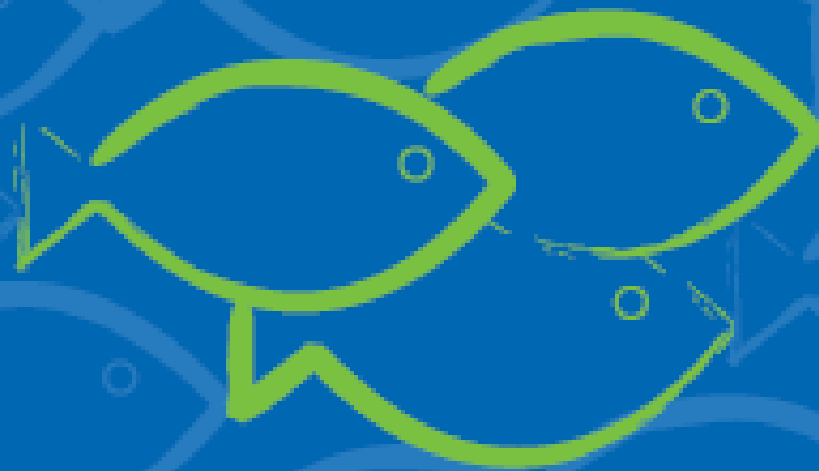




Habitat makes fish happen!

Craig Copeland
Manager

Conservation Action Unit



NSW DEPARTMENT OF PRIMARY INDUSTRIES

The Fish

Bream

Whiting

Flathead

Mulloway

Tailor

Blackfish

Murray Cod

Golden Perch

Australian Bass

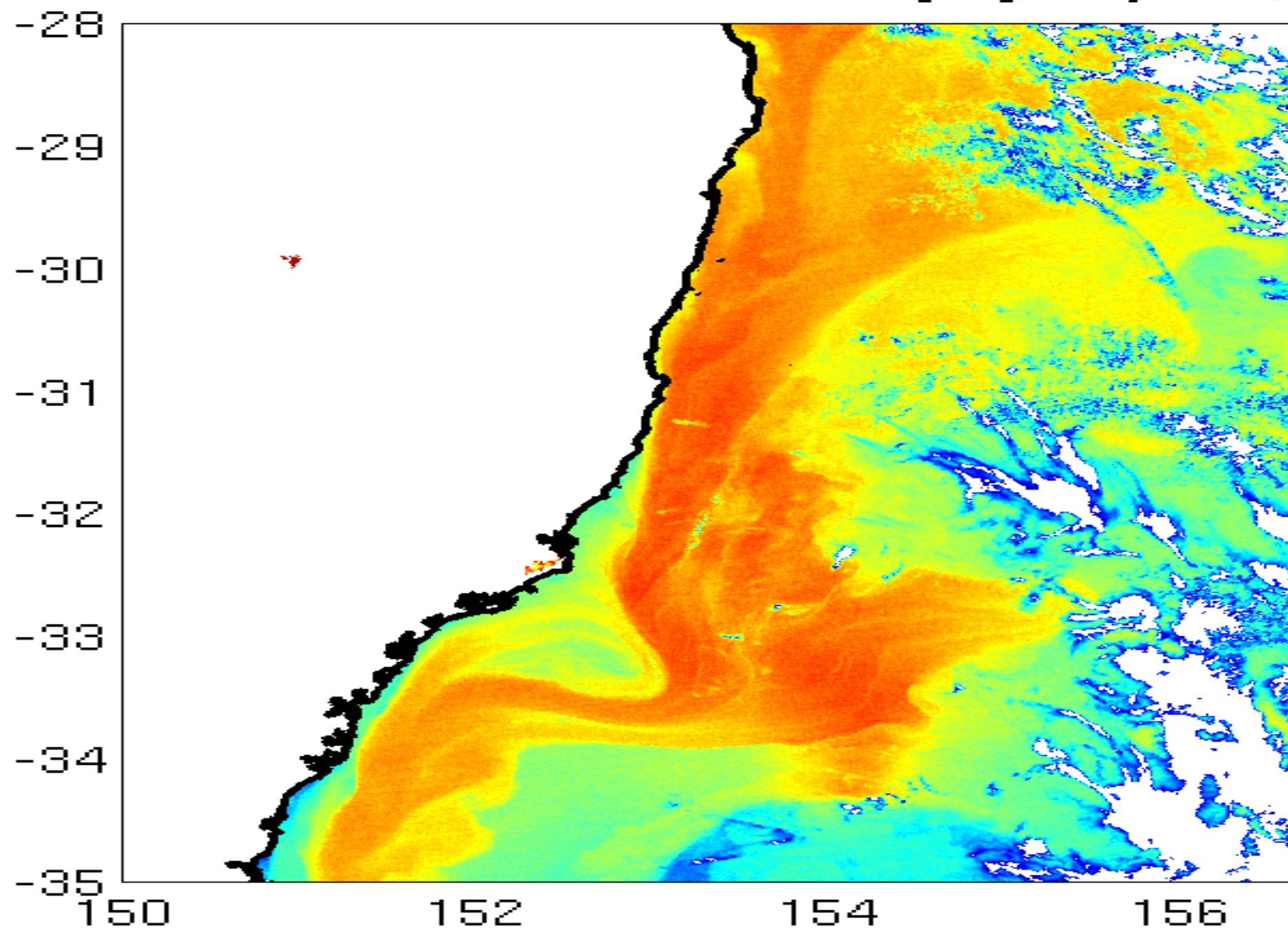








MODIS SST [$^{\circ}\text{C}$], Day 280,



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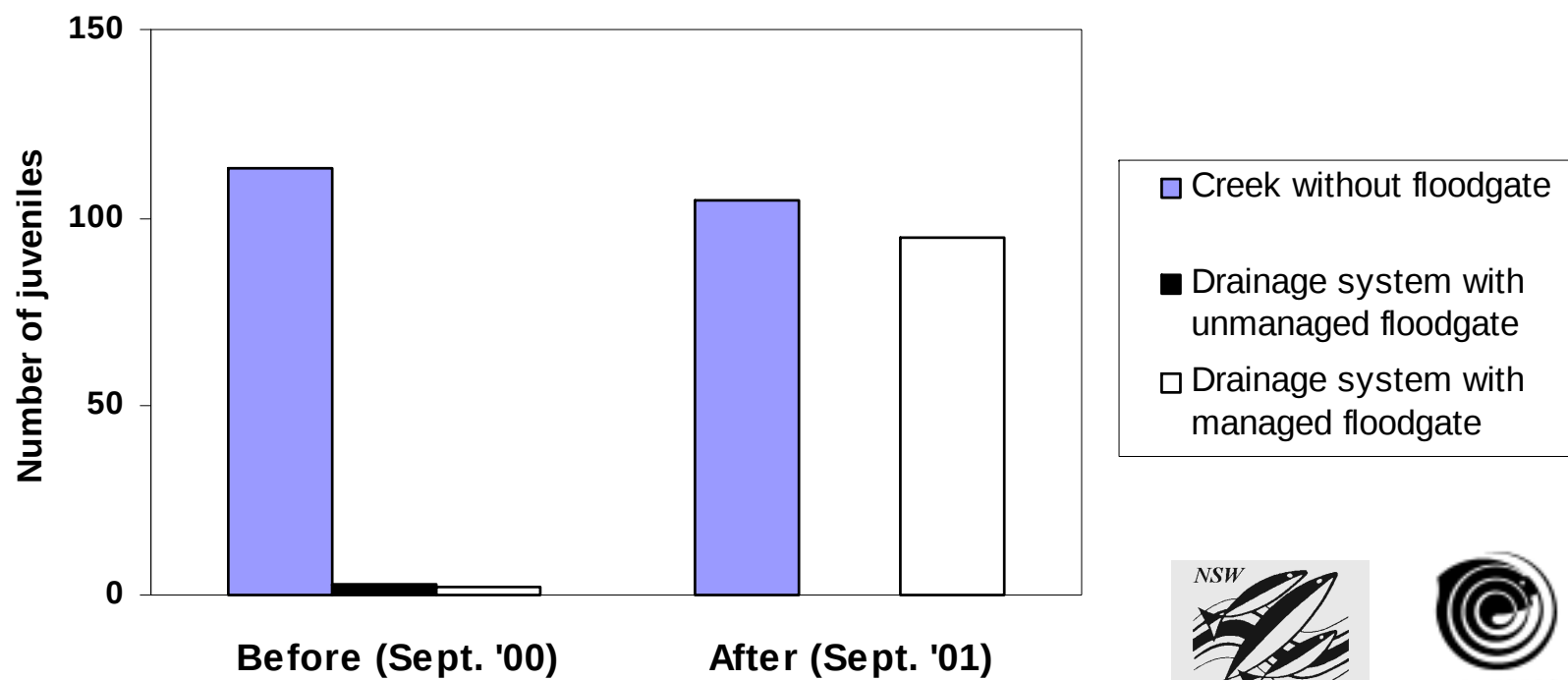
- | | | | |
|---|-----------|---|--------------------|
|  | Seagrass |  | Mangroves |
|  | Saltmarsh |  | Trees |
| | |  | Freshwater wetland |

