (EPBC and/or ACT)
 - Murray cod
 - Blue nosed cod
 - Macquarie perch
 - Two spined blackfish
 - Silver Perch
- 9 species of introduced/feral/alien fish

Fish of the Upper Murrumbidgee

- Short finned eel (*Anguilla australis*)
- Mountain galaxias (*Galaxias olidus*)
- Australian smelt (*Retropinna semoni*)
- Freshwater catfish (*Tandanus tandanus*)
- Murray cod (*Maccullochella peelii*)
- Blue nosed cod (*Maccullochella macquariensis*)
- Macquarie perch (*Macquaria australasica*)
- Golden perch (*Macquaria ambigua*)
- Two-spined blackfish (*Gadopsis bispinosus*)
- Silver perch (*Bidyanus bidyanus*)
- Western carp gudgeon (*Hypseliotris klunzingeri*)
- Dwarf flathead gudgeon (*Philypnodon megastomus*)



- Rainbow trout (*Oncorhynchus mykiss*)
- Brown trout (*Salmo trutta*)
- Atlantic salmon (*Salmo salar*)
- Brook char (*Salvelinus fontinalis*)
- Goldfish (*Carassius auratus*)
- European carp (*Cyprinus carpio*)
- Oriental weatherloach (*Misgurnus anguillicaudatus*)
- Plague minnow (*Gambusia holbrooki*)
- Redfin perch (*Perca fluviatilis*)



Why these fish?

- Focus on those that are small because:
- Numerically more abundant
- Harder to identify
- Commonly encountered by waterwatchers
- Less well known than larger species/individuals

1. Small native fish

- 5 species which do not commonly grow longer than 15 cm total length (TL)
- Represent 4 families
- Present in a wide range of habitats (creeks, lakes, dams, rivers)
- Predominantly insectivorous (none are 'vegetarians')
- All lay eggs (as most Australian fish do)
- Variable life spans from several months to several years
- They are the food for other species (important component of food webs)

2. Juvenile native fish

- 8 species of native fish grow larger than 15 cm TL
- Juveniles are regularly found in a wide range of habitats (creeks, lakes, dams, rivers)
- Often differ in their behaviour compared to adult phases – more visible in shallow water
- Predominantly insectivorous/predatory
- Are food for other species
- Their relative success will shape adult populations in the future
- Somewhat ‘seasonal’ due to timing of reproduction, and growth

3. Small-bodied feral fish

- 2 species do not commonly grow larger than 15 cm TL
- Represent 2 families
- Impacts on native species (predation, competition, disease)



Oriental weatherloach



Eastern gambusia

4. Juvenile feral fish

- 7 species of feral fish grow larger than 15 cm TL
- Juvenile phases commonly encountered (particularly redfin perch and goldfish)
- Great diversity in ecology and behaviour
- Their relative success shapes future adult populations



Carp



Brown trout



Redfin perch

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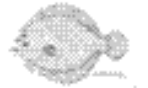










