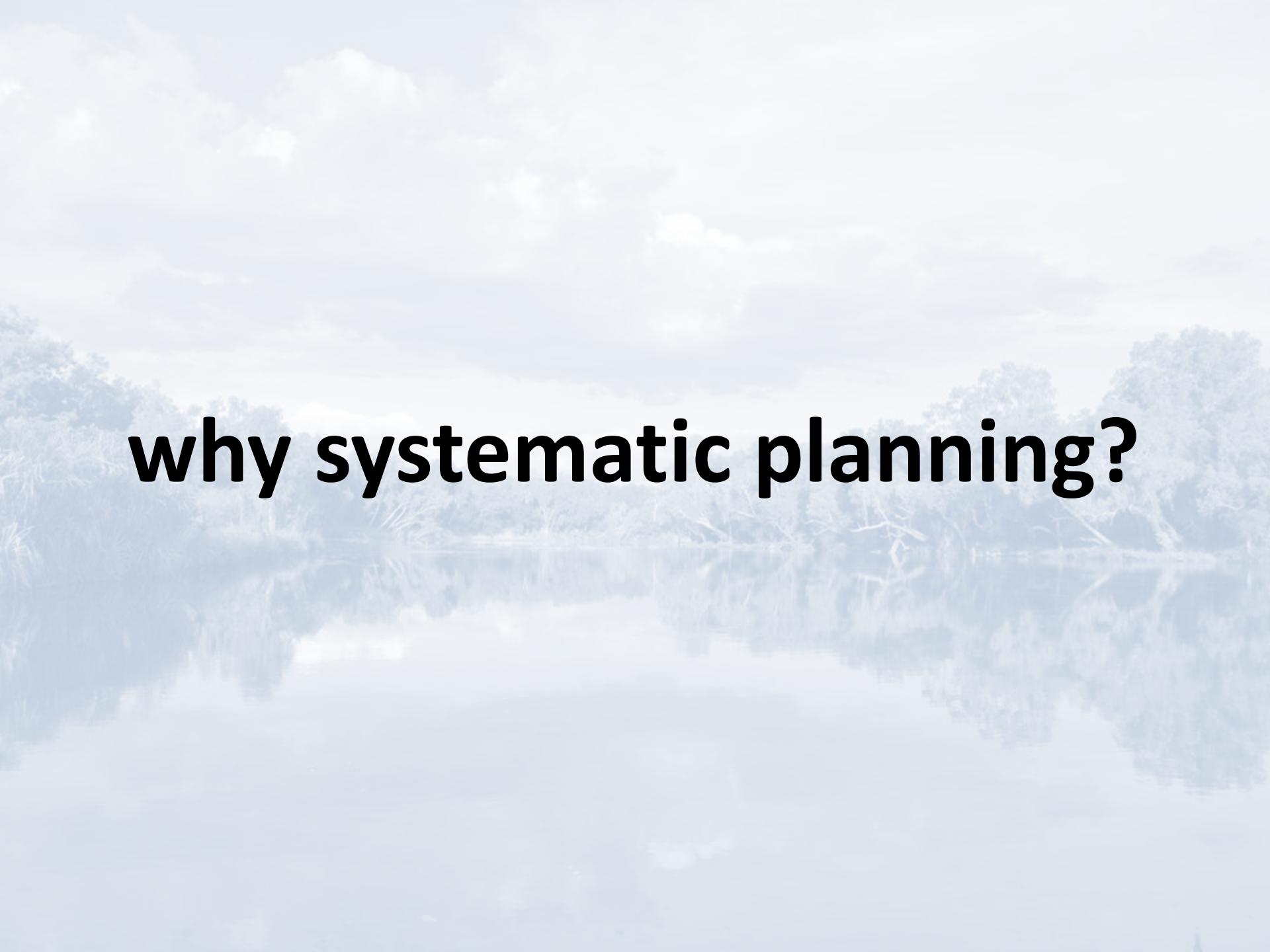


# Freshwater conservation planning: a systematic view

Virgilio Hermoso, Simon Linke, Eren Turak,  
Jeanne Nel & Michele Thieme



The background of the slide features a soft, out-of-focus photograph of a natural landscape. It depicts a body of water, likely a lake or river, with a dense line of trees visible along the far bank. The sky above is filled with scattered, wispy clouds. The overall effect is one of tranquility and reflection, which serves as a fitting backdrop for the main title.