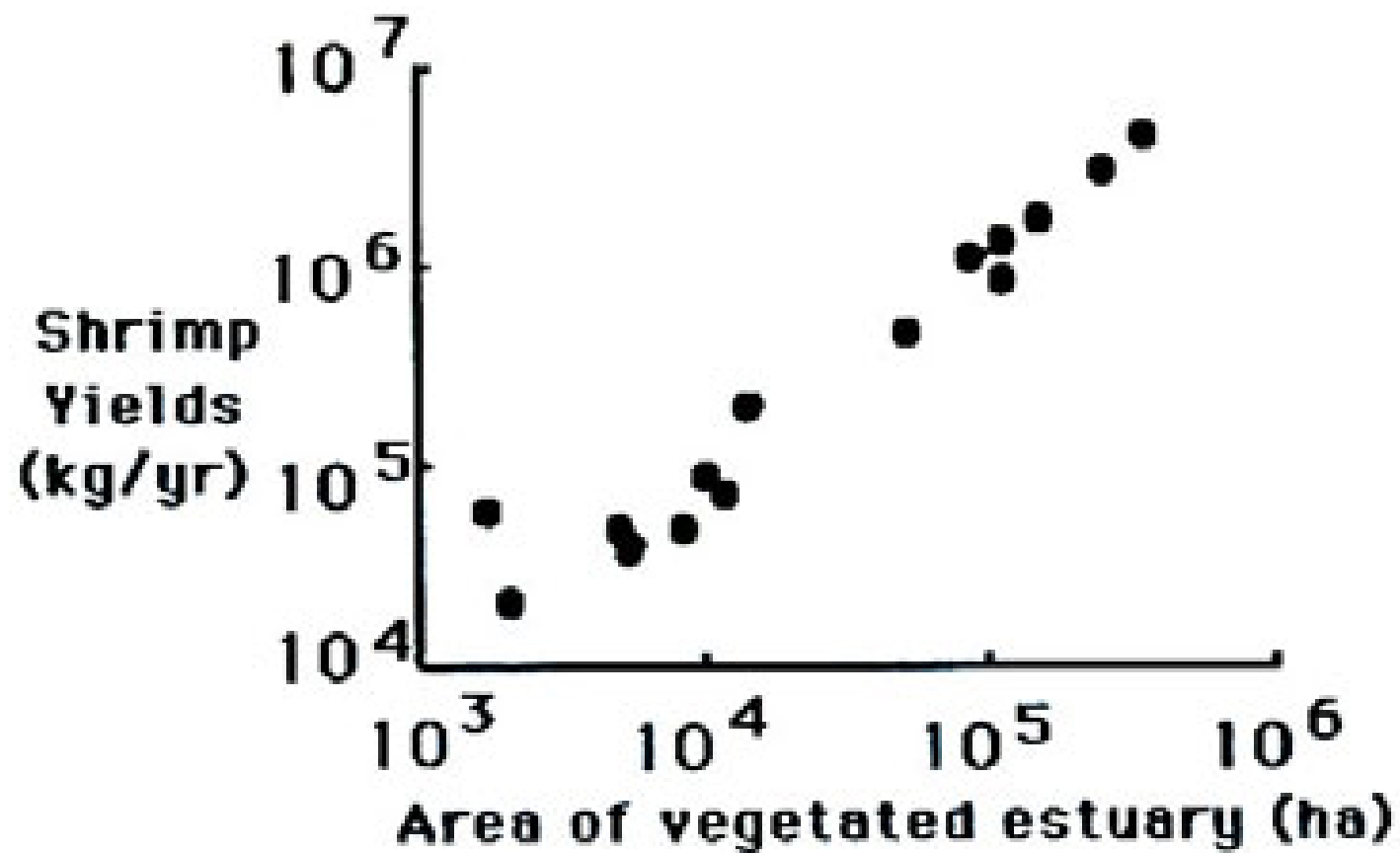


Age-specific movements of important commercial fish species in Botany Bay

Species	Small juveniles	Large juveniles	Adults	Spawning grounds
Dusky flathead	<i>Zostera</i> Mangroves Shallow mud	Deep mud	Seagrass (s) (w) Deep mud (w)	<i>Zostera</i>
Sand whiting	<i>Zostera</i> Shallow sand		Shallow sand	Inshore surf zone
Trumpeter whiting	<i>Zostera</i> Shallow sand	Deep sand (s) Deep mud (w)		Deep sand in bay
Tailor	<i>Zostera</i> Shallow sand	<i>Zostera</i> Deep sand (s) Deep mud (w)	<i>Zostera</i> Shallow sand (s) Deep mud (w)	Offshore
Yellowfin bream	Mangroves <i>Zostera</i> Shallow mud	Shallow sand (s) Deep mud (w)	Shallow sand (s) <i>Zostera</i> Deep sand(w) Rocky reef (w)	Inshore
Tarwhine	<i>Zostera</i>	Deep sand (s) Deep mud (w)	Offshore reefs	Inshore
Luderick	<i>Zostera</i>	<i>Zostera</i> (s) <i>Posidonia</i> (s) Mangroves (w)	<i>Zostera</i> <i>Posidonia</i> Rocky reefs	Inshore
(s) summer feeding grounds (w) winter feeding grounds				
Source: SPCC (1981)				

