

Fisher's local ecological knowledge improves understanding of temporal changes on fishing resources in tropical rivers

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Photo: Anais Prestes



— Laboratório de —
Ecologia Humana
— e Peixes —



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Research Project: Linking sustainability of small-scale fisheries, fishers' knowledge, conservation and co-management of biodiversity in large rivers of the Brazilian Amazon



PEER Cycle 4

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trackingchange

Local and Traditional Knowledge in Watershed Governance

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Coordinated by Brenda Parlee, University of Alberta

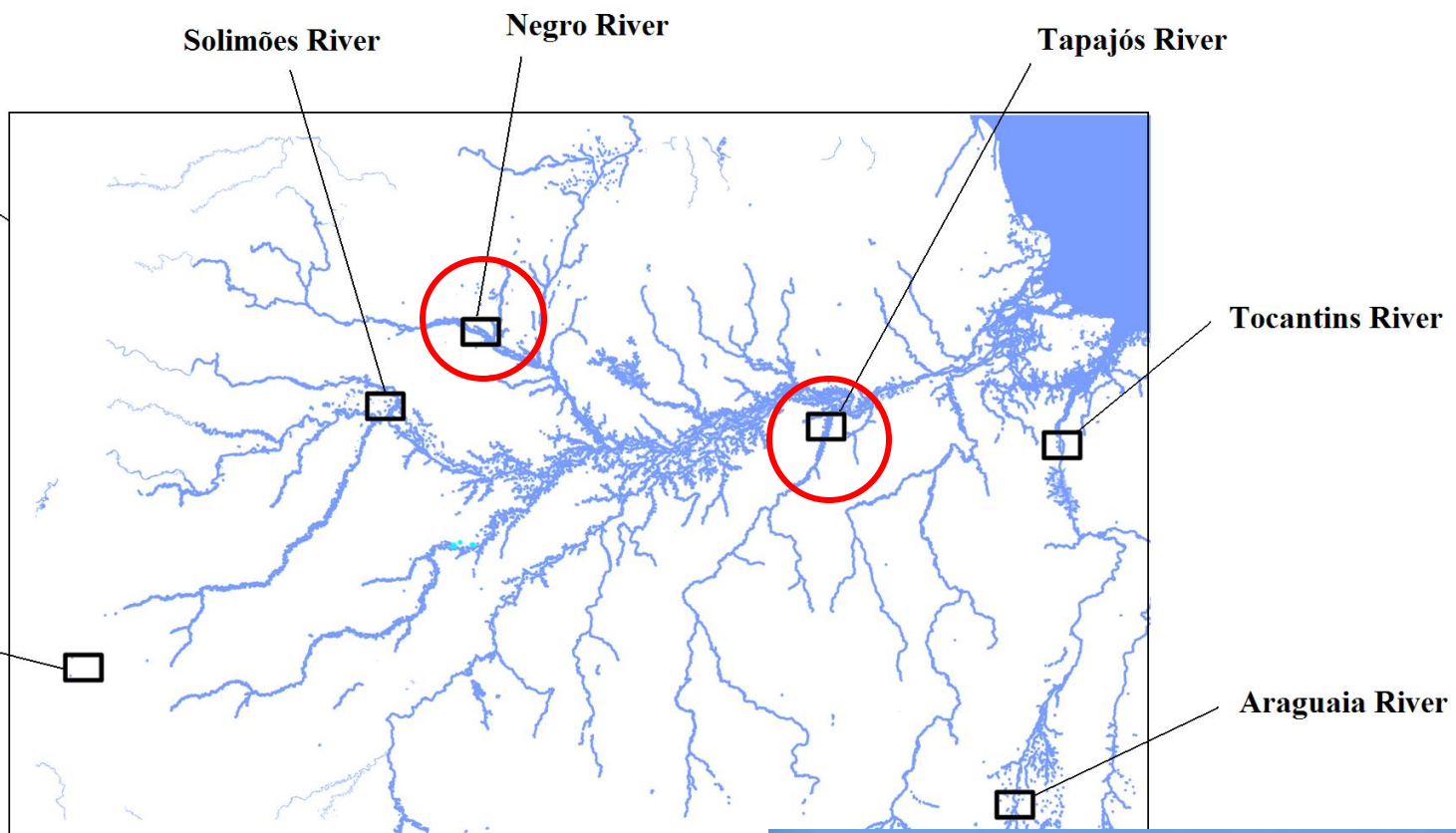


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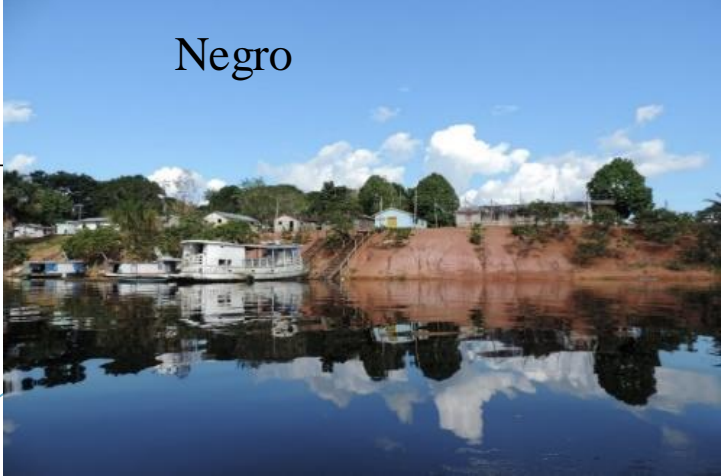
Brazilian Amazon



Km



Tapajós



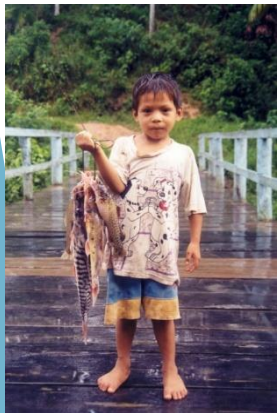
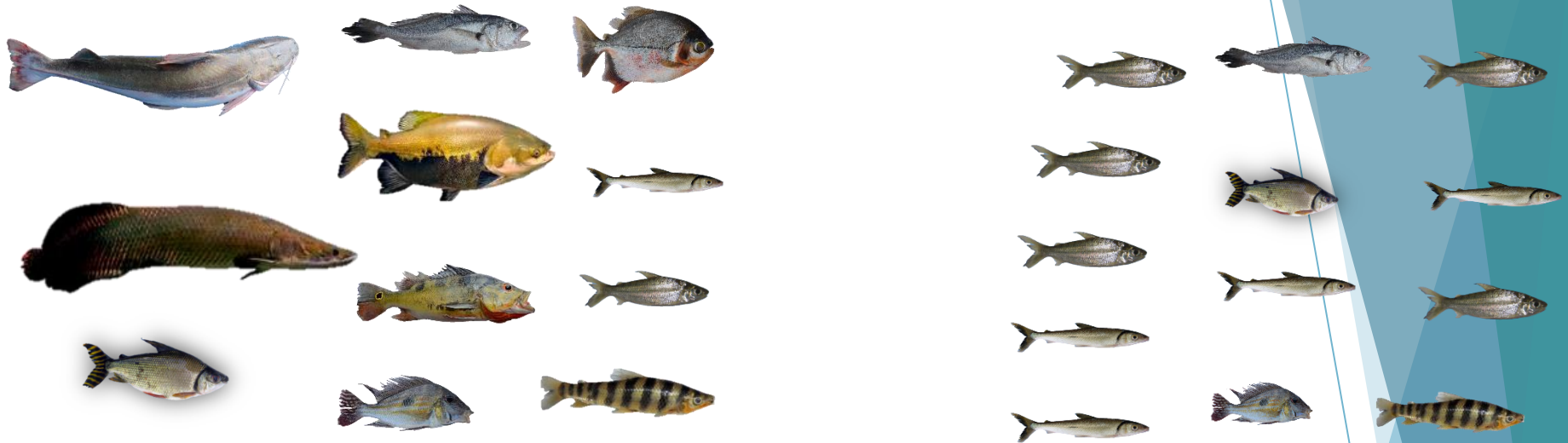
Negro