# **why systematic planning?**



*Yosemite NP, USA*



*Berchtesgaden NP, Germany*



Kakadu NP, Australia



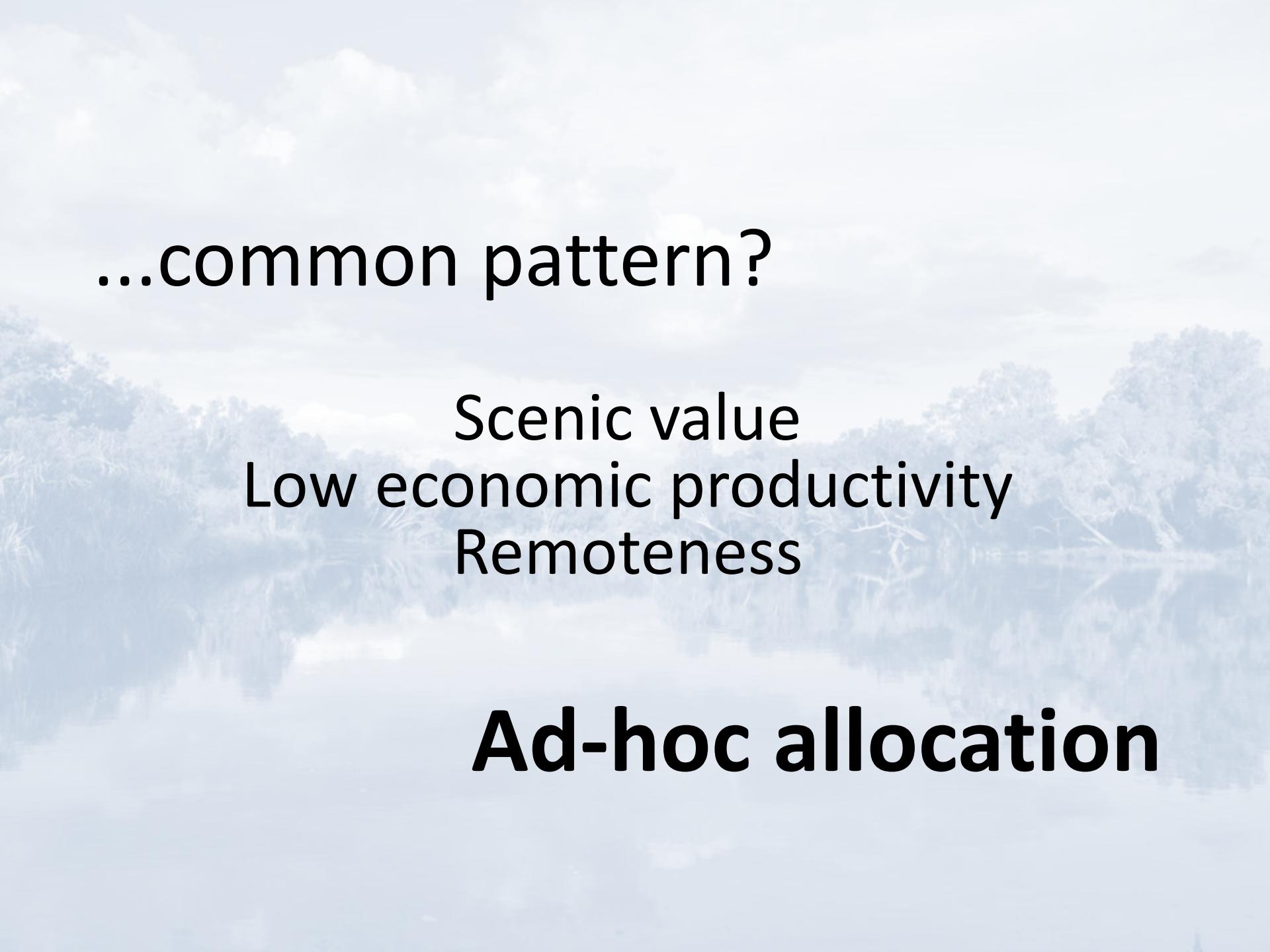
*Yasuni NP, Ecuador*



Ordesa NP, Spain



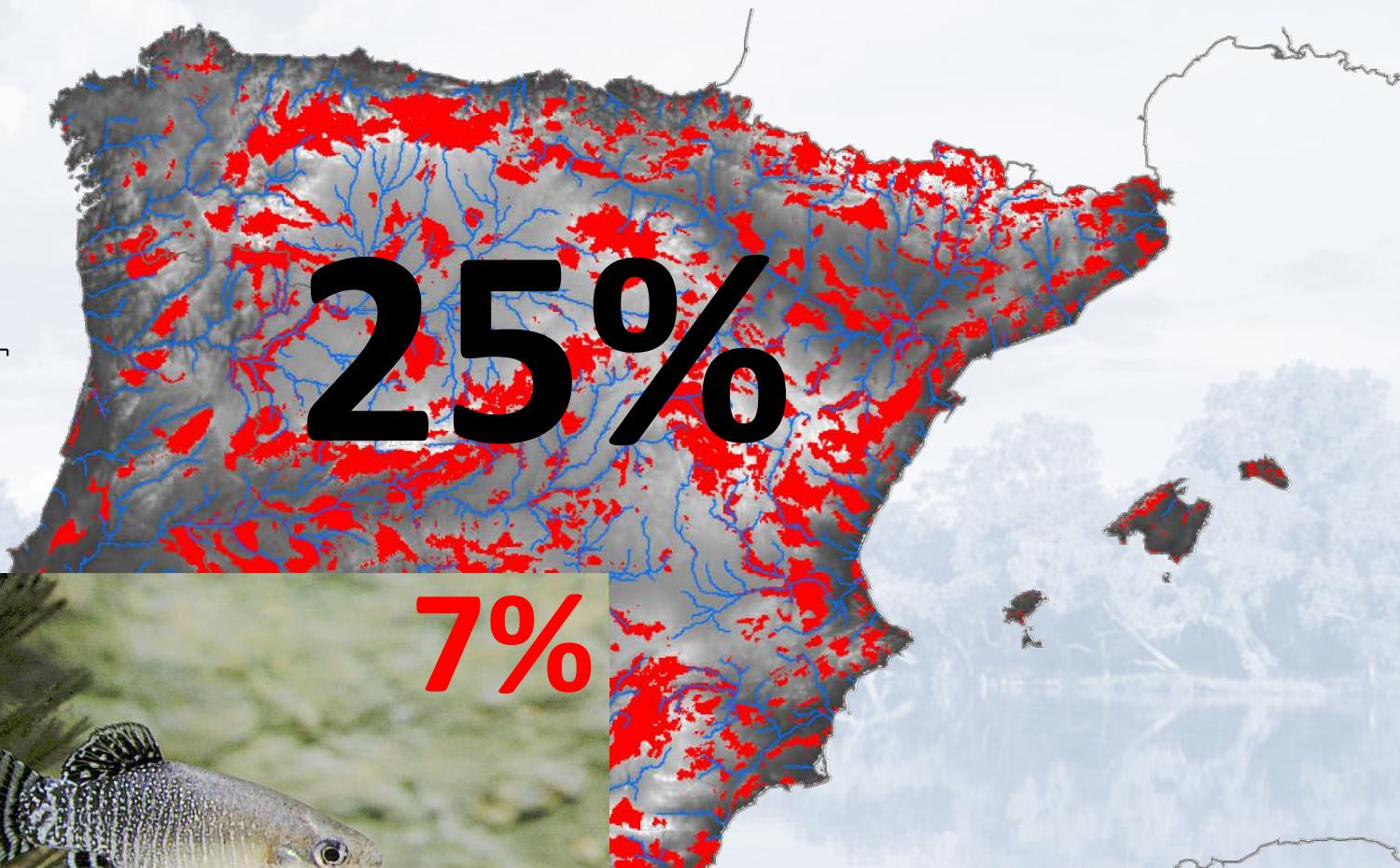
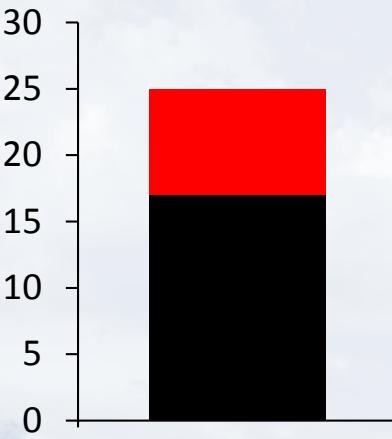
*Canaima NP, Venezuela*