Yellow-fin bream





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Seagrass



Saltmarsh



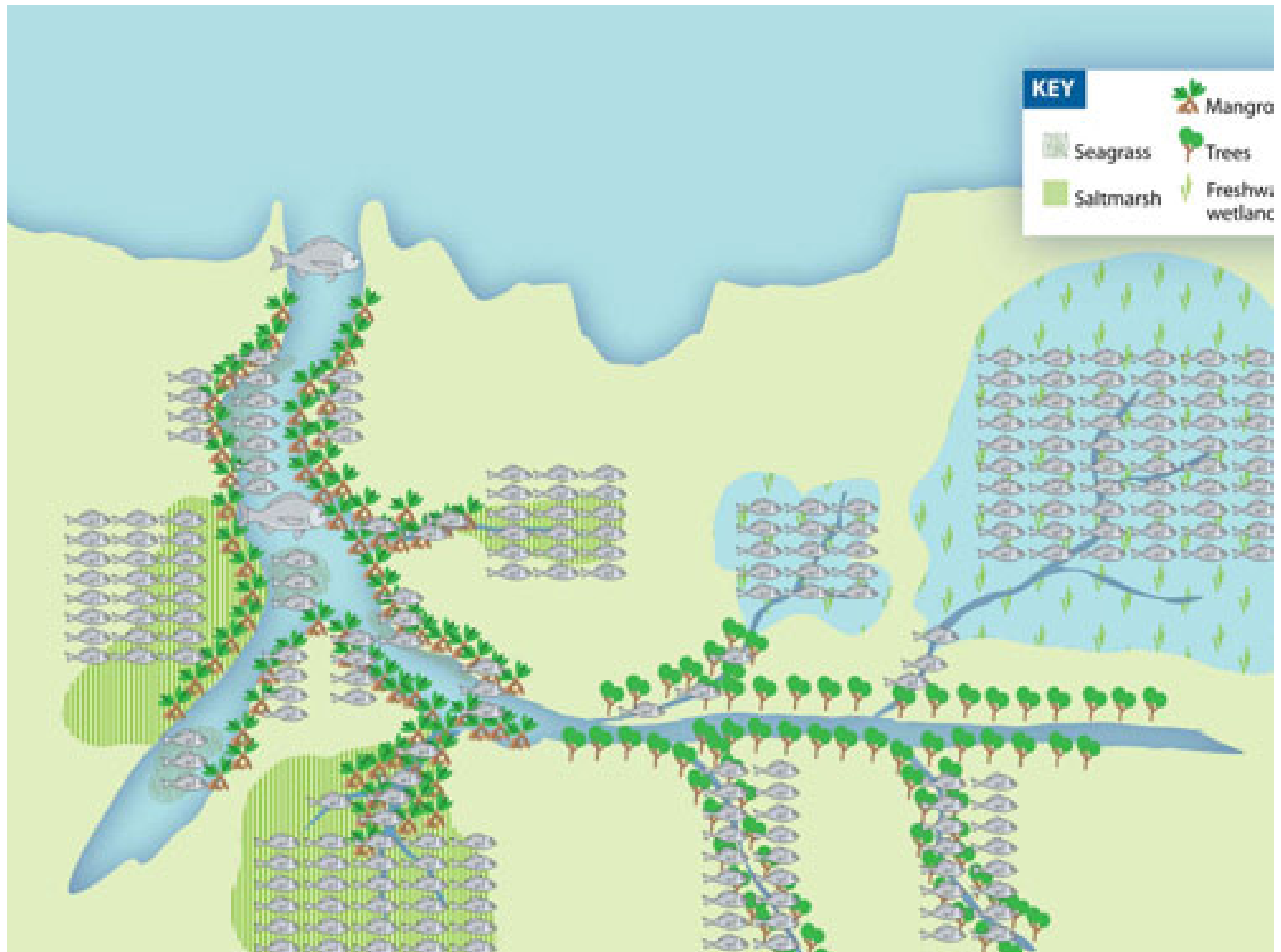
Mangro



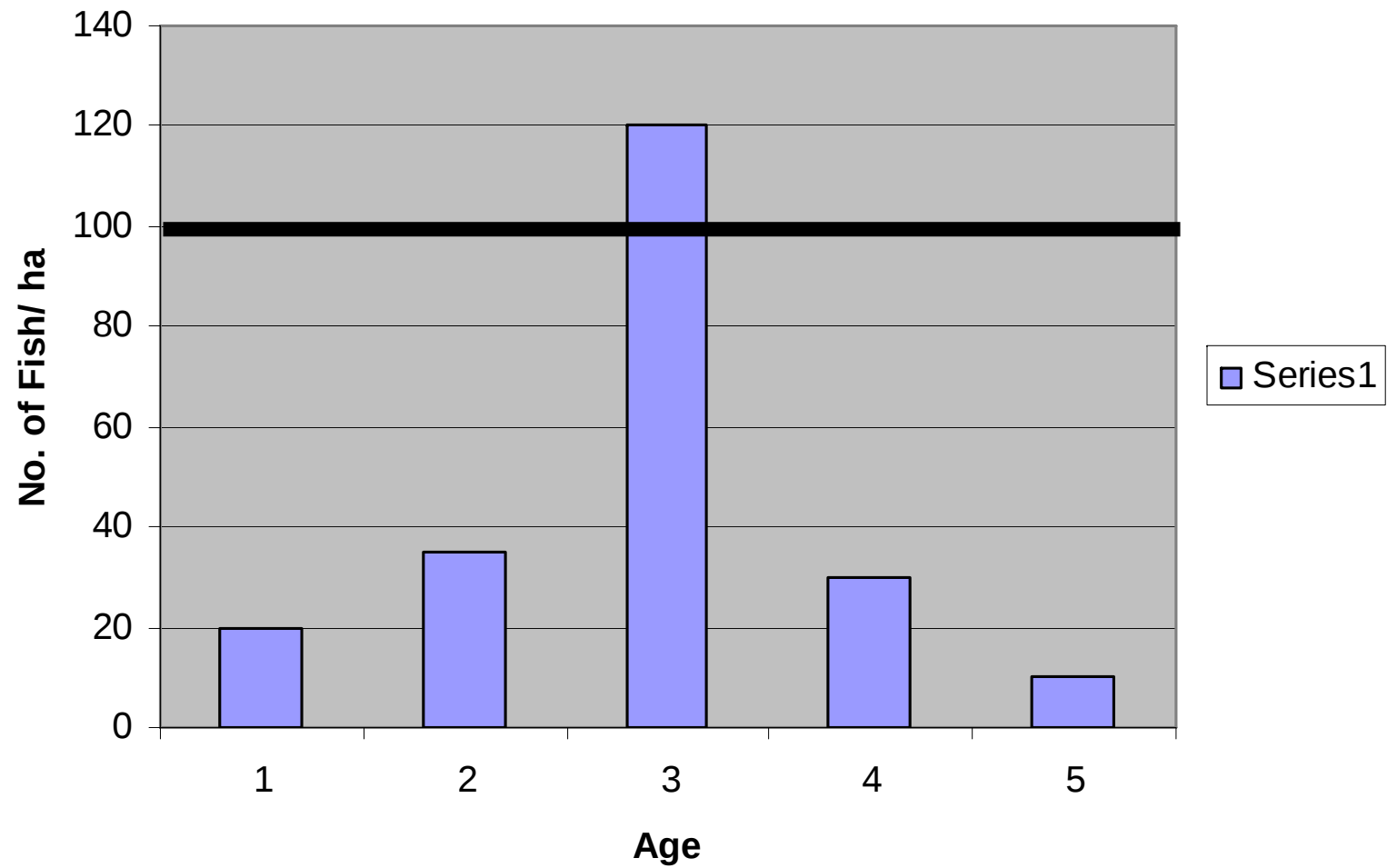
Trees

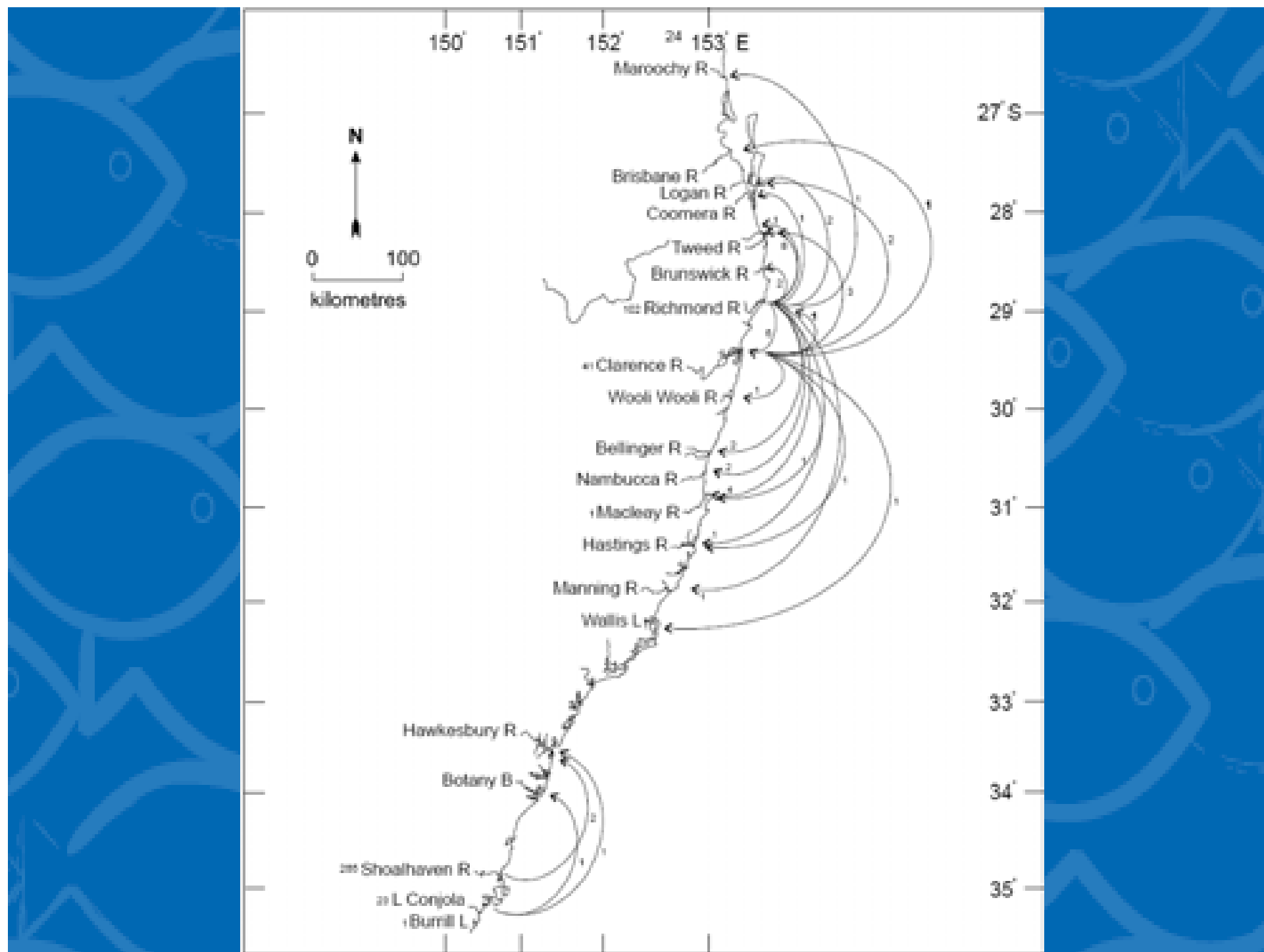


Freshwa
wetland



Carrying capacity





Summary so far

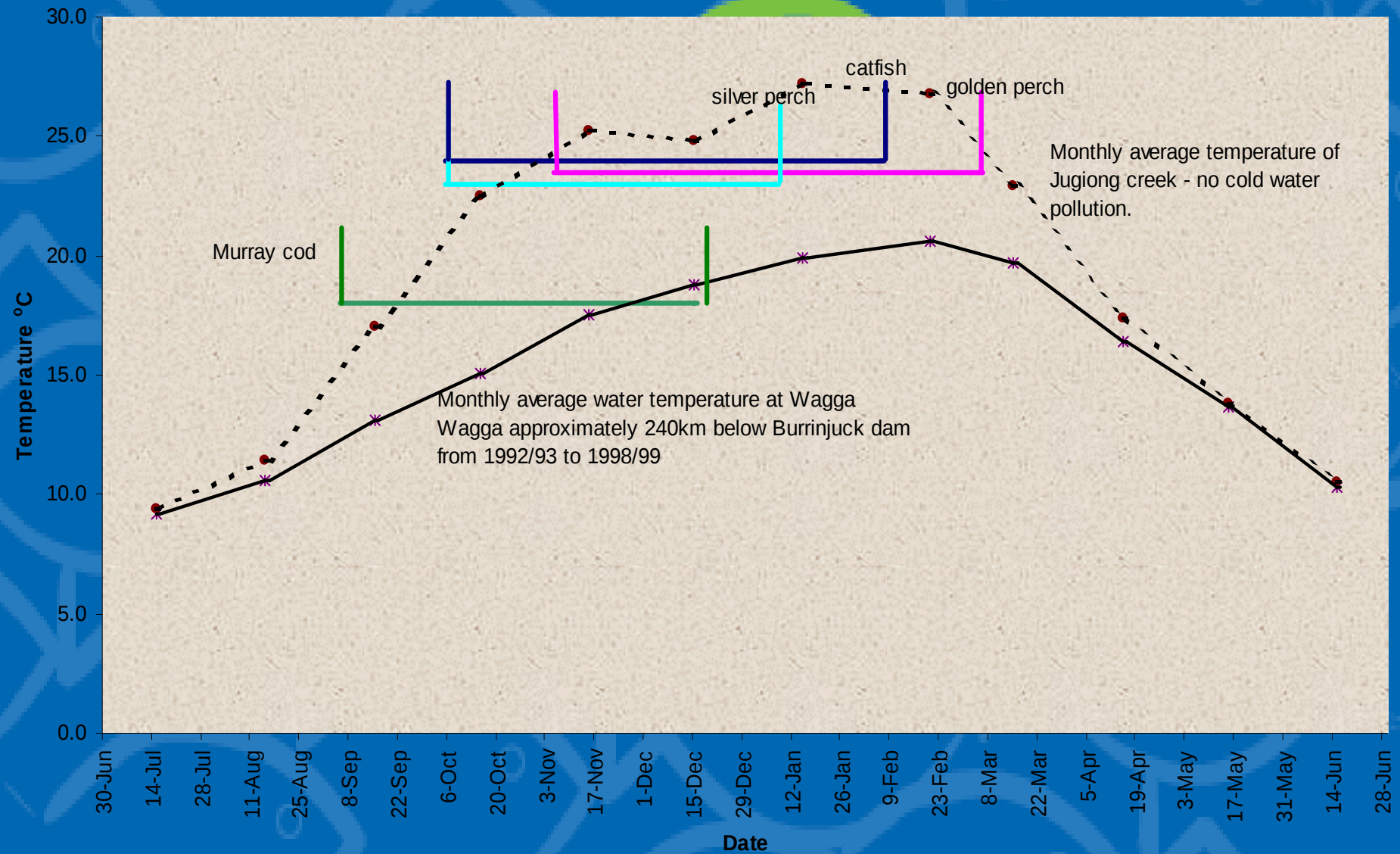