Goldfish

How to ID a fish in the Upper MR

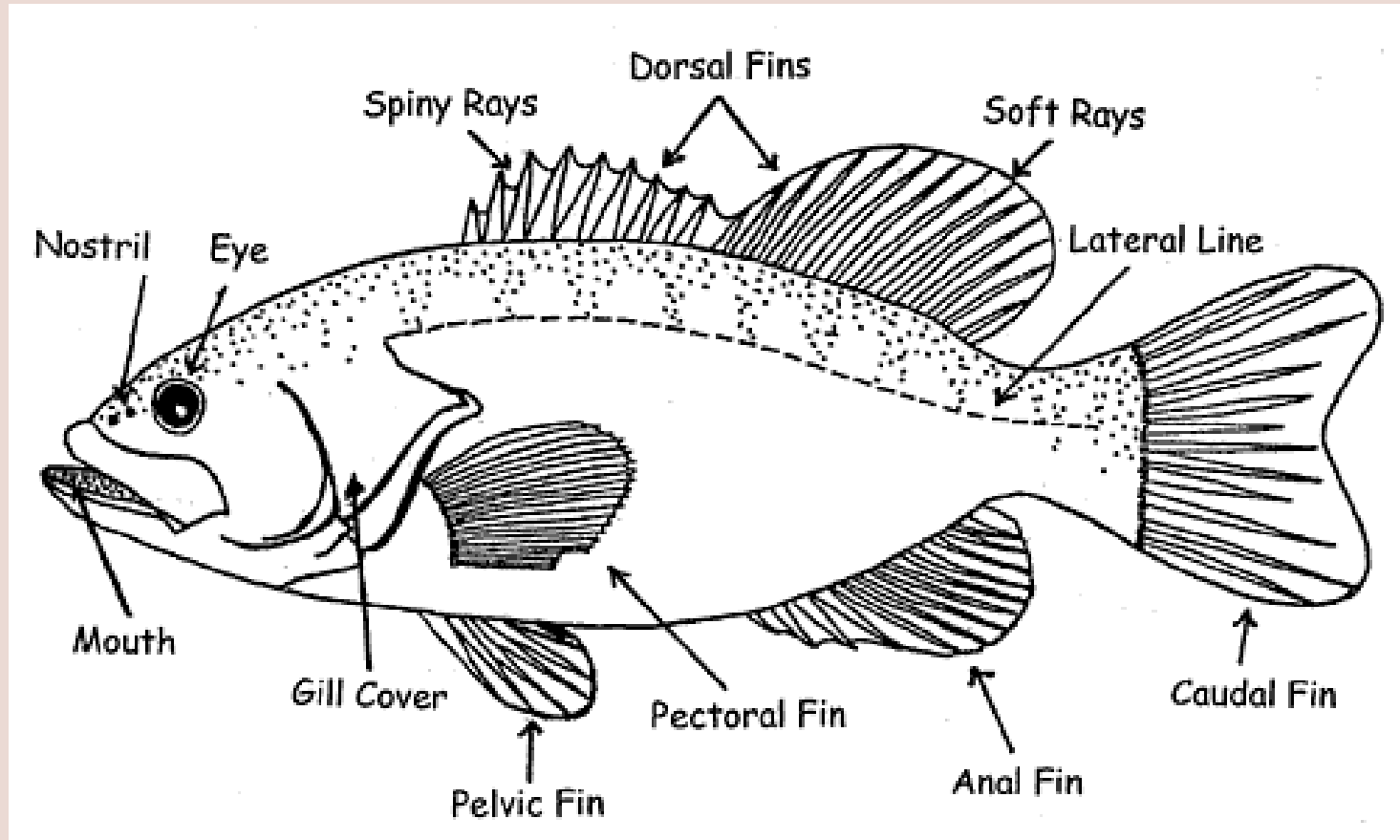
- Body shape and fins
- When looking at a fish, learn to study its fins!
- Where they are,
- How many there are,
- Their shape,
- Specific species diagnostic traits
- * there are many other traits that are used to ID fish but we won't worry about them here.

Body shape

- Long and thin (eel-like)
- Slender, tapered
- Short, stocky
- Flattened (either laterally or dorso-ventrally)

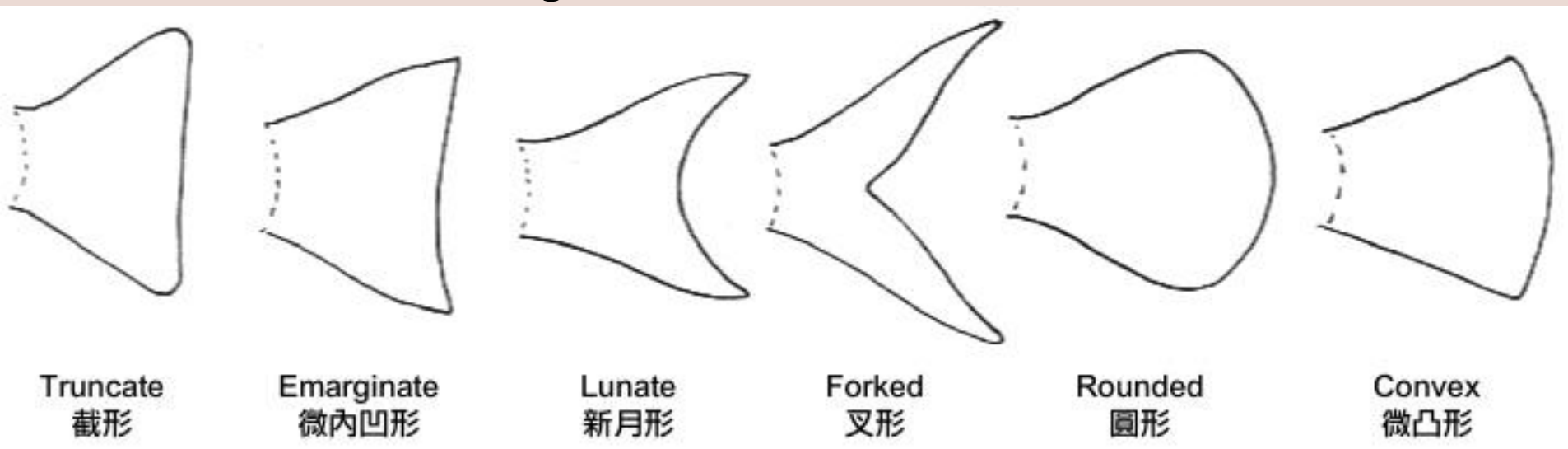
Cross-section	Species	Scientific name	Common name	Body shape type
		<i>Thunnus thynnus</i>	Northern bluefin tuna	Torpediform
		<i>Psetta maxima</i>	Turbot	Ventrally flattened
		<i>Cepola macrophthalmalma</i>	Red bandfish	Ribbon-like
		<i>Anguilla anguilla</i>	European eel	Eel-like
		<i>Mola mola</i>	Ocean sunfish	Spheroid
		<i>Caranx ignobilis</i>	Giant trevally	Laterally flattened
		<i>Hyporhamphus dussumieri</i>	Dussumier's halfbeak	Arrow-like