A faint, grayscale photograph of a natural landscape serves as the background. It depicts a calm body of water in the foreground, with dense foliage and trees lining the banks. In the distance, there are hills or mountains under a cloudy sky.

...common pattern?

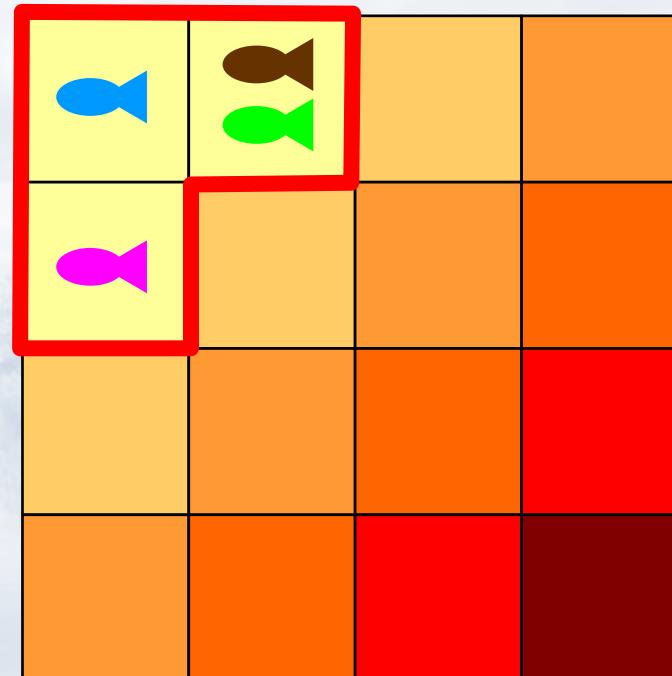
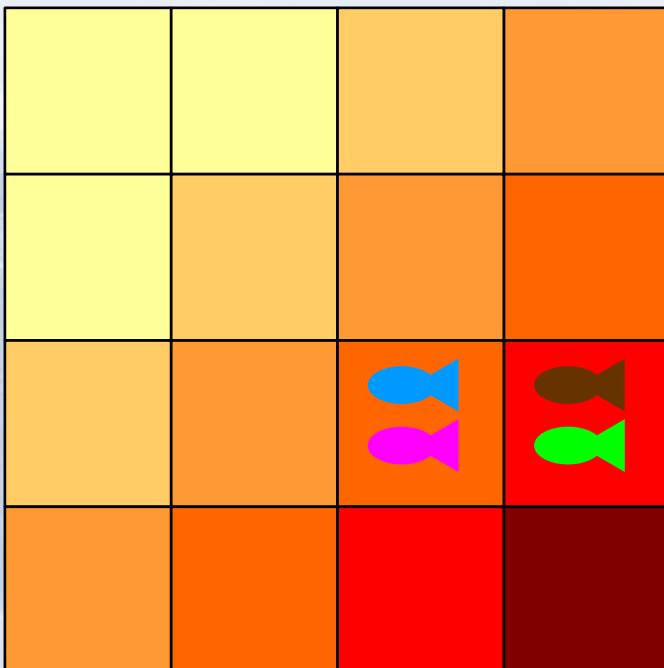
Scenic value  
Low economic productivity  
Remoteness

Ad-hoc allocation



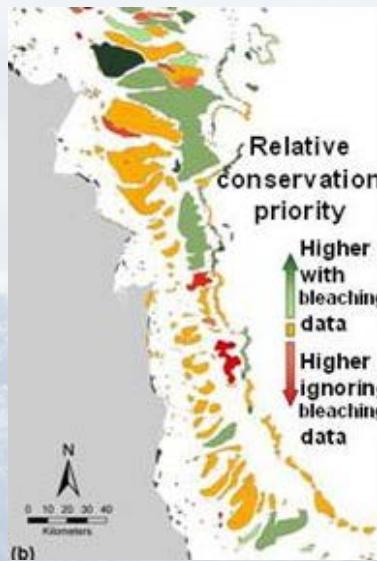
# What's systematic planning?