Offshore spawning

Larval recruitment variable

**Different habitats used by different species
at different times**

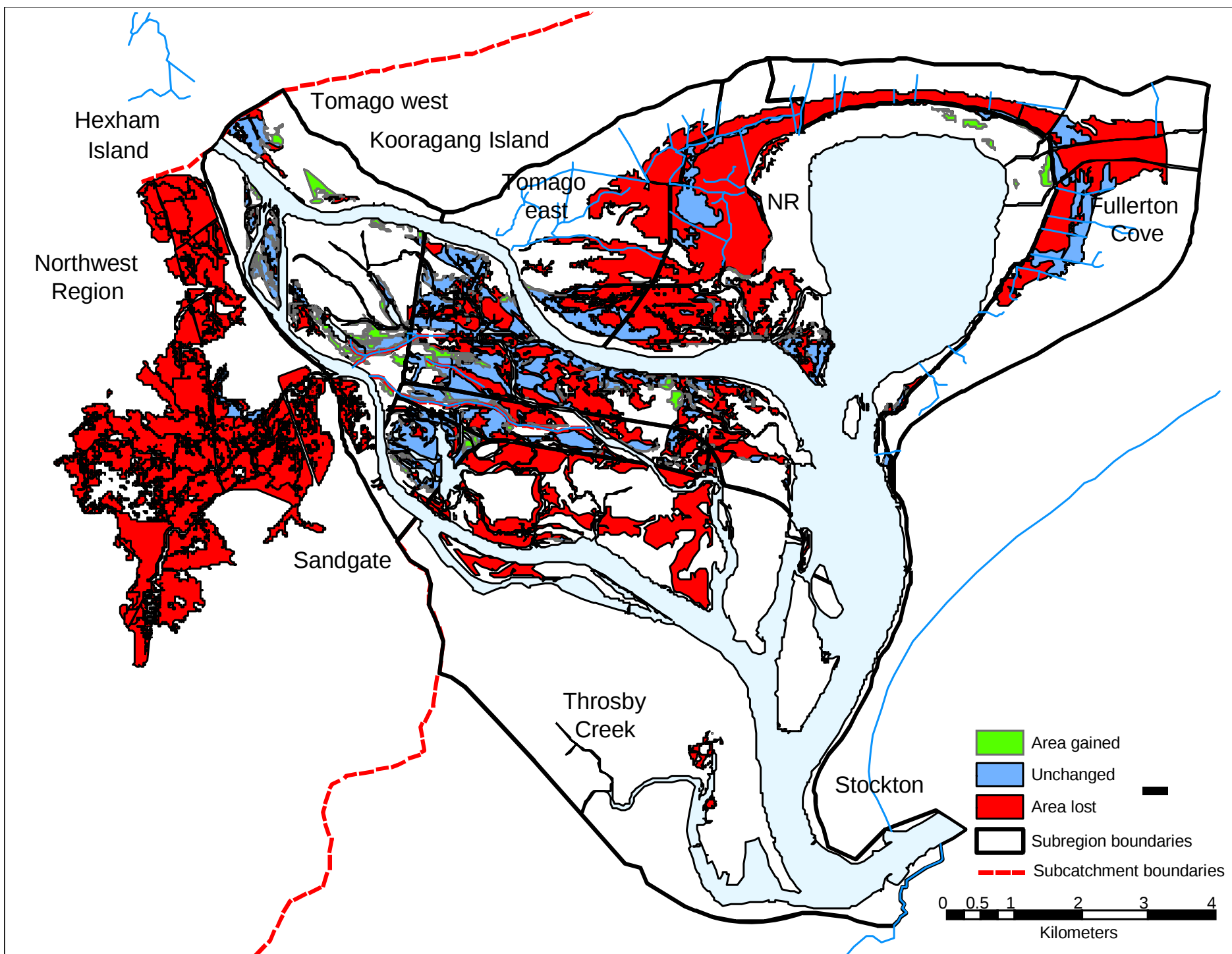
Carrying capacity affects fish numbers

Figure 4: Observed water temperature of the Murrumbidgee river at Wagga Wagga and Jugiong Creek at Jugiong in comparison to fish spawning envelopes.