Fish Fins



Caudal (tail) fin

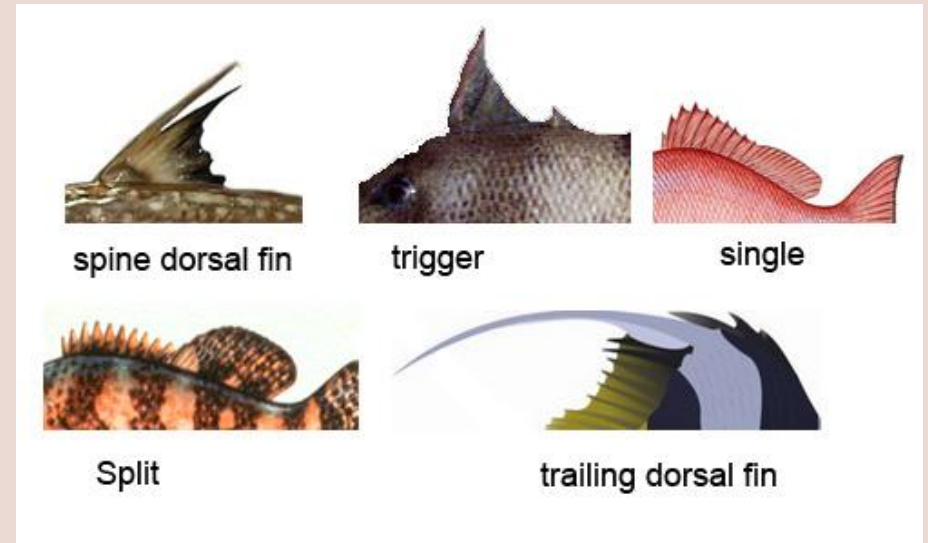
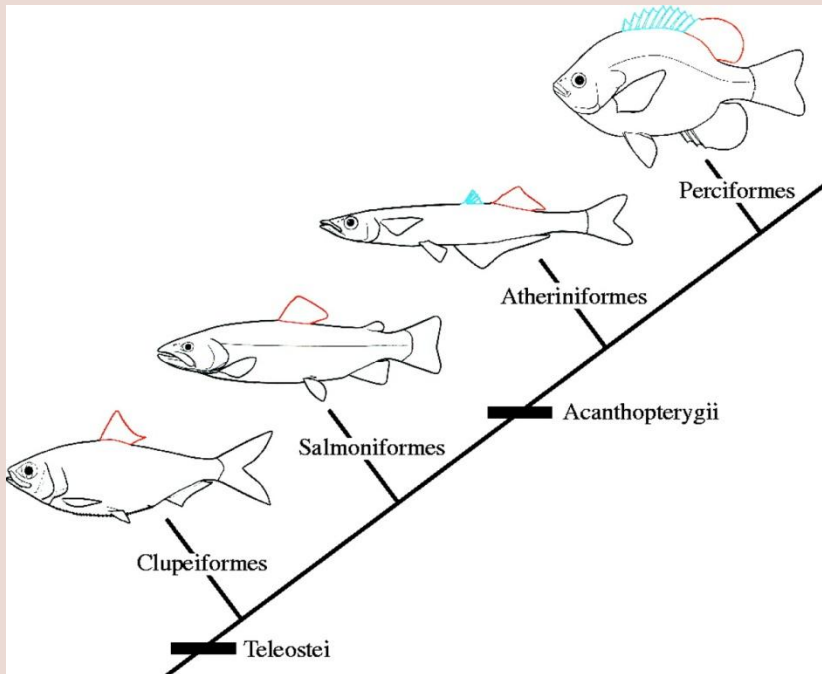
- Three main forms:
- Forked
- Truncate
- Rounded
- Be aware of damaged tails!