Representativeness & cost-effectiveness

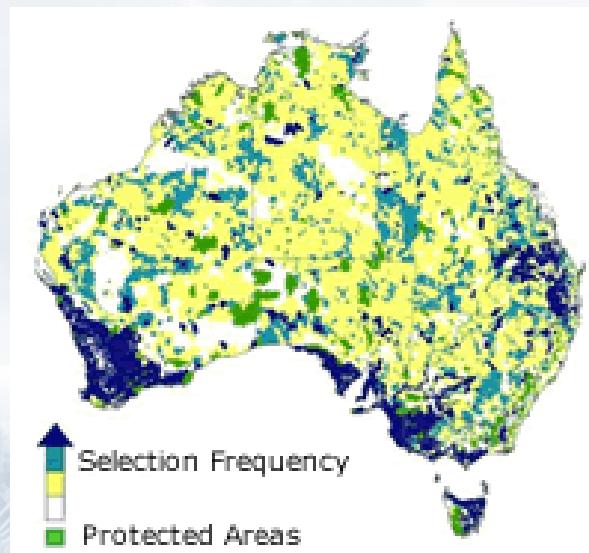


- expensive +

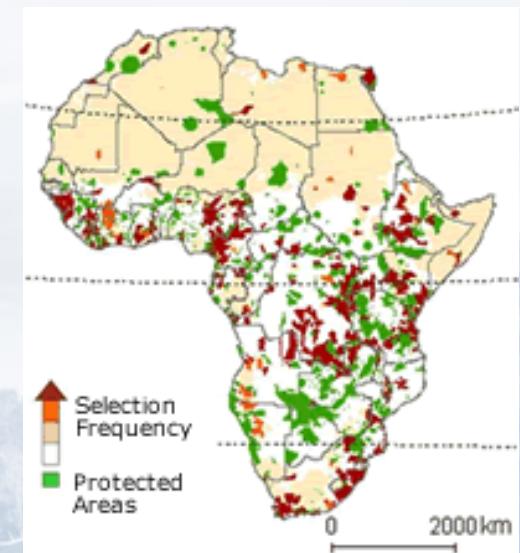
# How do we do it?