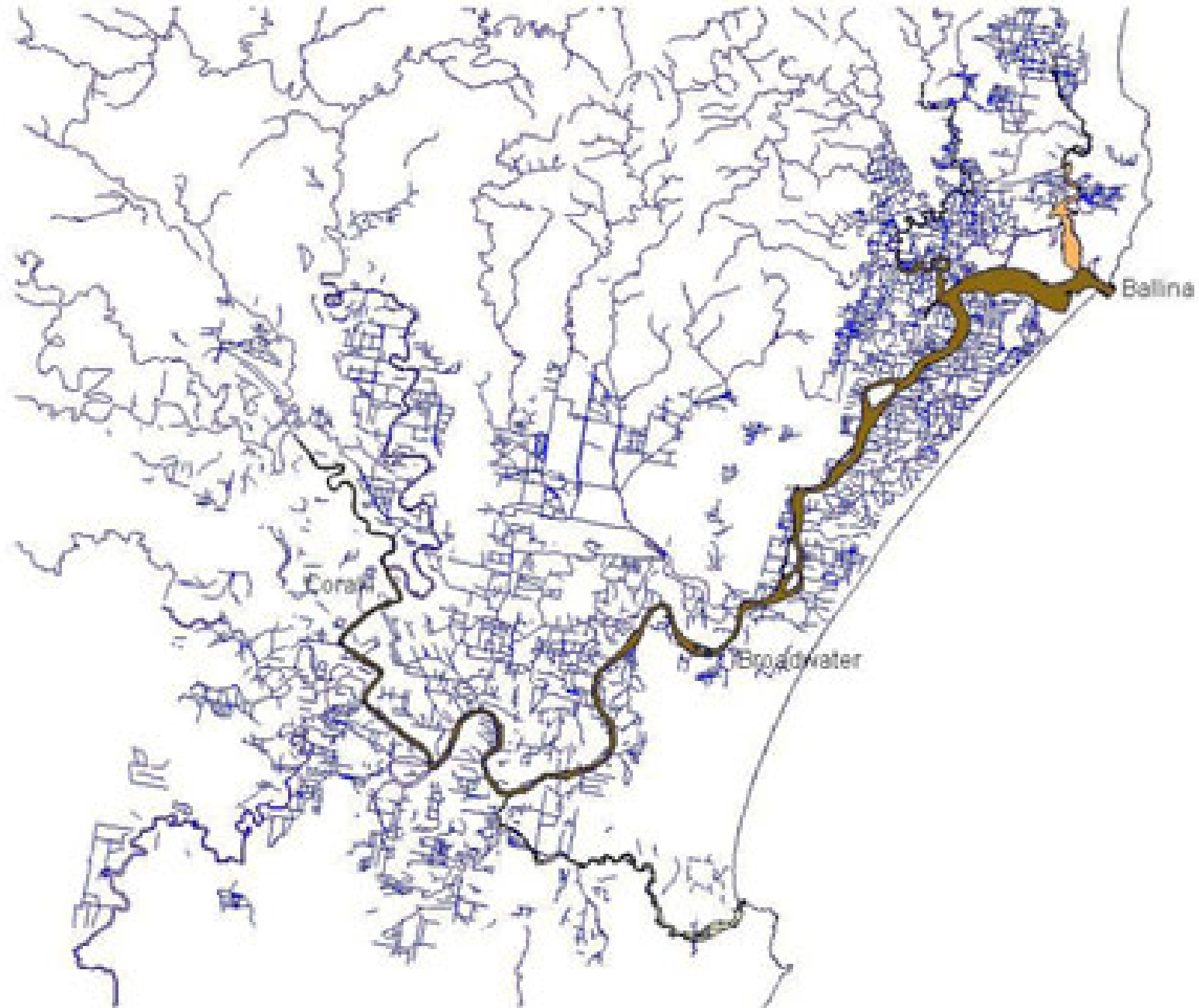


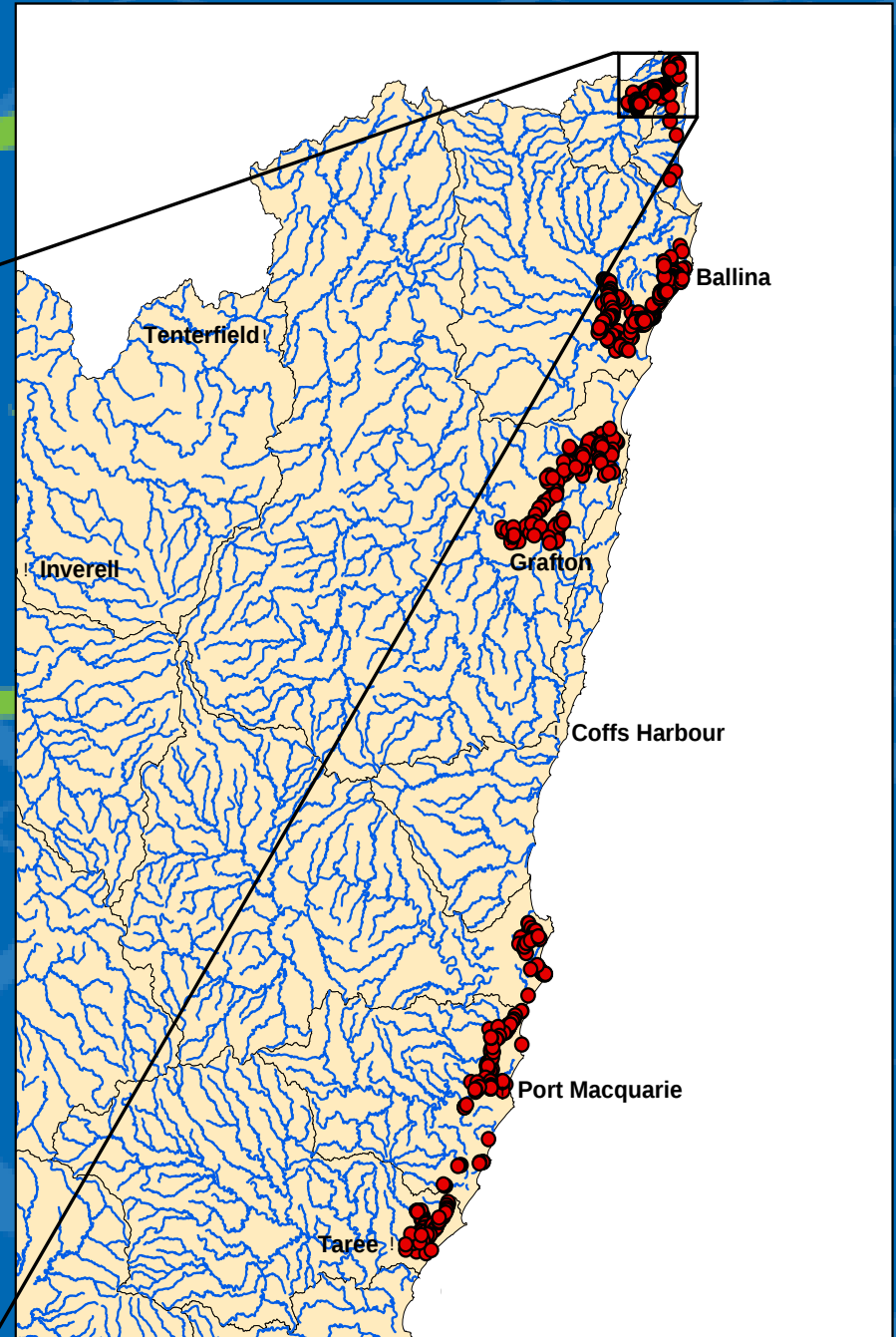
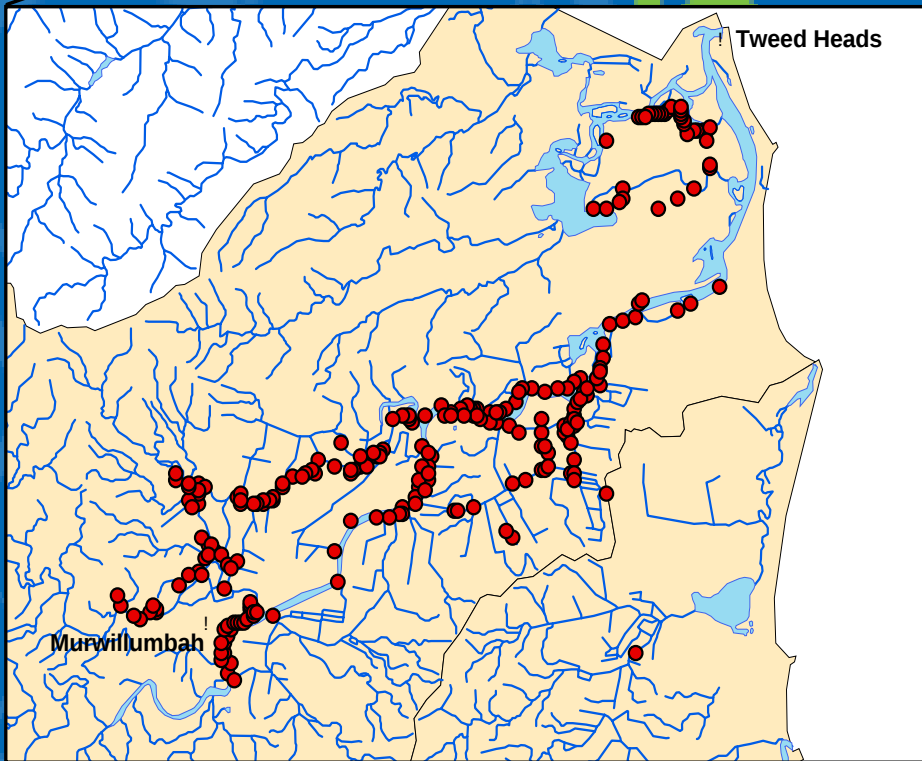