Brazilian Amazon as study case for tropical freshwater fisheries

- Small-scale fisheries important for local economy and food security
- People affect (overfishing) and are affected (food supply) by fish
- Lack of scientific information on fisheries and fish
- Fishers have good and detailed knowledge about fish: fill data gaps



Temporal change on freshwater fish assemblages: Fishing down = decline on fish size (Welcomme 1999)



- Fishing pressure
- New fishing gear
- Market demand for fish



Main goals:

- Analyze fishers' local ecological knowledge (LEK) on temporal trends of composition and abundance of fish catches.
- Comparing these perceived trends inside X outside protected areas in two rivers in the Brazilian Amazon.

Hypotheses:

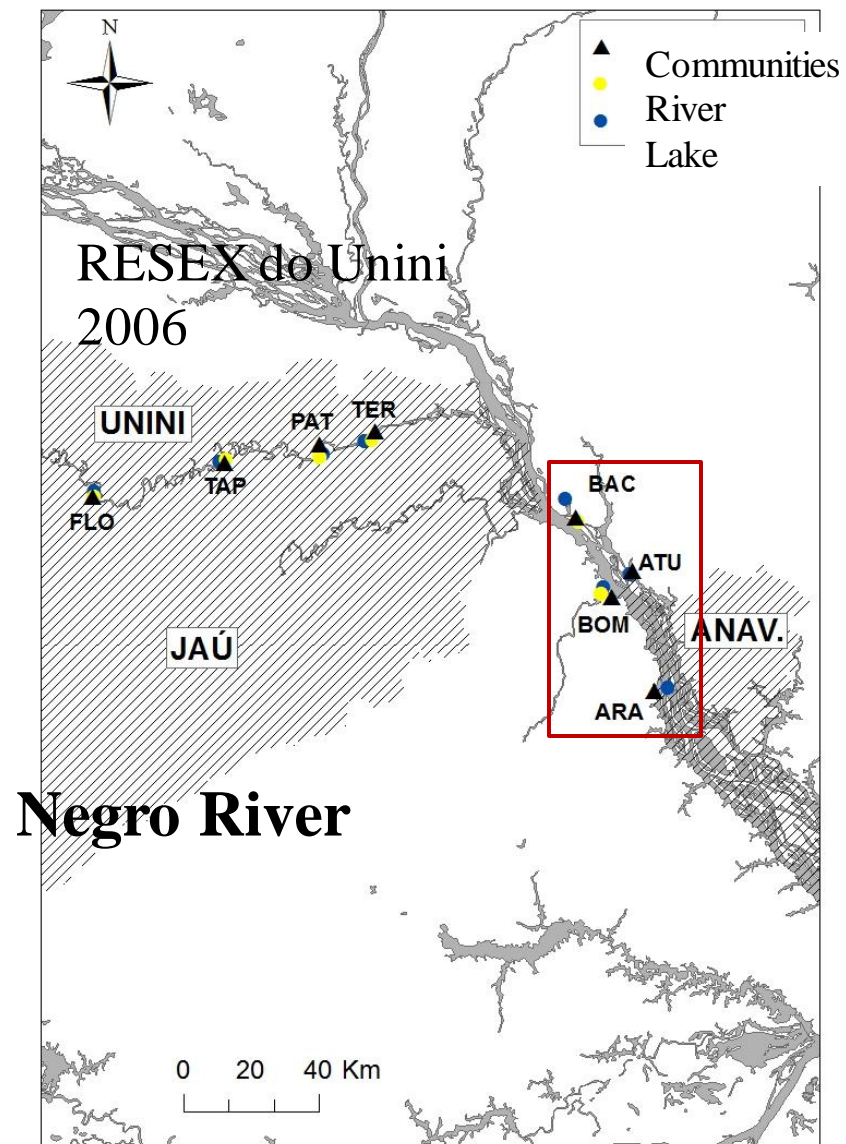
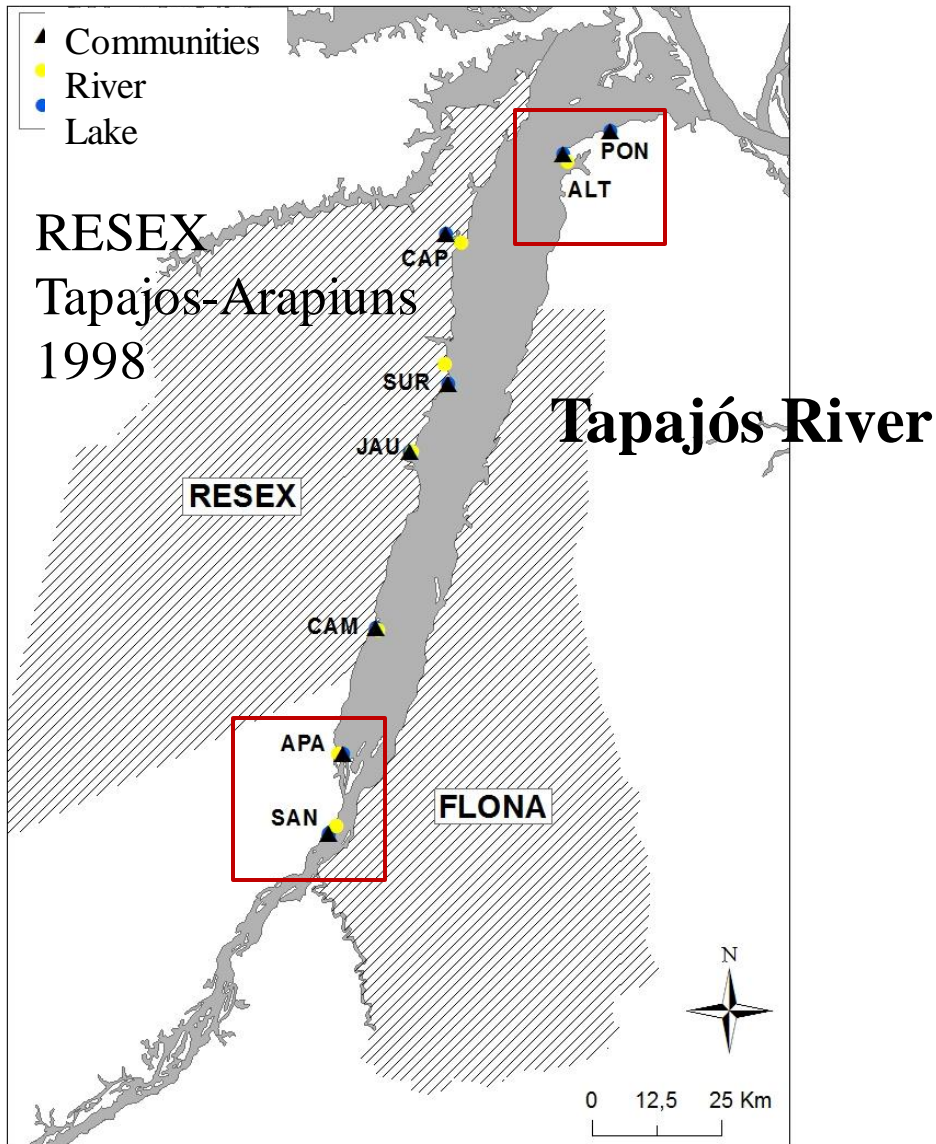
- Changed composition with a decline on fish abundance over time
- Protected areas show none or less changes or declines