Game et al. (2008) *Ecol App*



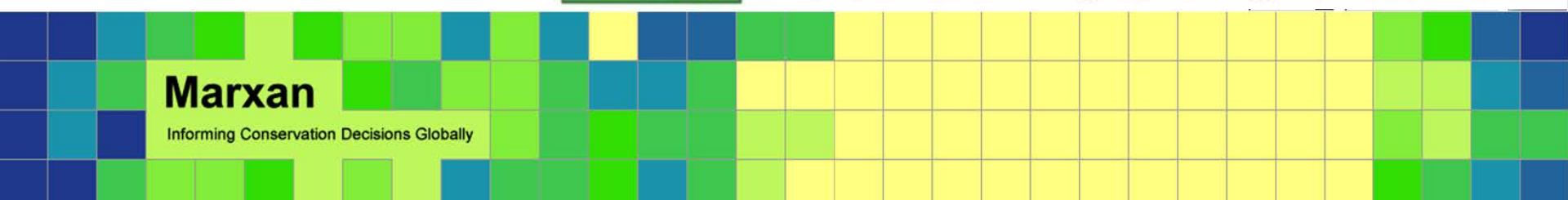
Klein et al. (2008) *Biol Cons*



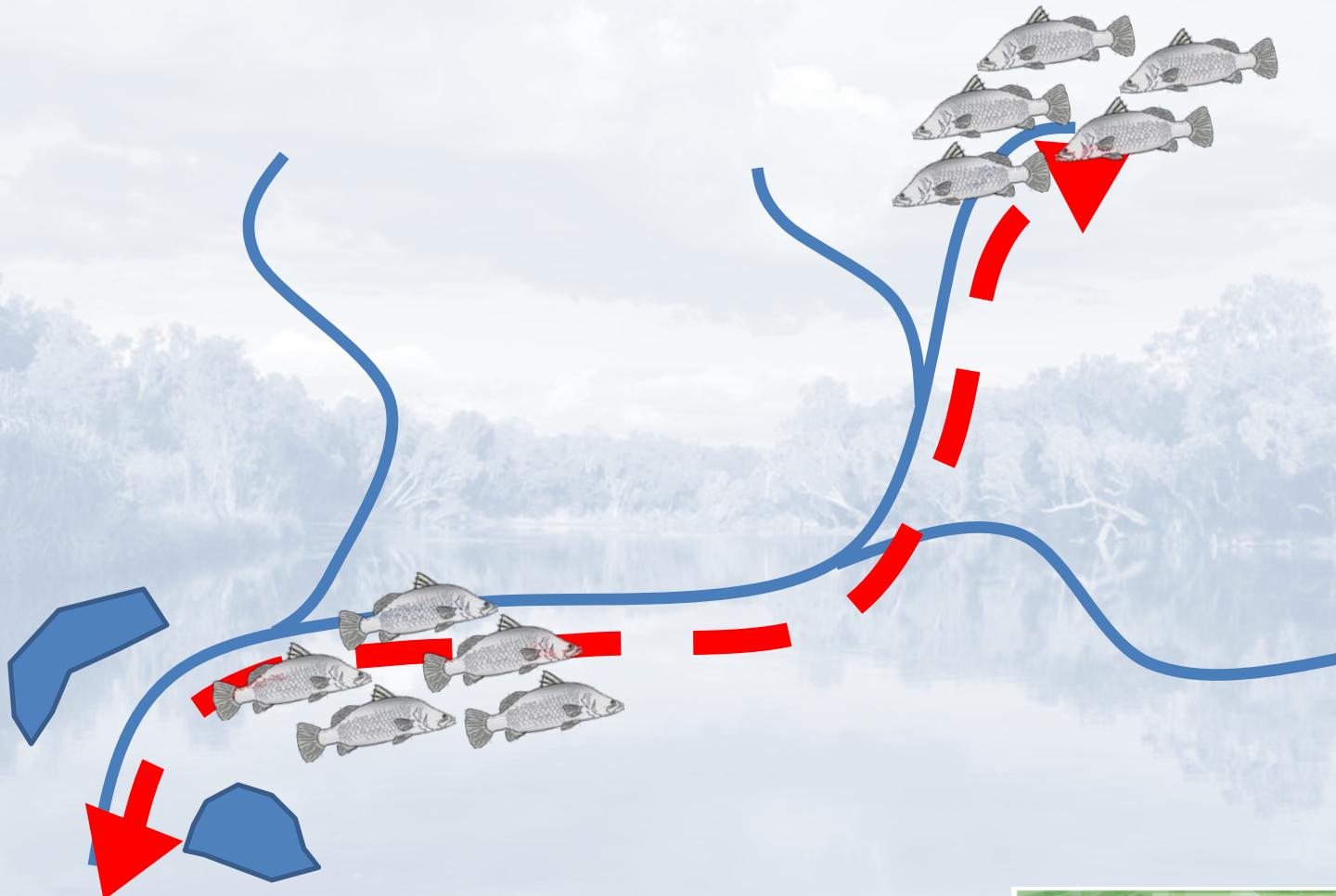
Rondinini et al. (2006) *Biol Cons*



**ZONATION**  
Conservation planning software



# ...what about freshwater ecosystems?



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<sup>†</sup>The Ecology Centre, School of Integrative Biology, University of Queensland, St Lucia, Qld, Australia

# ...what about freshwater ecosystems?



Addressing longitudinal connectivity in the systematic conservation planning of fresh waters

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# ...what about freshwater ecosystems?



Journal of Applied Ecology

Journal of Applied Ecology 2012, 49, 1036–1045



doi: 10.1111/j.1365-2664.2012.02177.x

**Merging connectivity rules and large-scale condition assessment improves conservation adequacy in river systems**

Simon Linke<sup>1,2\*</sup>, Mark J. Kennard<sup>1,3</sup>, Virgilio Hermoso<sup>1,2</sup>, Julian D. Olden<sup>4</sup>, Janet Stein<sup>5</sup> and Bradley J. Pusey<sup>1,3</sup>

Freshwater Biology

Freshwater Biology (2011) 56, 57–70

Freshwater Biology

doi:10.1111/j.1365-2427.2009.02390.x

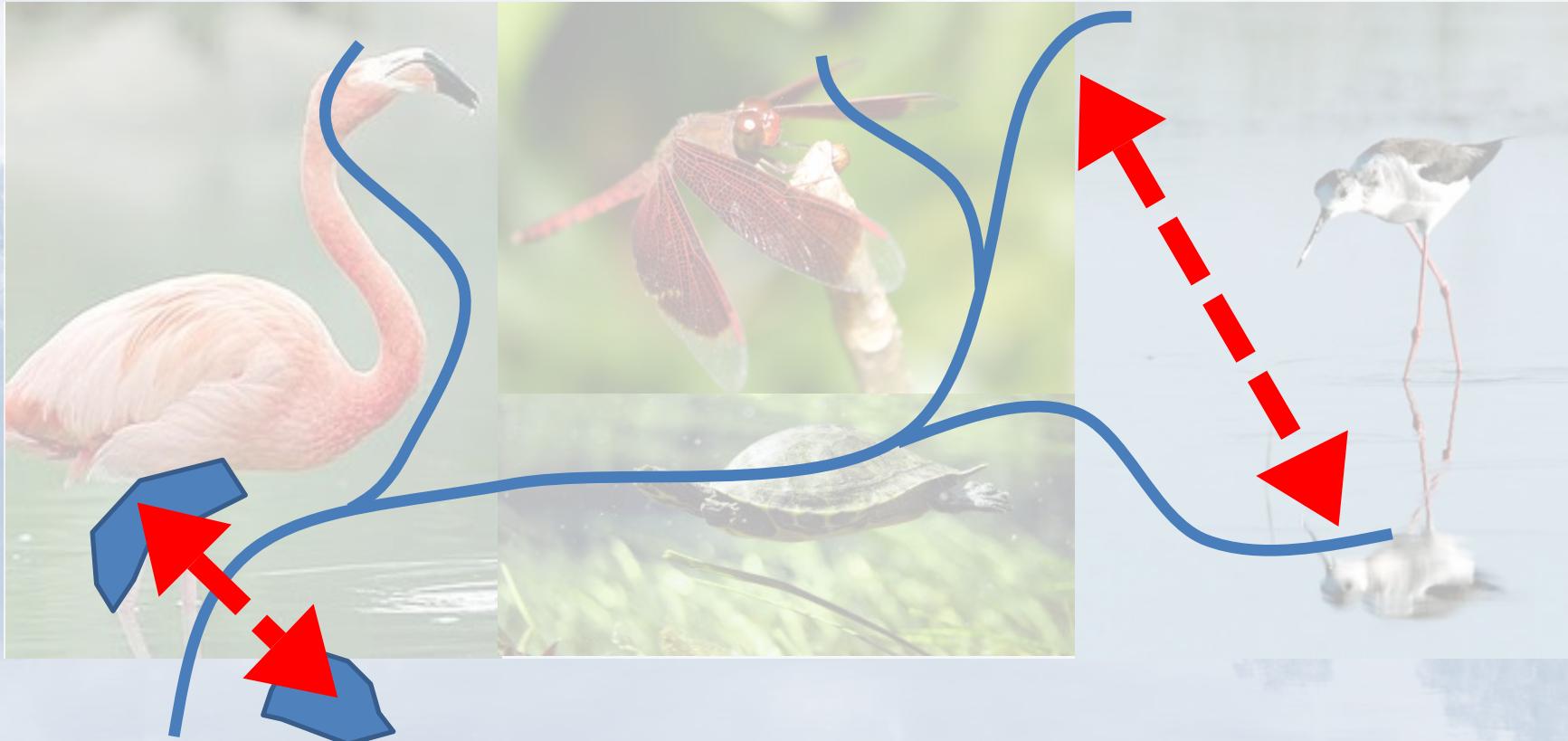
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# ...what about freshwater ecosystems?