- Measuring fish length: if forked, FL (Fork length)
- Rounded tail, TL (Total length)

Dorsal fins

- Number
- Shape, length
- Position
- Soft or spiny or both



Ventral fins

- Pelvic and anal fins
- Size
- Shape
- Position



Additional key features

- Scales (large or small – shiny/metallic)
- Colour patterns (spots, stripes, bars)
- Gravid spots and gonopods
- Whiskers



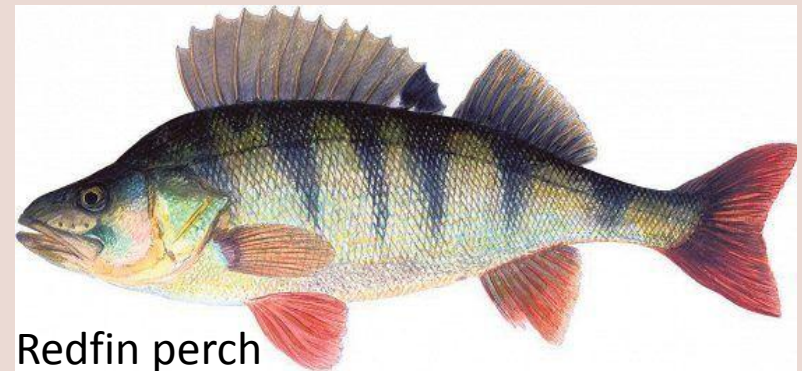
Eastern gambusia



Oriental weatherloach



Carp



Redfin perch

Behaviour

- Schooling or solitary
- Surface or benthic
- Jumping
- Hiding behaviour (burying, speeding away)



Brown trout

© Caters News Agency

Two-spined blackfish

Gadopsis bispinosus – 30cm TL



- Stronghold in the Cotter River catchment, but can be present in the Murrumbidgee River and its tributaries.
- Benthic (lives on the bottom under rocks). Prefers very clear, cobble-bottomed streams.
- Giraffe-like patterning and thin thread-like ventral fins under gills help identify this species.



Western carp gudgeon

Hypseleotris klunzingeri - 5cm TL



- Common in urban lakes, larger rivers
- Tend to sit motionless in the water.
- Males tend to have bright red/blue fin margins
- Readily confused with Plague minnow (due to sympatry)



Western carp gudgeon



Western carp gudgeon

Mountain galaxias

Galaxias olidus – 9cm FL



- Common in smaller, clear streams
- Juveniles readily school, adults benthic and hide under rocks
- Considered to suffer badly where trout are present
- Superficially look similar to trout



Mountain galaxias



Mountain galaxias

Australian smelt

Retropinna semoni – 6cm FL



- Very delicate/die very readily when captured
- Smell like cucumber
- Generally in larger waterways (lower Molonglo, Lower Cotter River, Murrumbidgee River)



Australian smelt

Dwarf flathead gudgeon

Philypnodon macrostomus – 5cm TL



- Lives in slower flowing waters, lower down in the catchment. Common around Lake Burrinjuck.
- An ambush predator, likes to sit on muddy or rocky bottoms, and near aquatic plants.
- Small – grows to ~5cm TL
- Cavernous mouth, flattened head – similar to a flathead you might catch at the coast.



Dwarf flathead gudgeon

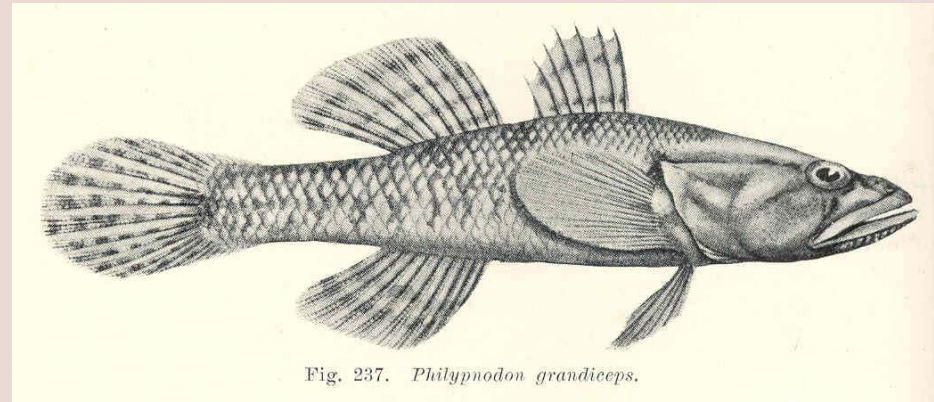


Fig. 237. *Philypnodon grandiceps*.