Past (20 years ago)



Actual





16 fishing communities, 8 in Tapajós and 8 in Negro River, 4 inside, 4 outside (red squares) Extractive Reserves (RESEX).

Methods

- Individual interviews with fishers: standard questionnaire with 31 questions
- 5 main fish species (or groups of species) caught now (2016) and 20 years ago
- Changes on abundance of most caught fish now: increased, same, decreased
- Snow-ball sampling:

Tapajos River: 161 fishers (154 male, 7 female), average age = 48.2 years (\pm 12.7)

Negro River: 120 fishers (110 male, 10 female), average age = 39.5 years (\pm 13.5)



Results

Tapajos: fishers cited 43 fish species (names)

- 36 in the RESEX
- 31 outside



- 29 in the RESEX
- 28 outside

Past (20 years ago)

Actual



1998

2006

1996

2016

RESEX Tapajós-Arapiuns

RESEX Unini

Negro: fishers cited a total of 32 fish species (names)

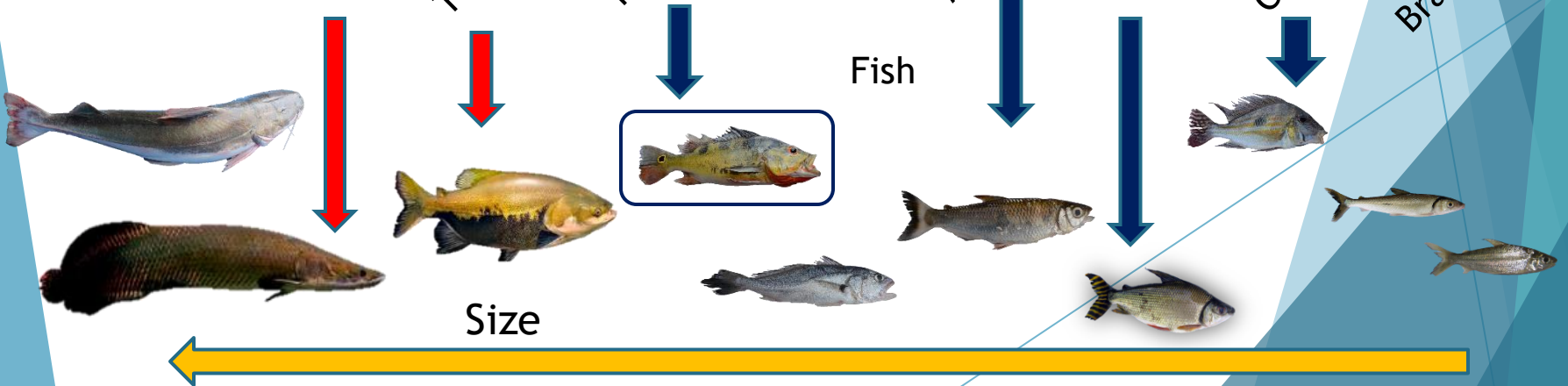
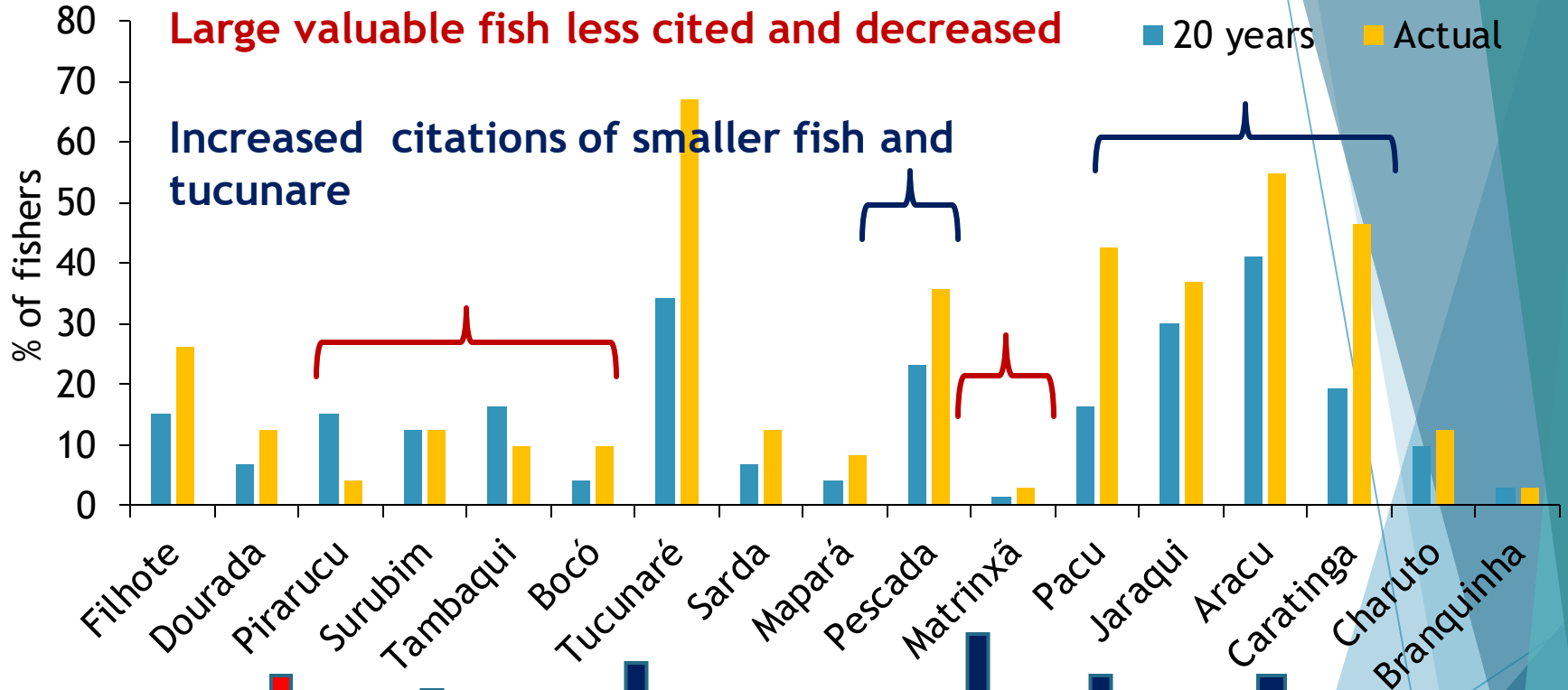
- 28 in the RESEX
- 13 outside



