Fact Sheet

How does the endangered purple-spotted gudgeon cope with drought?

The Murray-Darling Freshwater Research Centre

What is the purple-spotted gudgeon?

The purple-spotted gudgeon, *Mogurnda adspersa*, is a small freshwater gudgeon that may inhabit running and still waters within the Murray-Darling Basin. It is also found outside of the Murray-Darling Basin, within eastern coastal drainages. It grows to a length of 150-160 mm, but is most commonly 60-120 mm in length. It prefers slow-flowing and still waterbodies, where it lives on the bottom, in amongst aquatic plants and woody debris.

The purple-spotted gudgeon is an ambush predator, whereby it hides in complex habitats, waits for prey to approach, then rapidly captures and consumes prey in a burst of activity.

Why is the purple-spotted gudgeon endangered?

The purple-spotted gudgeon has, unfortunately, become extremely rare, especially within the Murray-Darling Basin. We are not sure why this species is becoming so rare, but multiple factors are probably involved including regulation of rivers, habitat degradation, pollution, as well as invasive competitors and predators, such as redfin.

Purple-spotted gudgeons are commonly found in unregulated rivers, but droughts cause certain unregulated rivers to dry to a series of pools, where individual fish then become concentrated. These pools provide refuge from the drought for freshwater fish, but even though these refuge pools are vital for the maintenance of a healthy fish population, the water quality in these pools can naturally become quite poor during a drought. For example, the water may become unusually warm, dissolved oxygen may become quite low, making it hard for the fish to breathe, and food may be in short supply.

This lowered water quality can be exacerbated by water extraction during droughts. Not surprisingly, the surrounding community may extract water during a drought in order to sustain their agricultural and domestic water requirements. But how much water can we take from these refuge pools during a drought before purple-spotted gudgeons start to lose condition and become unhealthy? This is the question that scientists at The Murray-Darling Freshwater Research Centre (MDFRC) are trying to answer.

How does water extraction from drought refuge pools affect the purple-spotted gudgeon?

When the purple-spotted gudgeons are attempting to see out the drought at the bottom of a refuge pool, they experience harsh temperatures and dissolved oxygen levels. The high temperatures and low dissolved oxygen levels typical of these refuges should place quite a strain on their metabolism, hence their energy demands and population production rates. Of course, water extraction just exacerbates the strain, so we need to know how much strain they can take before the gudgeons start to lose a significant amount of condition and productivity.

MDFRC scientists are conducting a range of physiological experiments to determine how temperature, dissolved oxygen and food shortage combine to affect the growth and productivity of Purple-spotted gudgeons during drought. This experimental data will be used in a computer model that catchment managers can then use to forecast the effect water extraction will have on purple-spotted gudgeons during drought. This model will essentially be used—in conjunction with other models—to help set water extraction limits from unregulated rivers during drought.

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