Eastern gambusia/Plague minnow

Gambusia holbrooki – 6cm TL

INTRODUCED

- Live bearer
- Strong sexual dimorphism (females larger than males)
- Very aggressive/predatory
- Generally prefer shallow, still water
- Reach high population densities
- Not as prevalent in upper catchments (yet)



Eastern gambusia

A. Kahn

Oriental weatherloach

Misgurnus anguillicaudatus – 25cm TL

INTRODUCED

- Fairly cryptic (lives on the bottom - benthic)
- Can breathe air through its intestinal tract
- Extremely tolerant (can survive droughts by aestivating in dried mud)
- Potential impacts are poorly known
- Can reach very high densities
- Spreading rapidly in the lower Murray River system



Oriental weatherloach



Golden perch

Macquaria ambigua – 50cm TL



- Regularly stocked into urban lakes in the ACT and surrounding region.
- Previously natural populations from Colington down through the ACT. Present in lower parts of the Cotter River, Molonglo River, Queanbeyan River and Murrumbidgee River.
- Popular angling species
- Juveniles rarely encountered



Golden perch

Goldfish

Carassius auratus – 30cm FL

INTRODUCED

- Tend not to orange or red in the wild
- Fast swimmers!
- Present in urban wetlands and major rivers
- Difficult to distinguish from carp as juveniles



Goldfish

European carp

Cyprinus carpio – 80cm FL

INTRODUCED

- ~70% of the fish biomass in the Upper Murrumbidgee River catchment
- Juveniles tend to be fairly cryptic
- They like still, shallow, weedy environments
- Spawn in spring, reach 20cm FL after 1 year!
- Common in urban wetlands and lakes, Murrumbidgee River



Redfin perch

Perca fluviatilis – 40cm FL

INTRODUCED

- Very common in the urban lakes
- Juveniles readily observed. School near the bank, weeds etc.
- Often seen/heard chasing other fish
- Major impacts on native fish through predation



Redfin perch

Rainbow trout

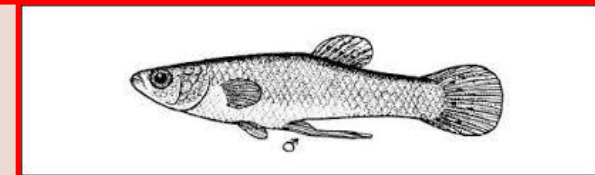
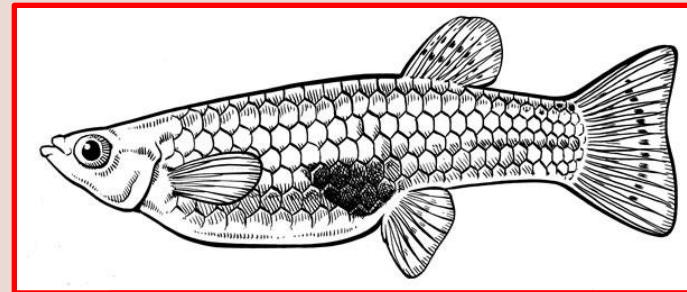
Oncorhynchus mykiss – 60cm FL

INTRODUCED

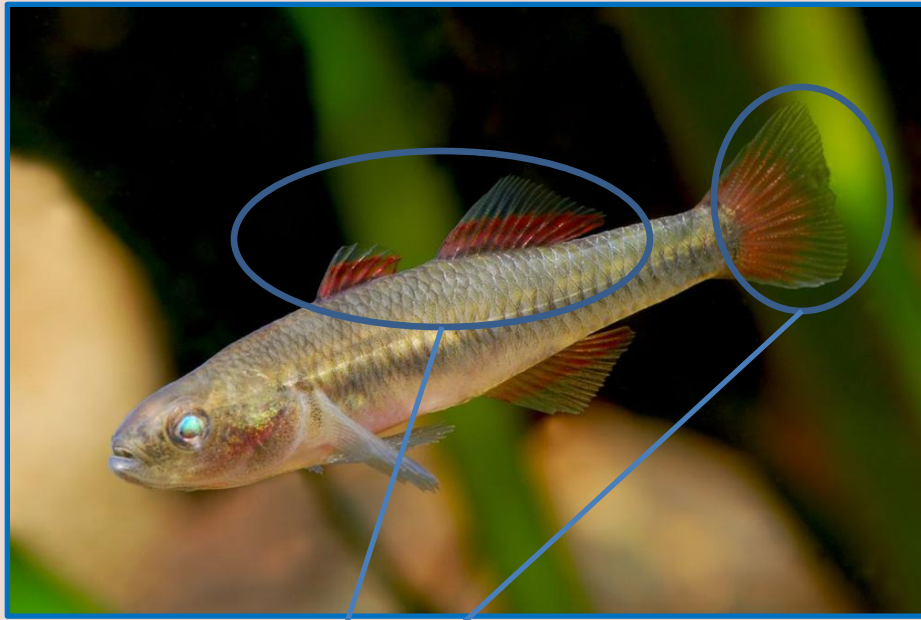
- Common in smaller, clear, fast flowing creeks
- Highly predatory – prey on frogs, and native and introduced fish
- Often seen ‘rising’ to catch insects
- Often solitary/small groups – very spooky
- Easily confused with adult Galaxias (similar behaviour)