- 15 in the RESEX
- 16 outside

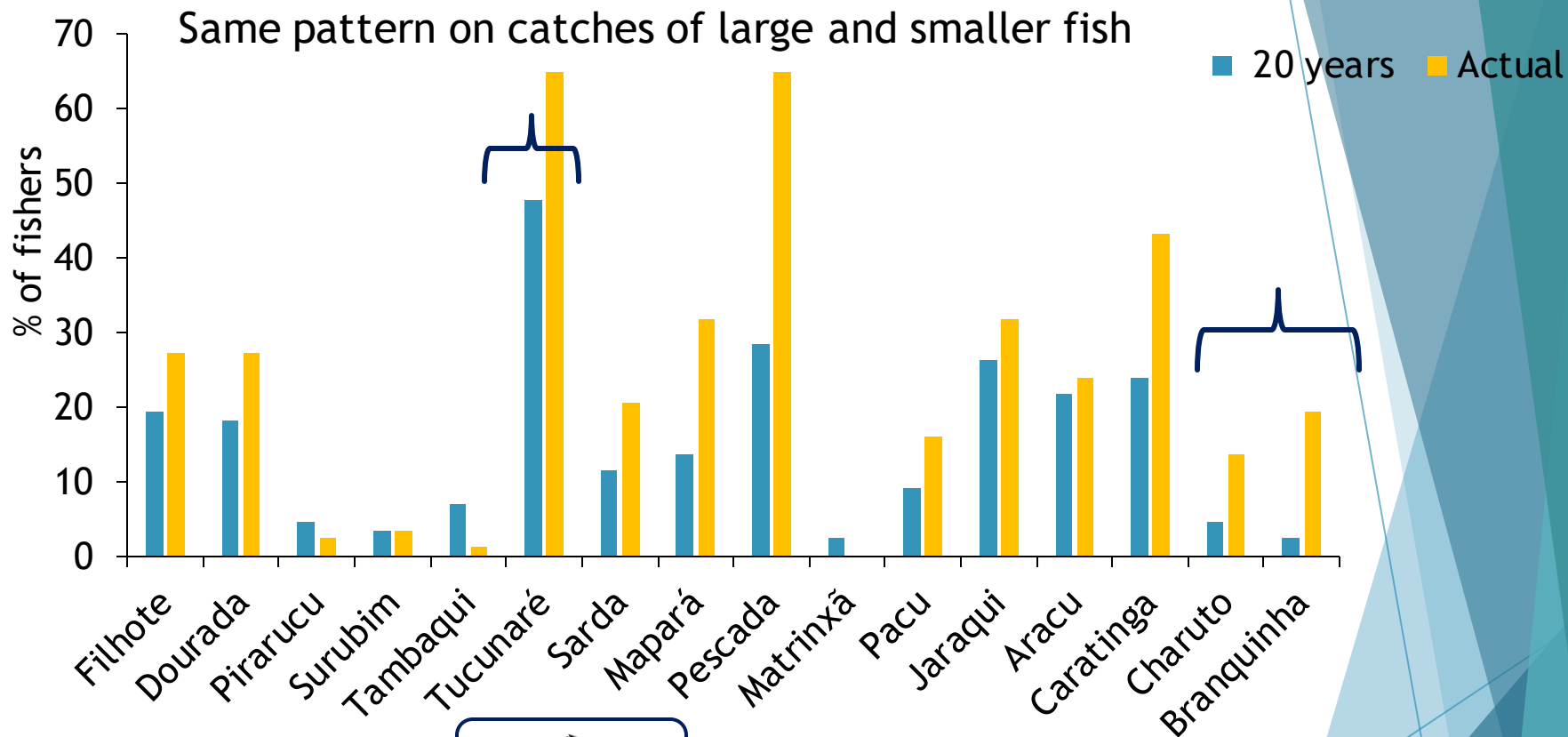
Tapajos: similar fish caught now and in the past outside = 79.7 % similarity

Tapajos Outside (n= 73 fishers)



Similar fish caught now and in the past inside RESEX = 83.24 % similarity

Tapajos RESEX (n= 88 fishers)