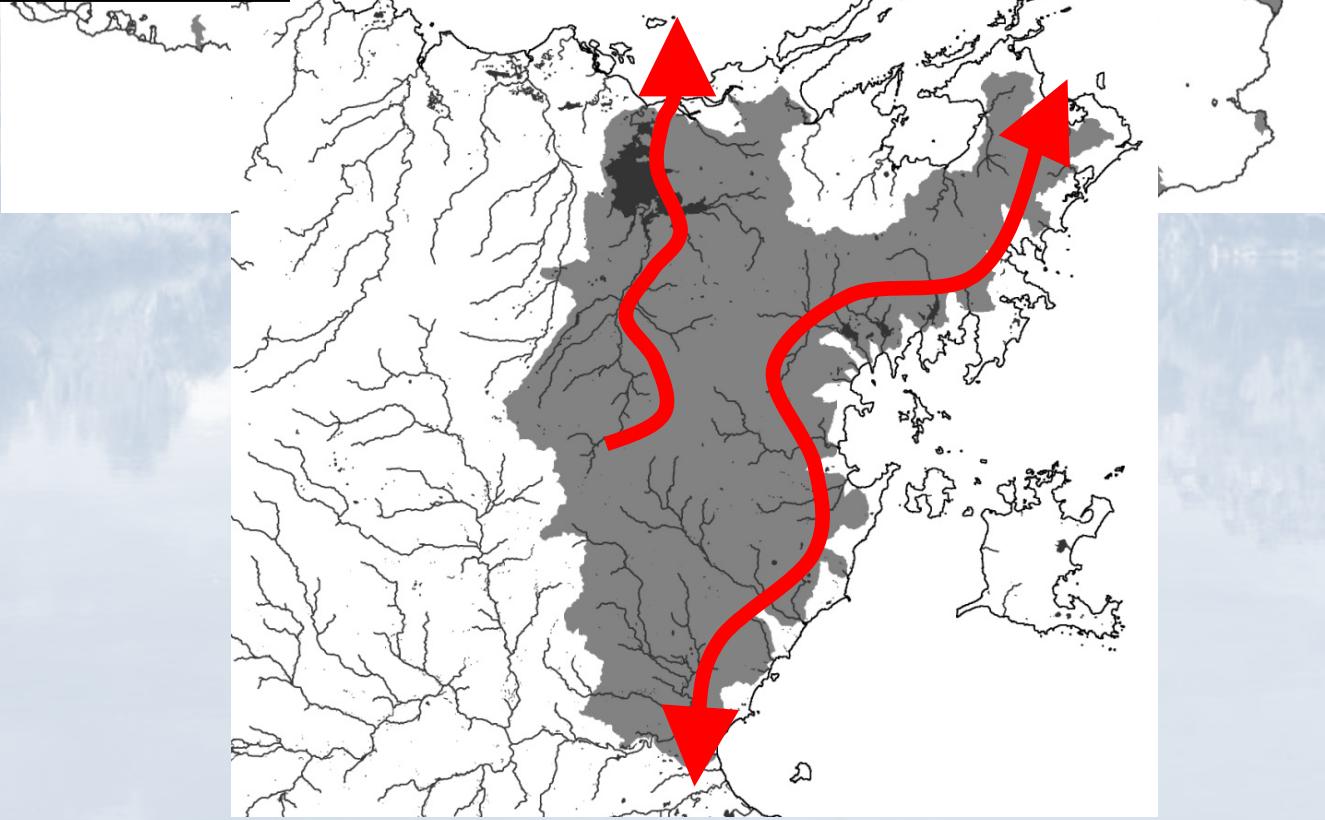
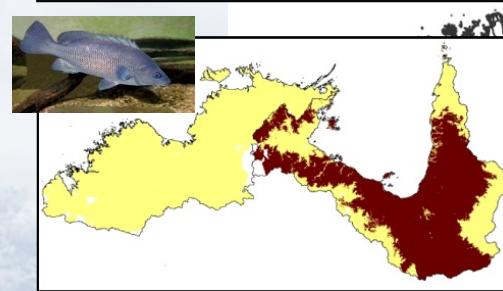
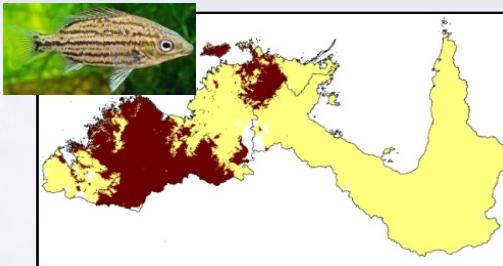