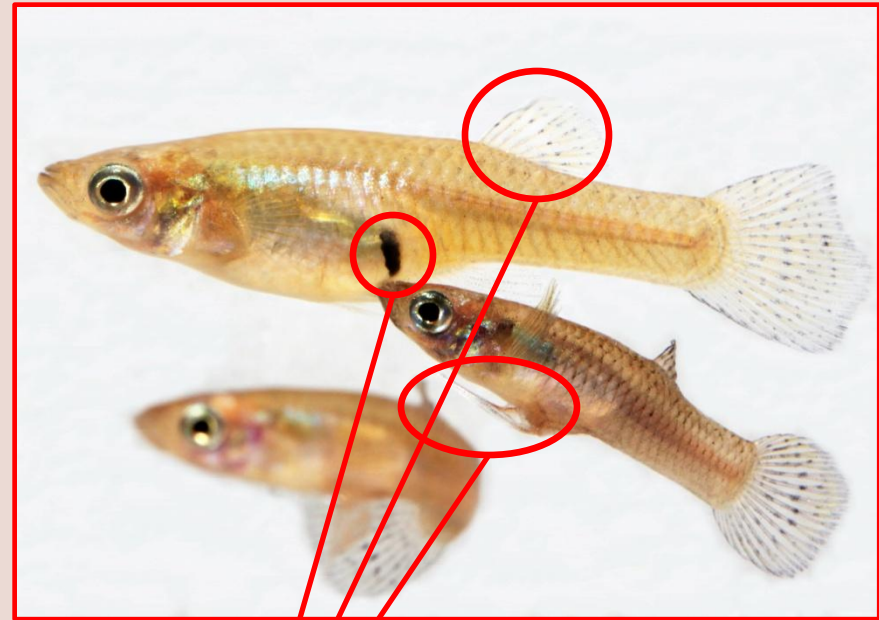
Carp gudgeon V Plague minnow



Carp gudgeon V Plague minnow

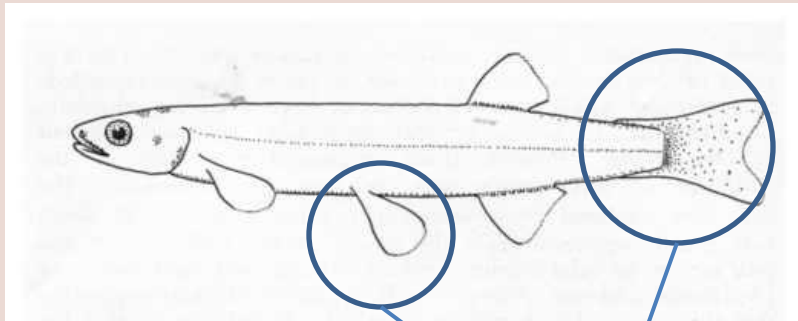


- Two separate dorsal fins (margins often coloured red or blue)
- Caudal fin rounded

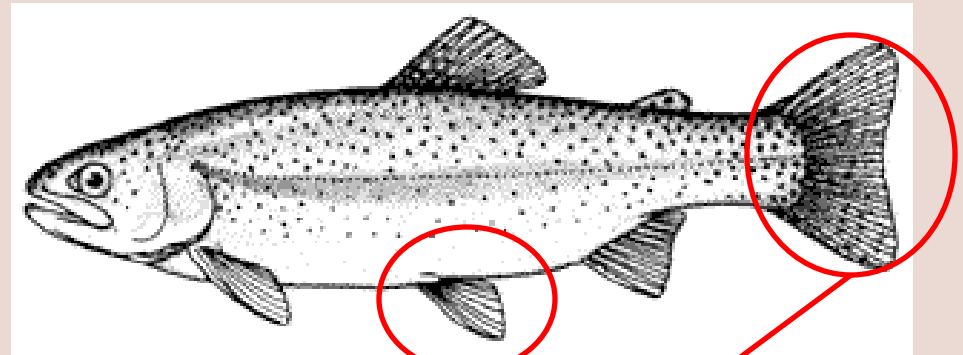


- Single dorsal fin (un-coloured)
- Large females have black 'gravid spot' on flank
- Males have a gonopod (sharp pointy pelvic fin)