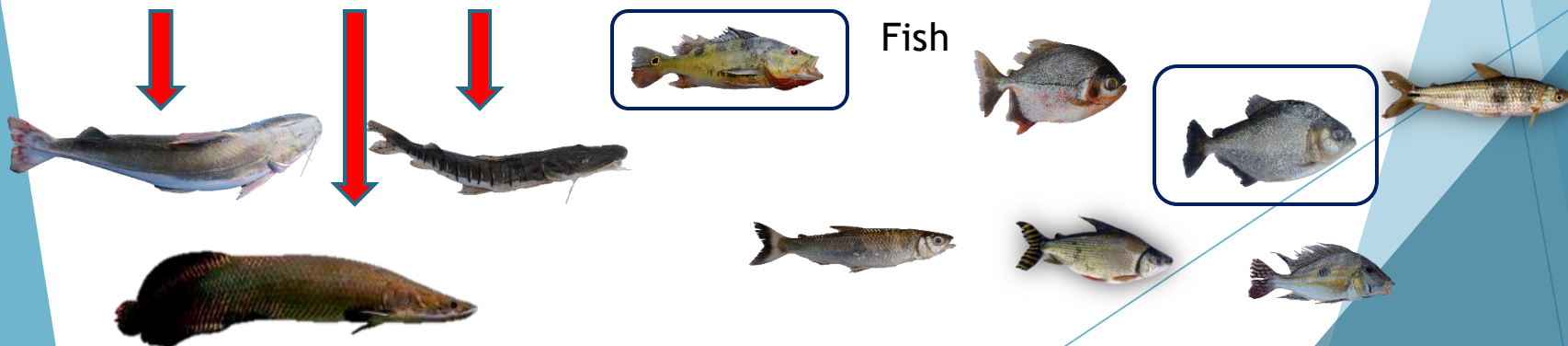
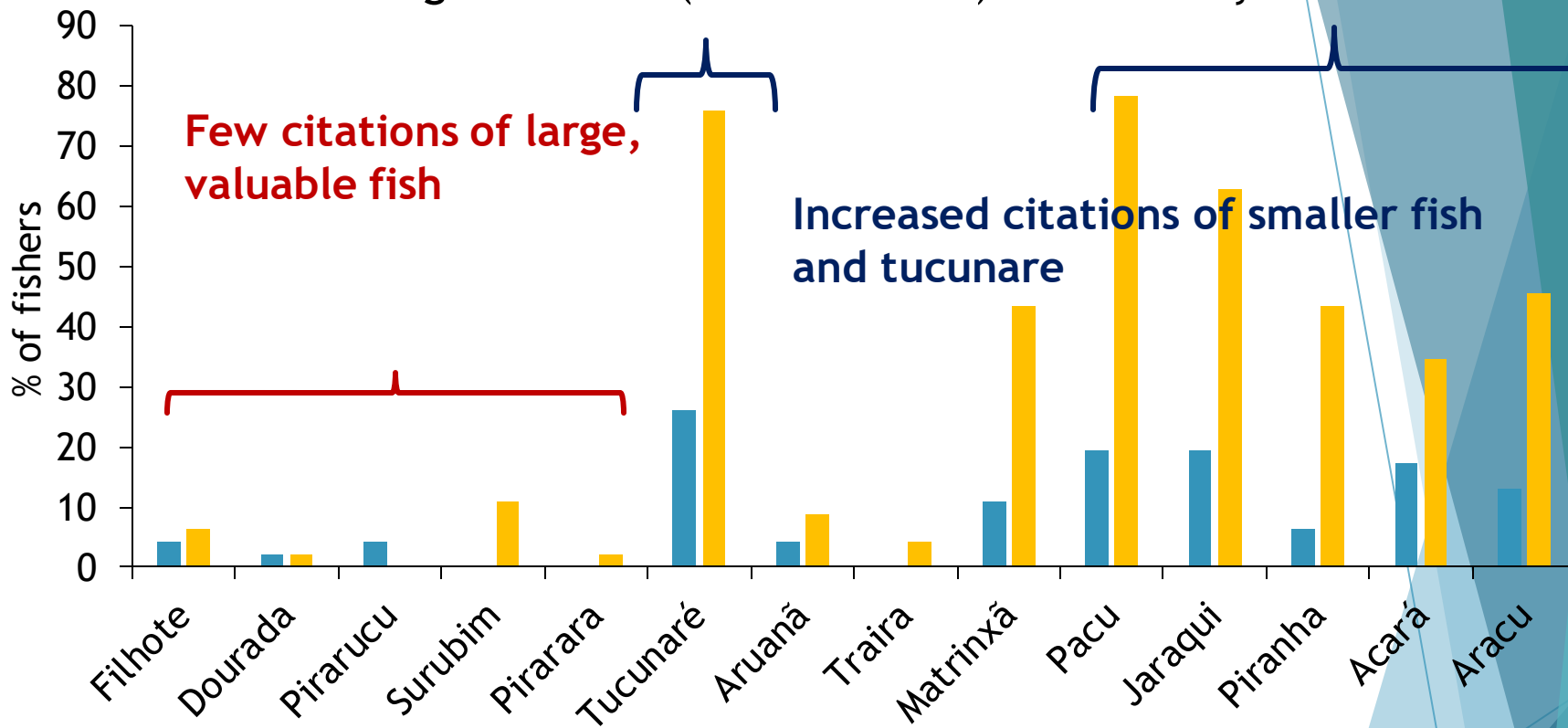
Fish



Negro: similar fish caught now and in the past outside = 83 % similarity

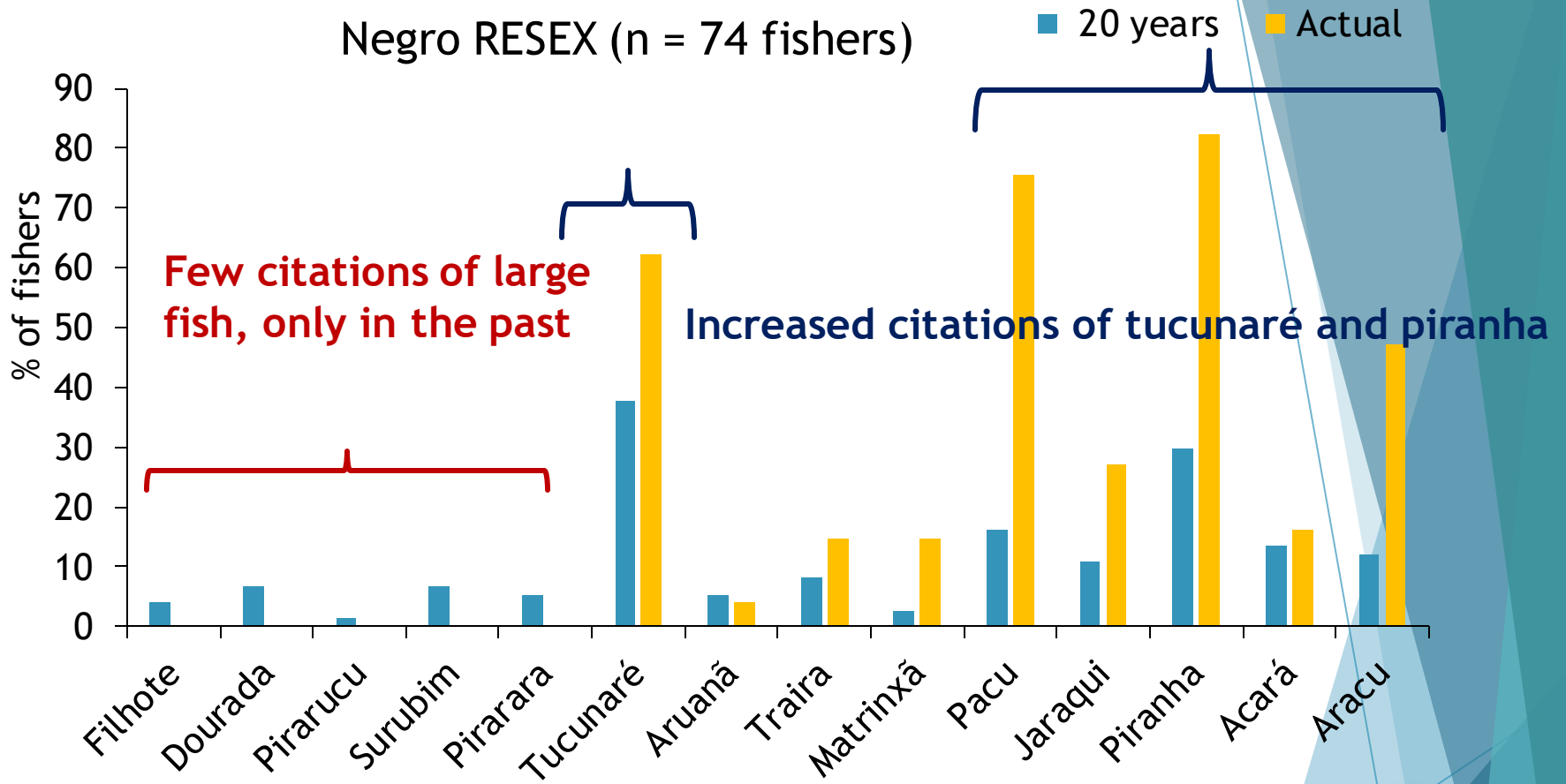
Negro Outside (n = 46 fishers)