Richmond River Natural Drainage System



Richmond River Drainage System





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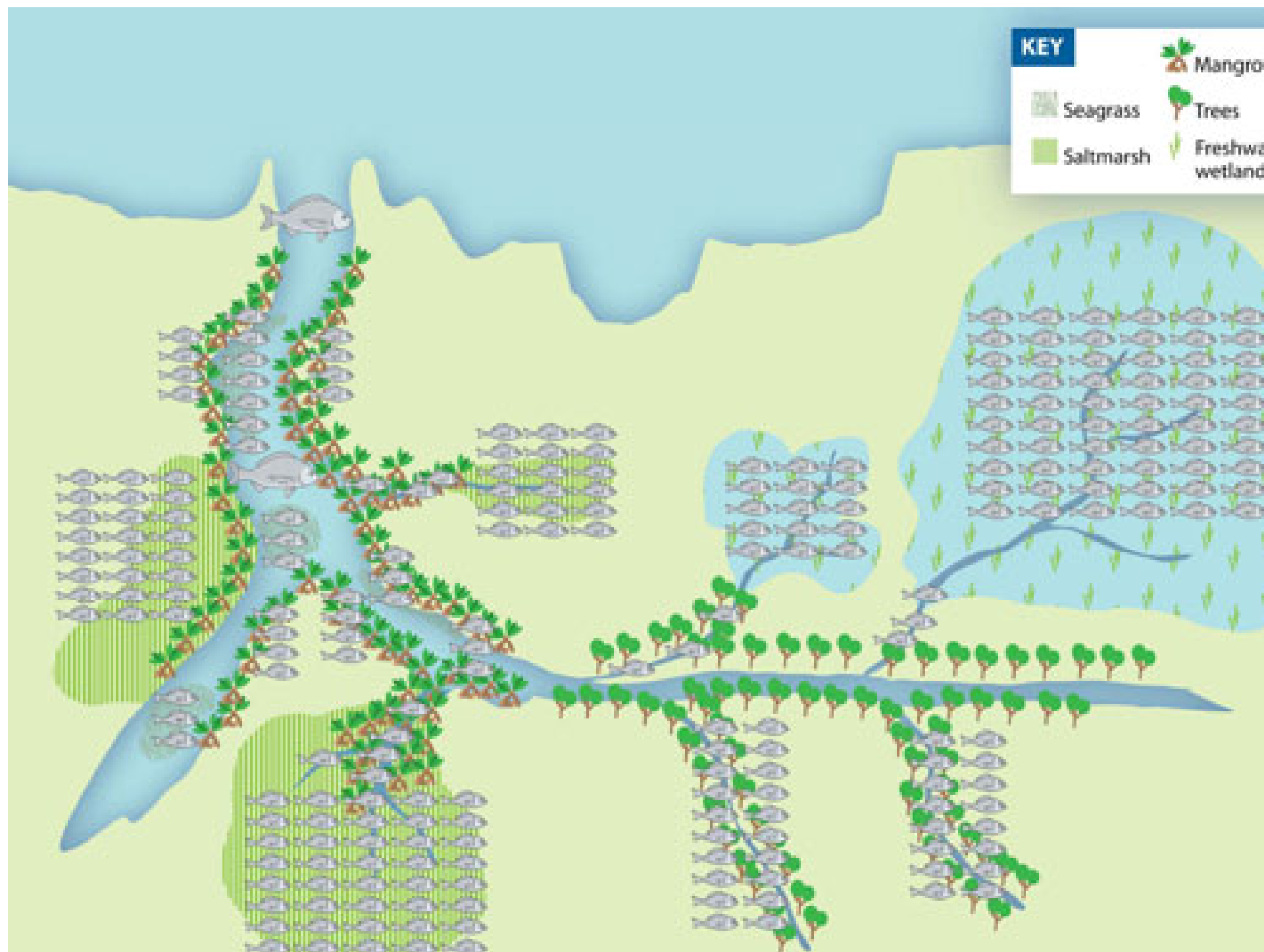
Seagrass