Galaxias V Trout



Ventral fin mid-way along body
Forked/truncate caudal fin



Ventral fin mid-way along body
Forked/truncate caudal fin
Adipose fin

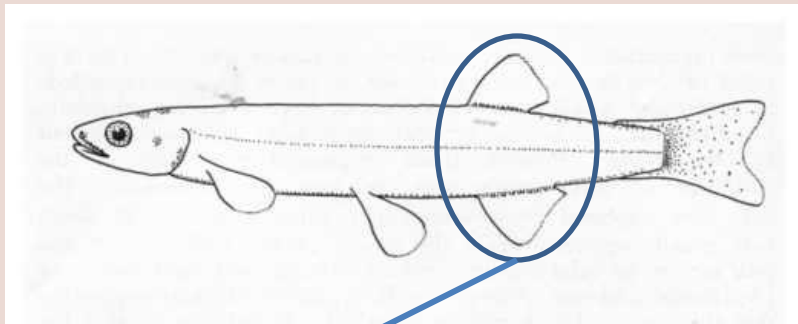
Galaxias V Trout



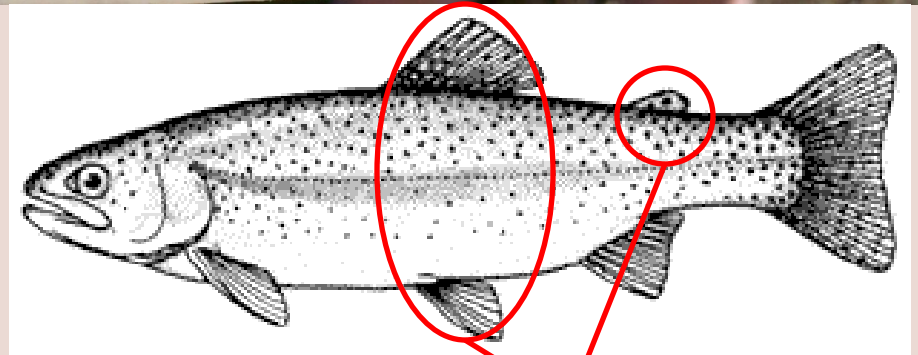
Mountain galaxias



Brown trout

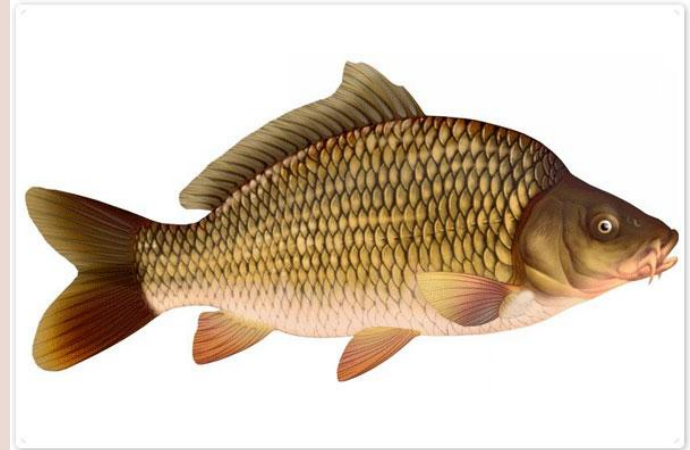
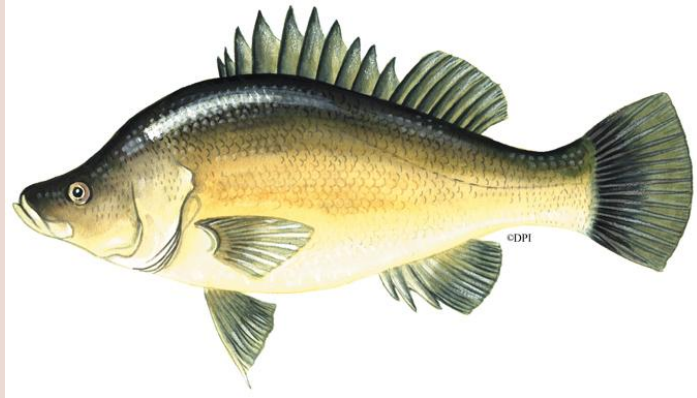