■ 20 years ■ Actual



Similar fish caught now and in the past inside RESEX = 64 % similarity

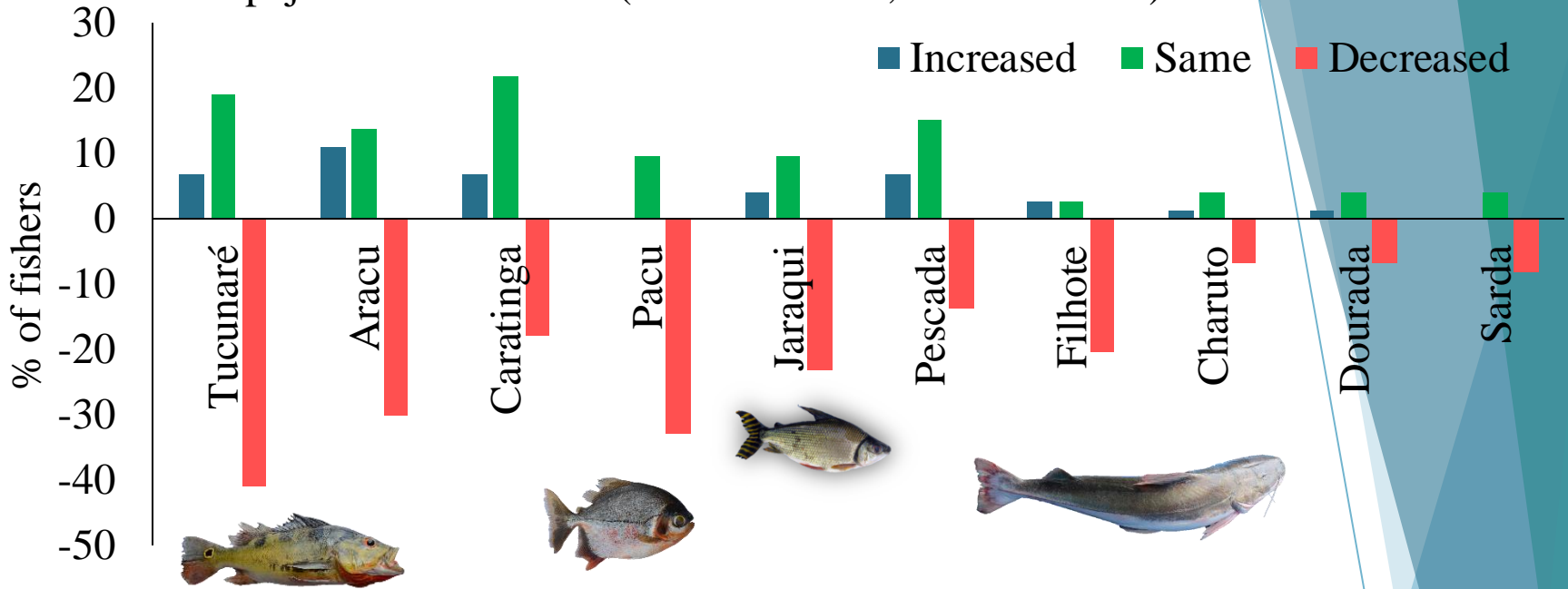
Negro RESEX (n = 74 fishers)



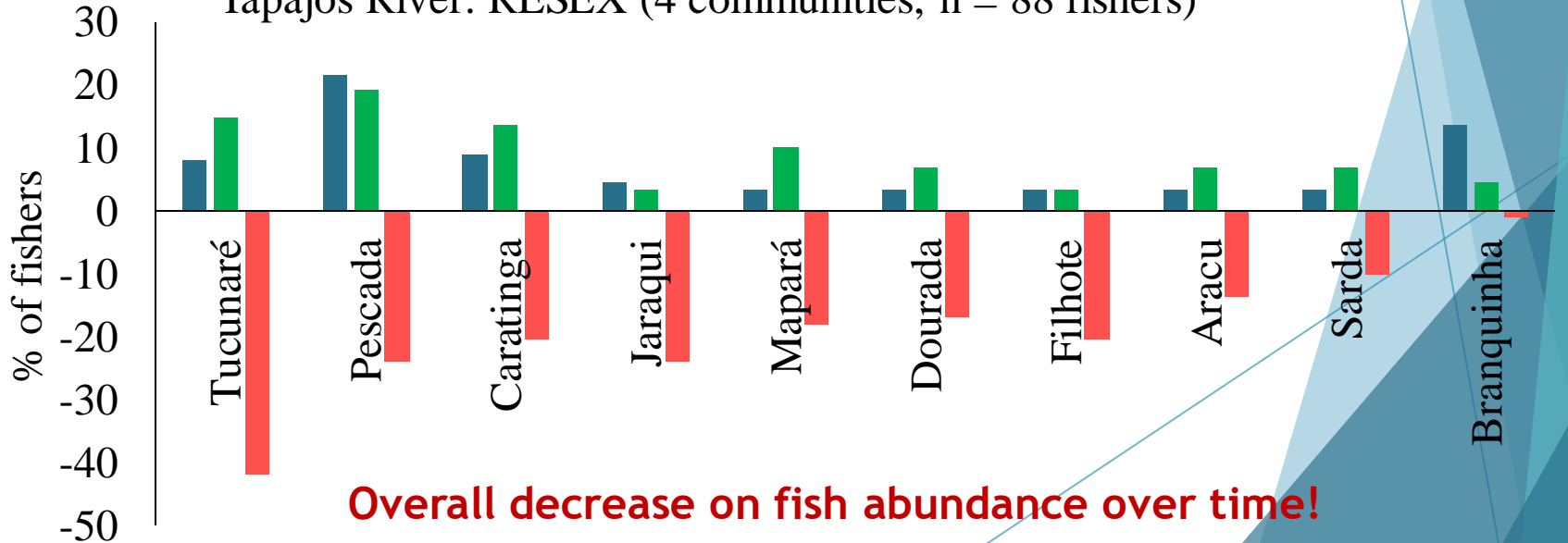
Fish



Tapajos River: Outside (4 communities, n = 73 fishers)