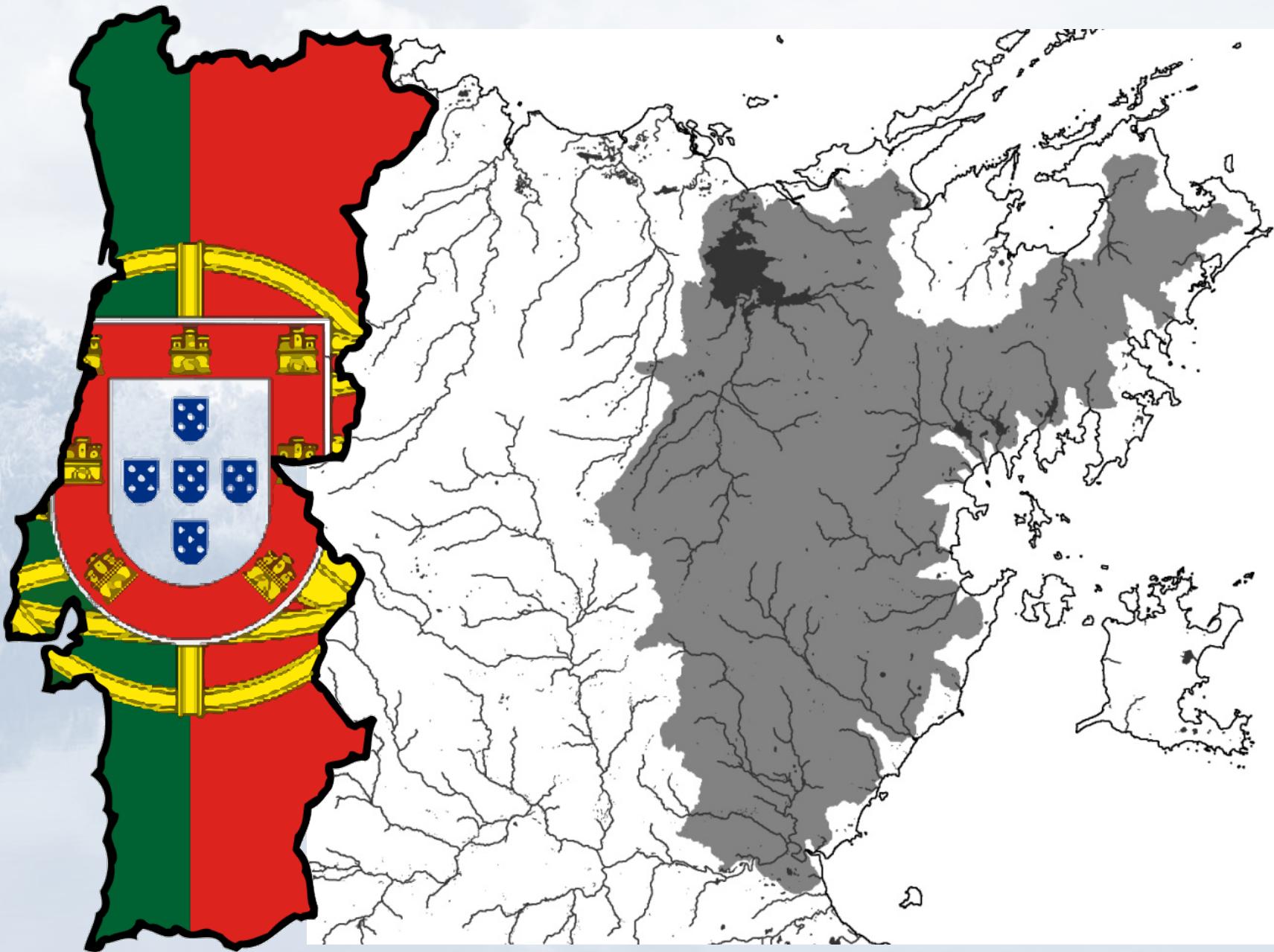
Diversity and Distributions, (Diversity Distrib.) (2012) 18, 448–458



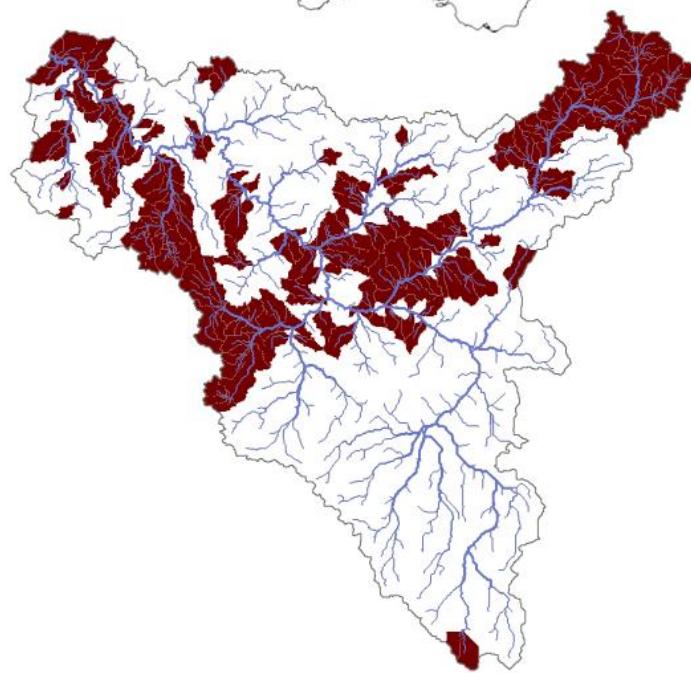
Integrating multidirectional connectivity  
requirements in systematic conservation  
planning for freshwater systems