Dorsal fin and anal fin level
No obvious adipose fin

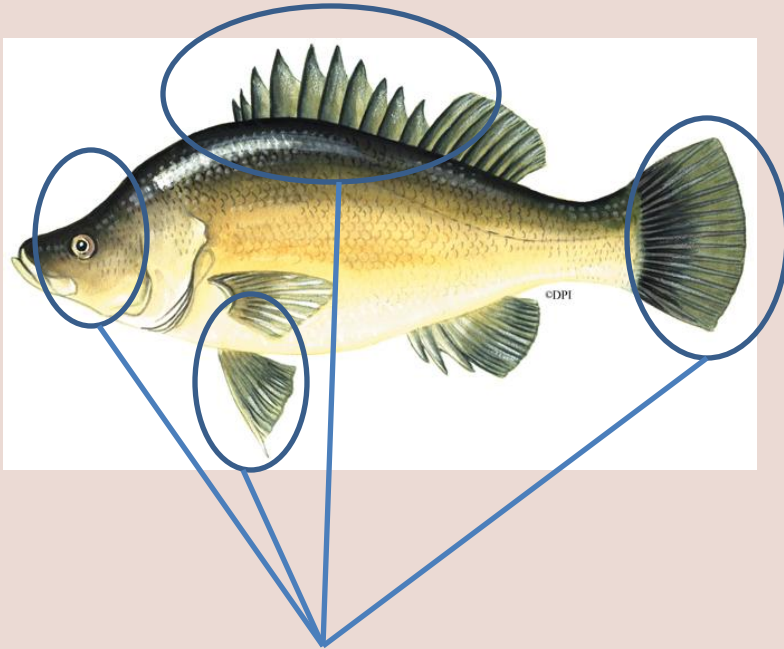


Adipose fin present
Dorsal fin level with ventral fin
Red spots (juvenile brown trout)
Parr marks

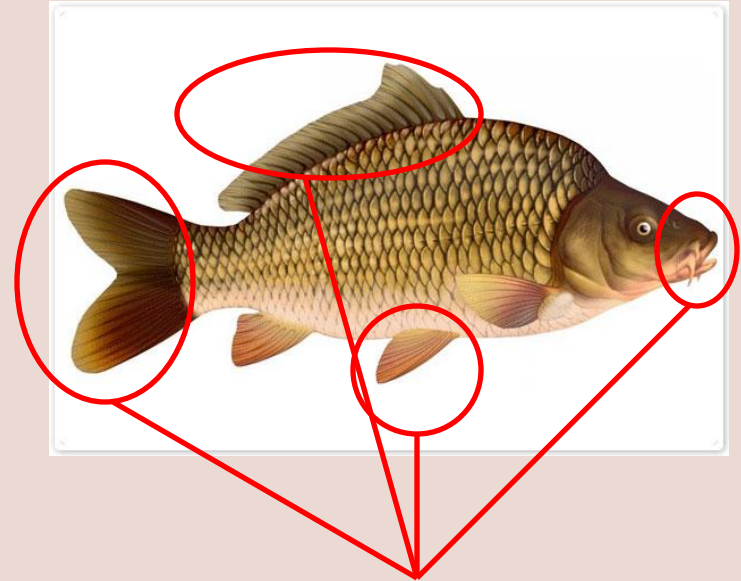
Golden perch V Carp



Golden perch V Carp



Rounded caudal fin
Long, spiny dorsal fin, soft dorsal fin
Ventral fin anterior, level with pectoral fin
Concave head profile



Forked caudal fin
Large dorsal spine, long soft dorsal fin
Ventral fin posterior, level with dorsal fin
Four barbels (whiskers)
Large scales

Tadpoles v Fish

- Tadpoles have a single conjoined dorsal and ventral fin (eels are the same)
- Hind leg buds visible on larger/older specimens
- Obvious coiled intestinal tract (visible through skin)
- Small terminal mouth openings
- Dorsal view very distinctive (a blob with a tail)



What to record when you catch a fish

- LOCATION LOCATION LOCATION!
- Size (length)
- Fin arrangements
- Colours and patterns
- Photograph – a (good) picture is worth 1000 words
- Describe where it was caught/seen

Additional resources

- Lintermans, M. (2000) Fish in the Upper Murrumbidgee Catchment: a review of current knowledge. www.upperbidgeereach.org.au
- Lintermans, M. (2007) Fishes of the Murray-Darling basin. Murray Darling Basin Authority, Canberra.
- Allan GR, Midgley SH, and M Allen (2003) Field guide to the freshwater fishes of Australia. CSIRO Publishing.
- FeralFishScan www.feralscan.org.au/feralfishscan
- <http://www.fishesofaustralia.net.au/key/lucid>
- Email: waterwatch@act.gov.au
- Thanks to those people whose photos we have used.