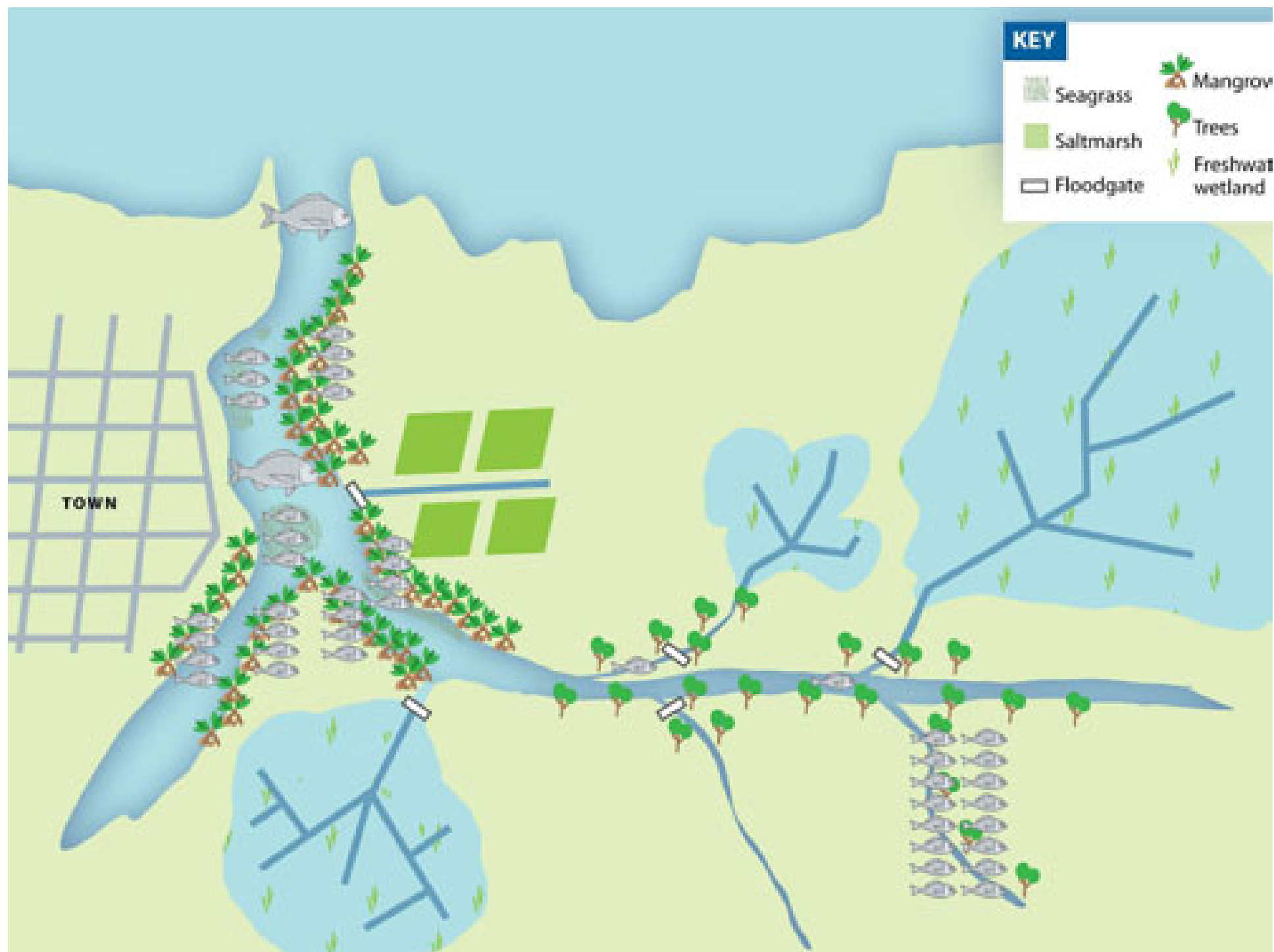
Saltmarsh

Mangrov

Trees

Freshwat
wetland





Carrying capacity

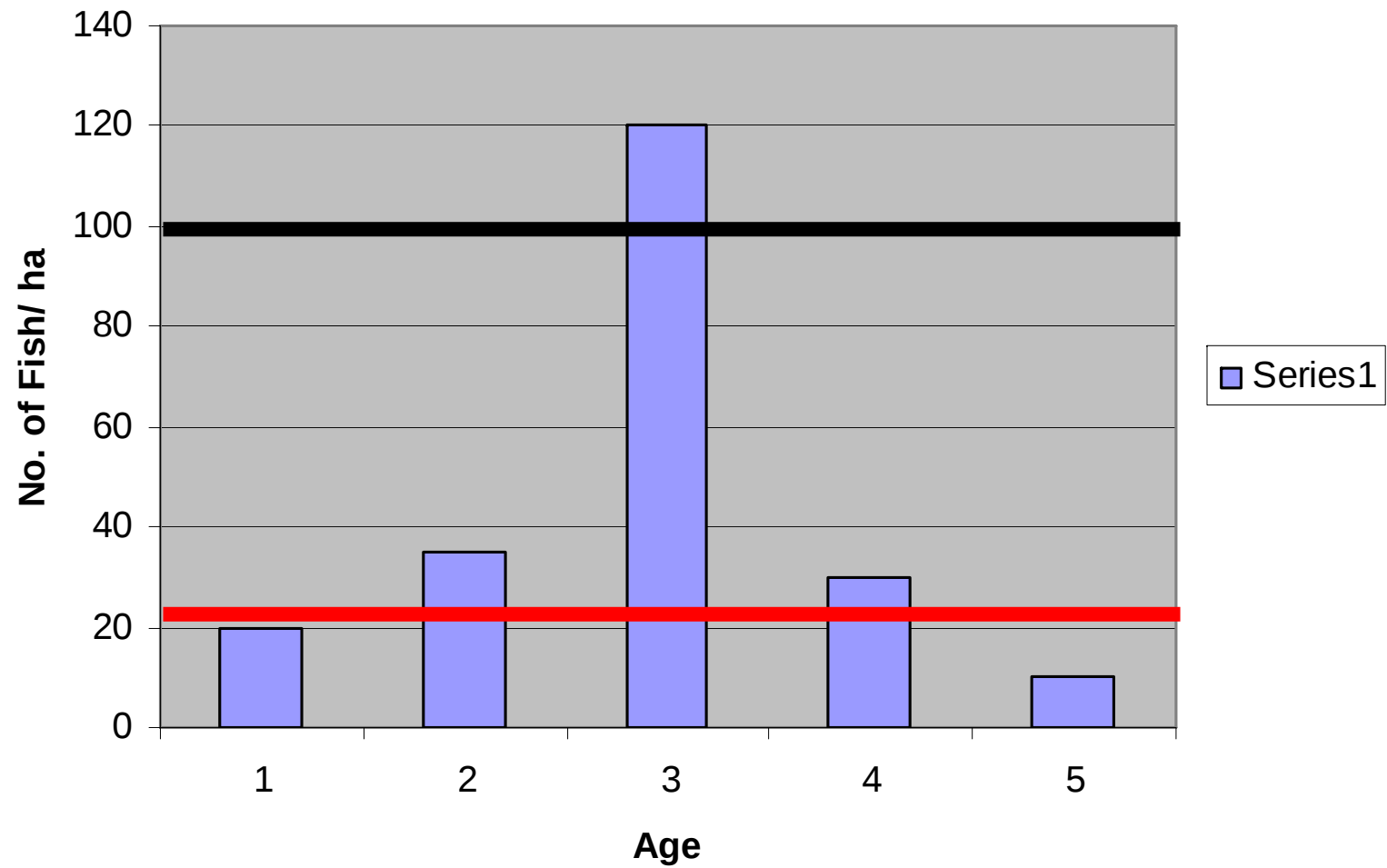
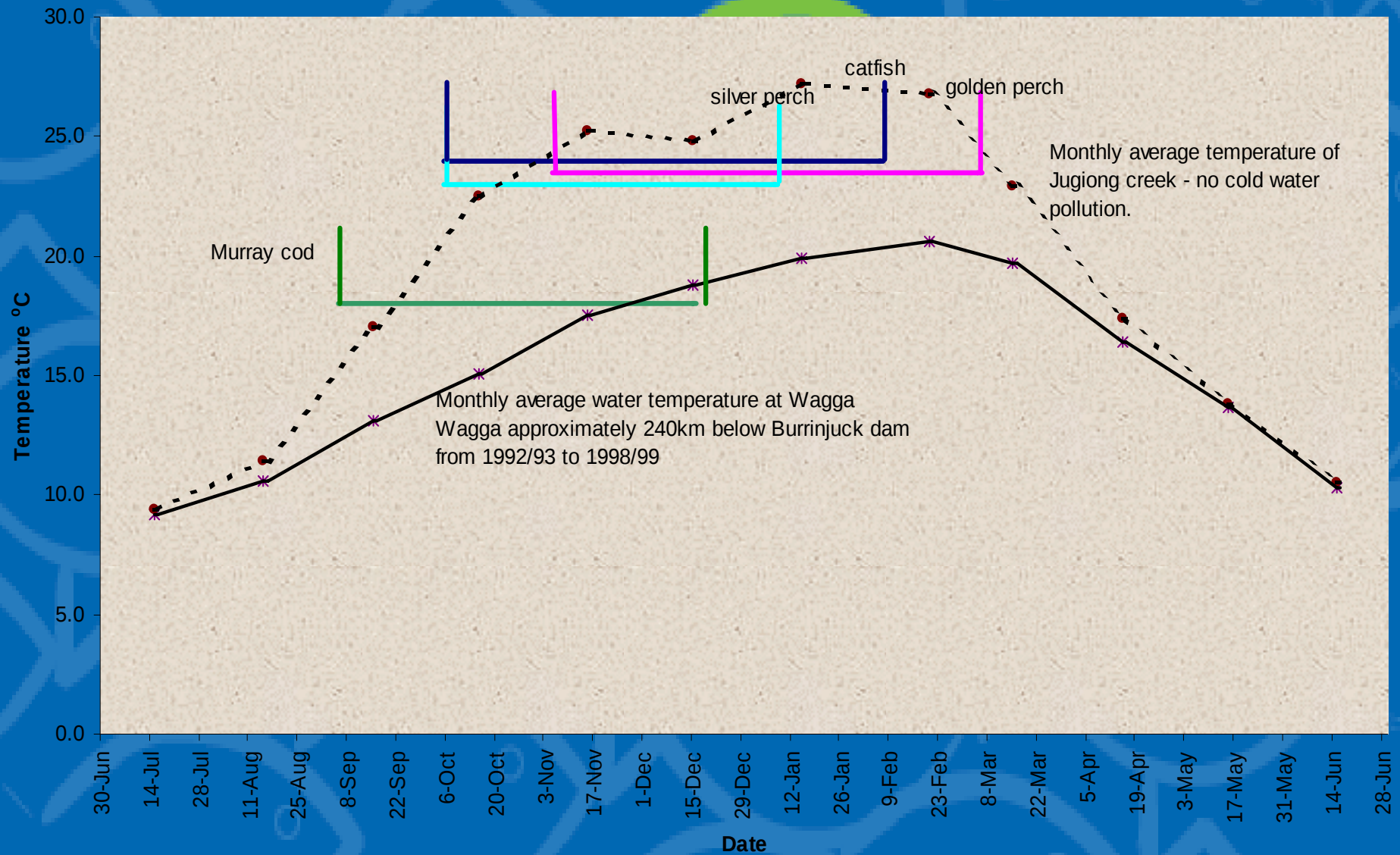
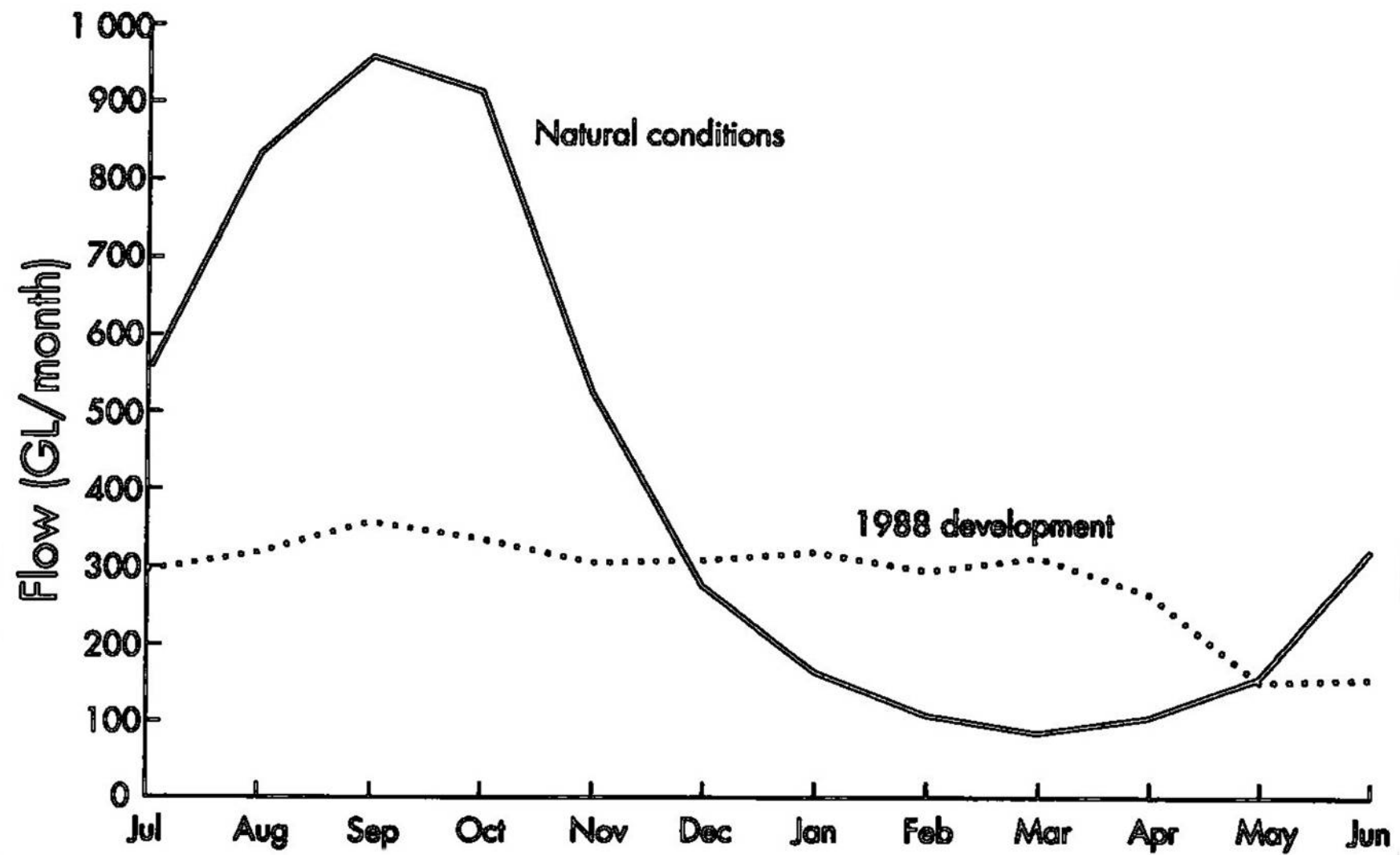