Virgilio Hermoso\*, Mark J. Kennard and Simon Linke





## Traditional



■ Priority areas for conservation



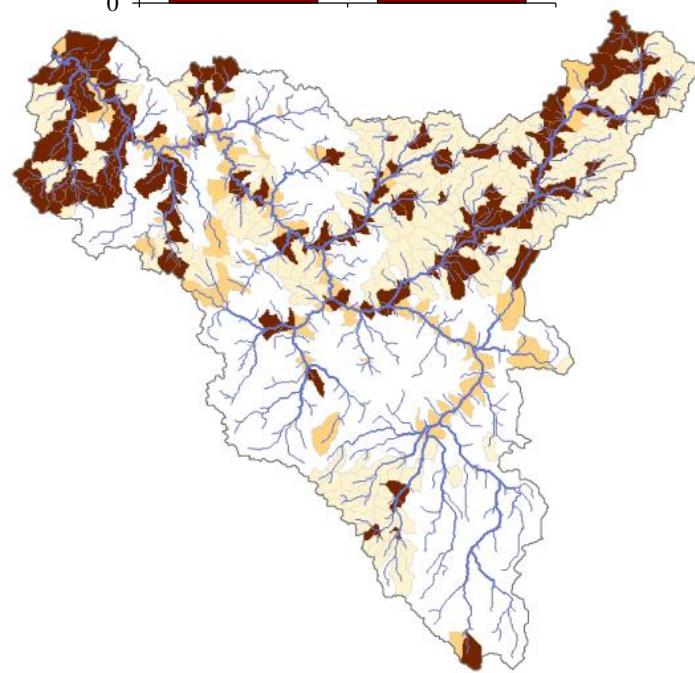
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50

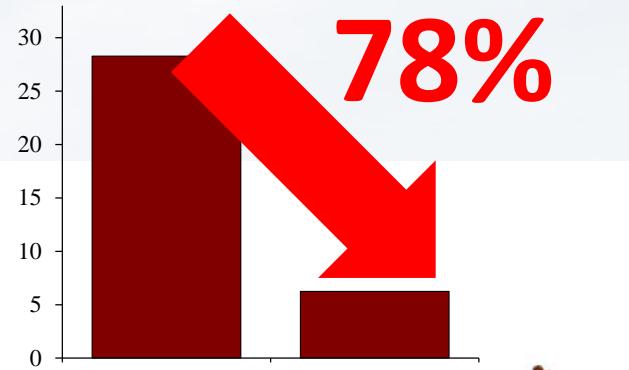
100

Kilometers

## Multi-zoning

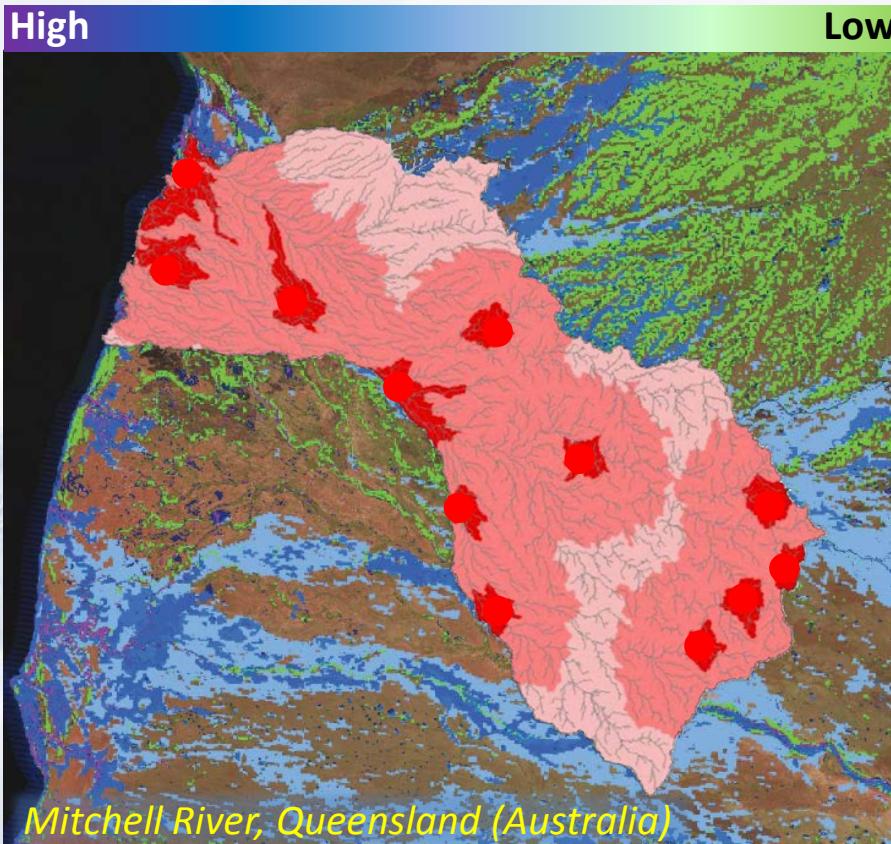


■ Freshwater focal areas  
■ Critical management zones  
■ Catchment management zones



# Temporary freshwater ecosystems

## Water residency time



Diversity and Distributions, (Diversity Distrib.) (2013) 1–12



Prioritizing refugia for freshwater biodiversity conservation in highly seasonal ecosystems

Virgilio Hermoso\*, Doug P. Ward and Mark J. Kennard

Journal of Applied Ecology

Journal of Applied Ecology 2012, 49, 1028–1035



doi: 10.1111/j.1365-2664.2012.02191.x

Using water residency time to enhance spatio-temporal connectivity for conservation planning in seasonally dynamic freshwater ecosystems

Virgilio Hermoso\*, Doug P. Ward and Mark J. Kennard

Australian Rivers Institute and Tropical Rivers and Coastal Knowledge, National Environmental Research Program Northern Australian Hub, Griffith University, Nathan, Qld, 4111, Australia

# Wrapping up...

**We can address key ecological processes that support freshwater biodiversity in conservation planning**

**This will help improve our capacity to manage freshwater ecosystems for conservation**

**Now we need to consider new and novel methods to improve efficiency to make solutions more implementable**

# Thank you

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National Environmental  
Research Program

NORTHERN AUSTRALIA hub

 Griffith  
UNIVERSITY  
Australian Rivers Institute