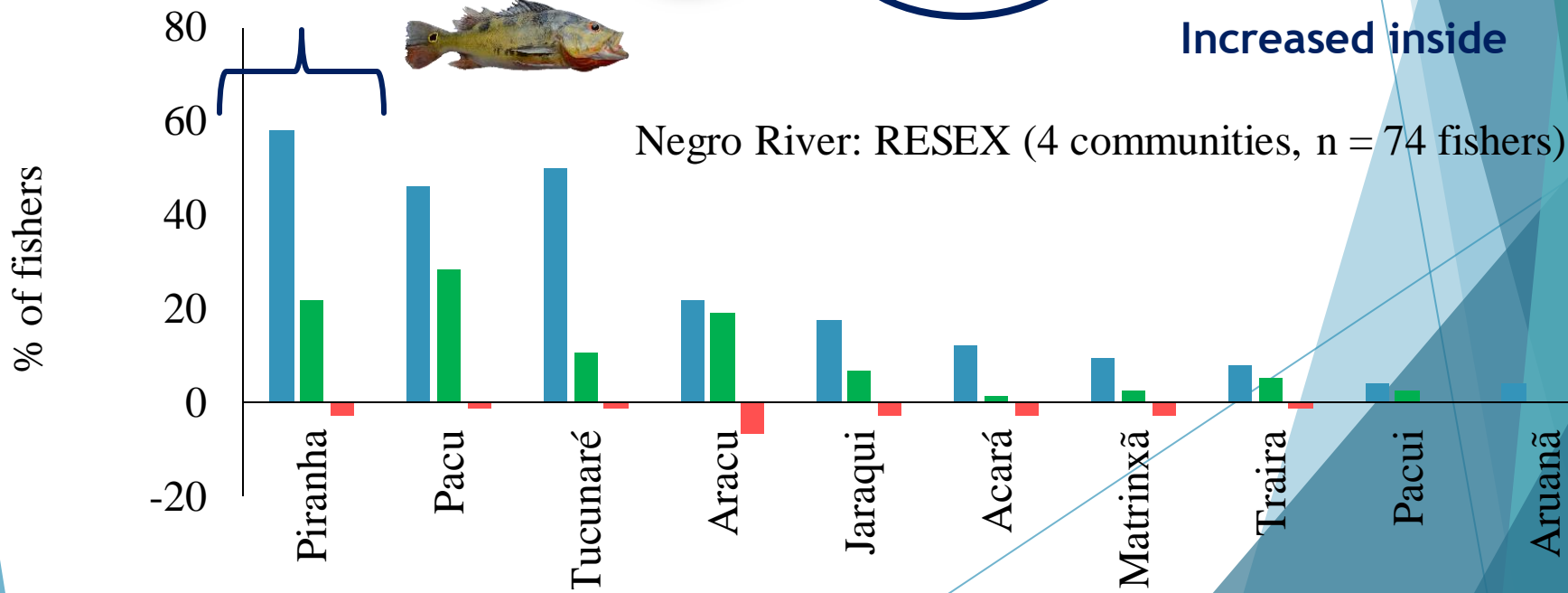
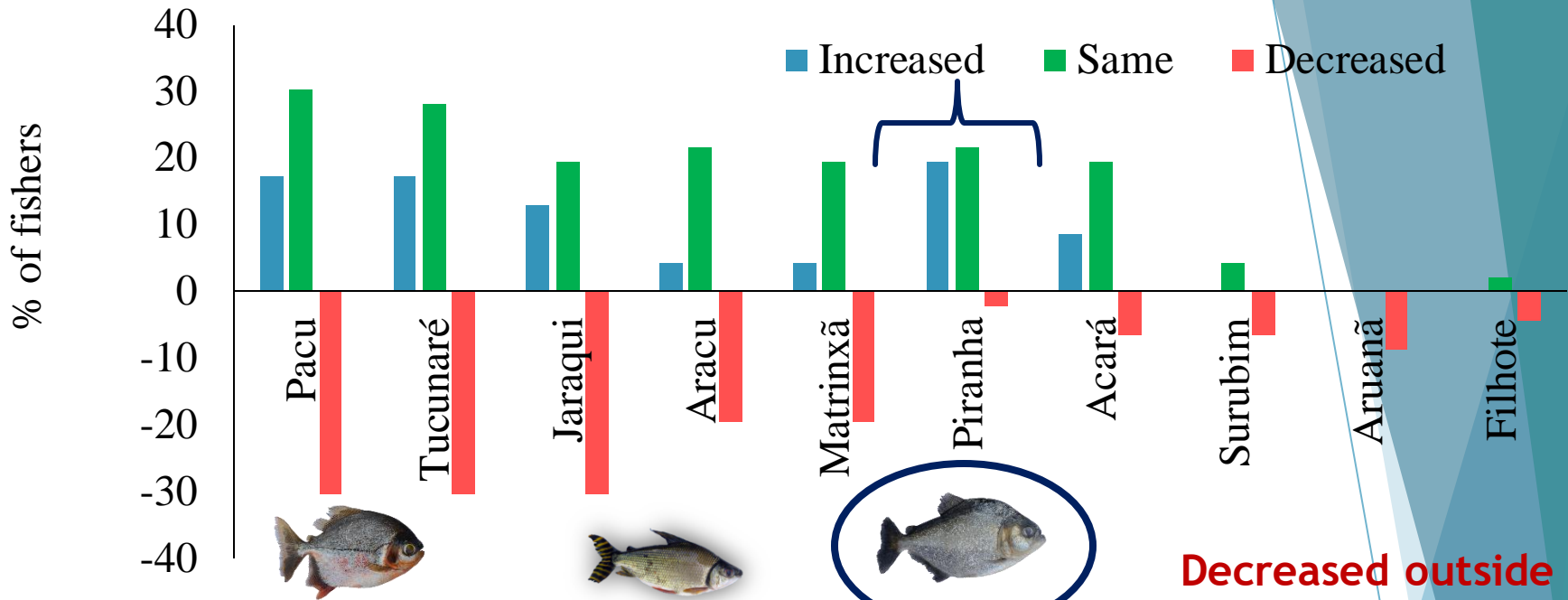


Tapajos River: RESEX (4 communities, n = 88 fishers)



Overall decrease on fish abundance over time!