Figure 4: Observed water temperature of the Murrumbidgee river at Wagga Wagga and Jugiong Creek at Jugiong in comparison to fish spawning envelopes.





NSW State Weir Review Program





Image © 2009 GeoEye

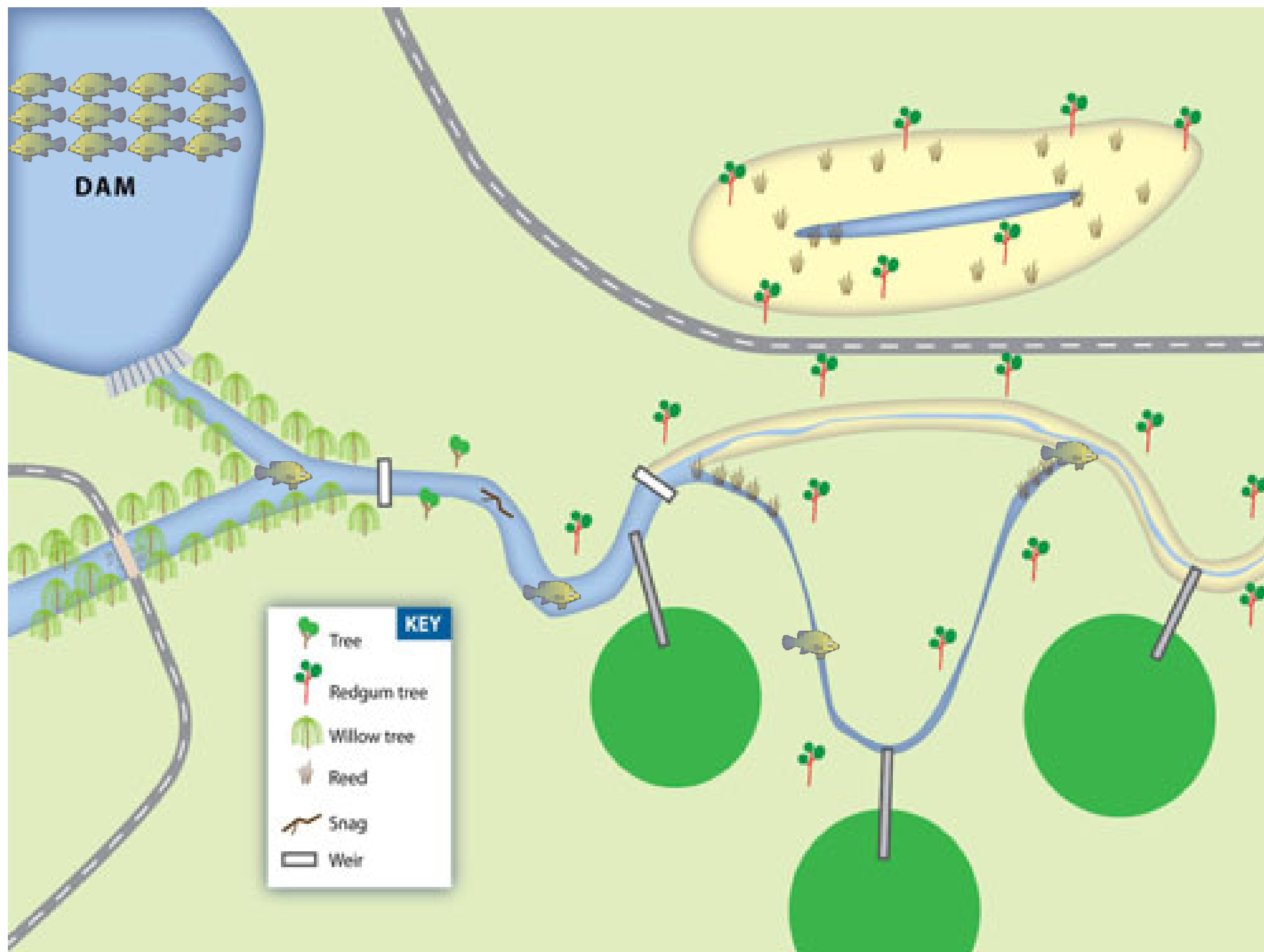
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Pointer: 30°57'26.95" S 152°59'27.09" E elev: 0 m Streaming 100%

Eye alt: 614 m





Summary

Recruitment success varies

Habitat loss has been massive

Increased habitat makes more fish

Finish

But what was it like?

- IF HOWEVER THE COUNTRY IS POOR, THE RIVER IS RICH IN THE MOST EXCELLENT FISH, PROCURABLE IN THE UTMOST ABUNDANCE. ...

FROM THE JOURNAL OF CHARLES STURT (1828-9): JANUARY, 1829, DARLING RIVER

- ... SAW THEIR SURFACE KEPT IN CONSTANT AGITATION BY THE LEAPING FISH, I DOUBTED WHETHER THE RIVER COULD SUPPLY ITSELF SO ABUNDANTLY ...

FROM THE JOURNAL OF THOMAS MITCHELL (1839): 1ST JUNE, 1835, DARLING RIVER AT BOURKE

- ... THE WATER BEING BEAUTIFULLY TRANSPARENT, THE BOTTOM WAS VISIBLE AT GREAT DEPTHS, SHOWING LARGE FISHES IN SHOALS, FLOATING LIKE BIRDS IN MID-AIR.

1960S REFLECTS THE EXPLORER'S ACCOUNTS OF THE QUALITY OF THE WATER:

- ... WE WERE LURE FISHING BEHIND A BOAT AND THE RIVER HAD STOPPED RUNNING AROUND HERE, AND YOU COULD ACTUALLY SEE THE FISH BEHIND, LIKE THIRTY METRES BEHIND THE BOAT, COME UP AND FOLLOW YOU DOWN THE RIVER THEN GO BACK TO THEIR LOG. ... YOU COULD SEE DOWN ABOUT TEN OR TWELVE FOOT. YEAH, IT WAS ACTUALLY CRYSTAL CLEAR.

Thanks

Dr Iain Suthers UNSW

Jenny Grant NSW DPI