Negro River: Outside (4 communities, n = 46 fishers)



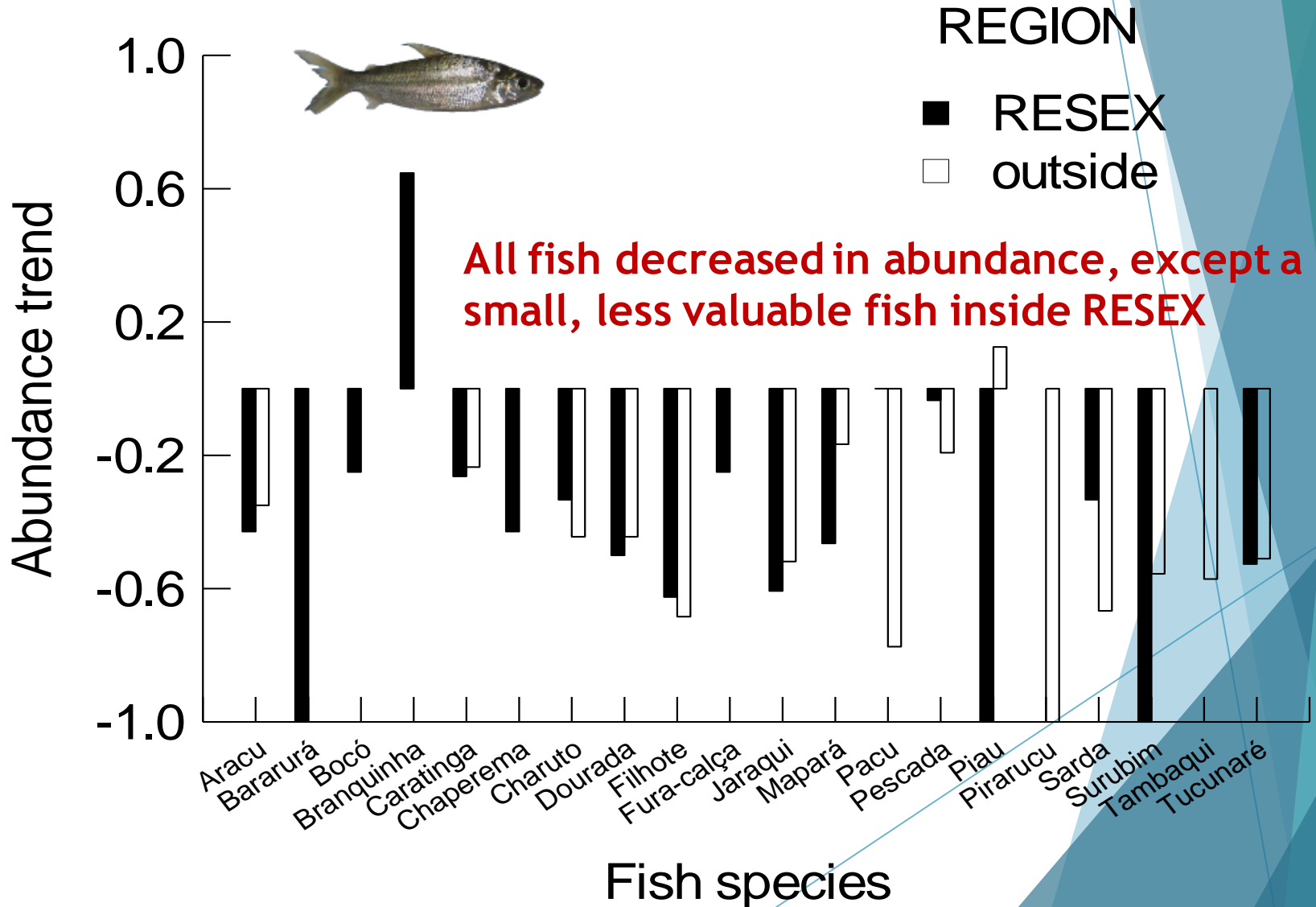
Decreased outside
Increased inside

Negro River: RESEX (4 communities, n = 74 fishers)

Comparison of abundance trends, for each fish species (x proportion of fishers who mentioned the trend):

Increased= +1, Same = 0, Decreased = -1

Tapajos

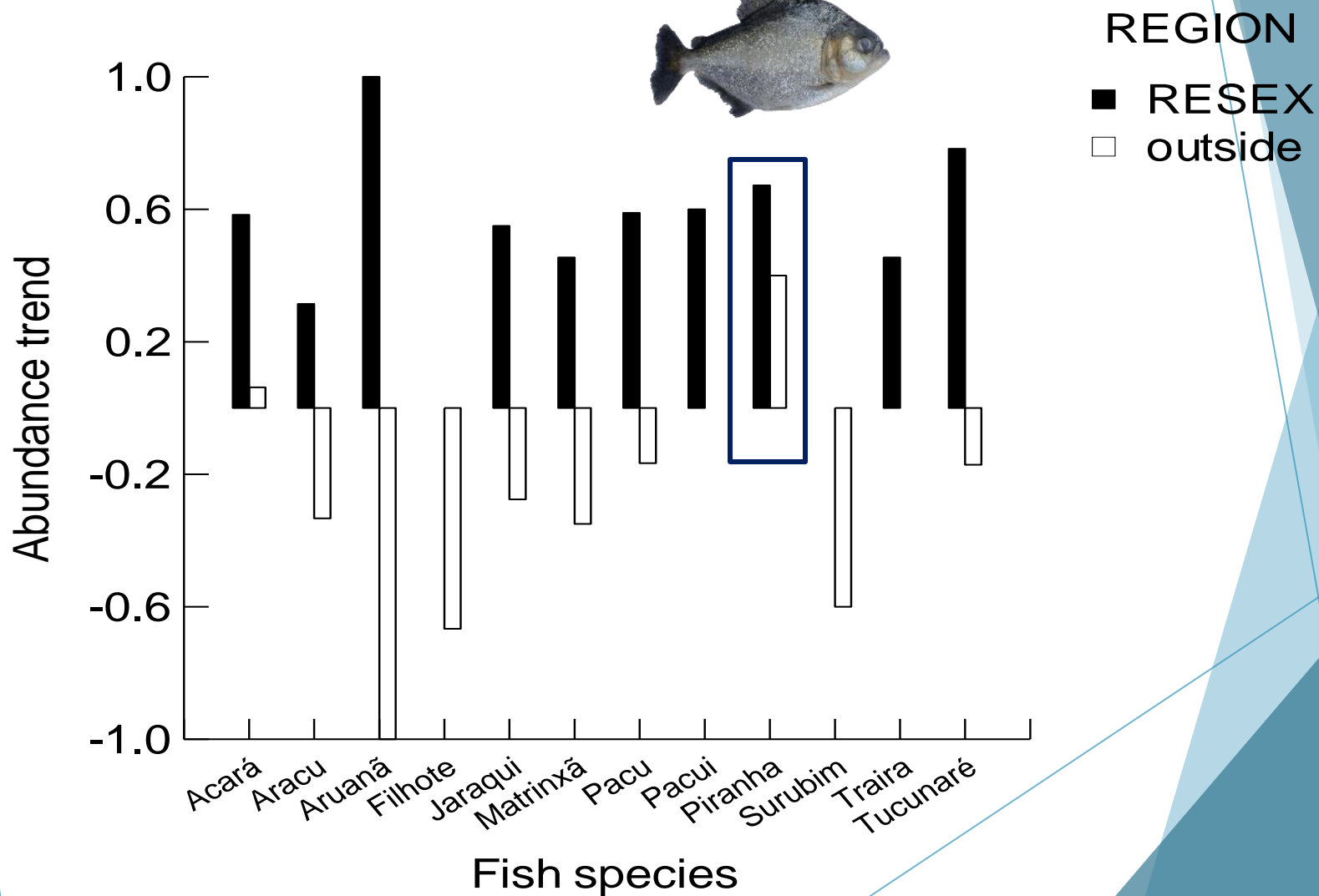


Negro

Overall opposite trends:

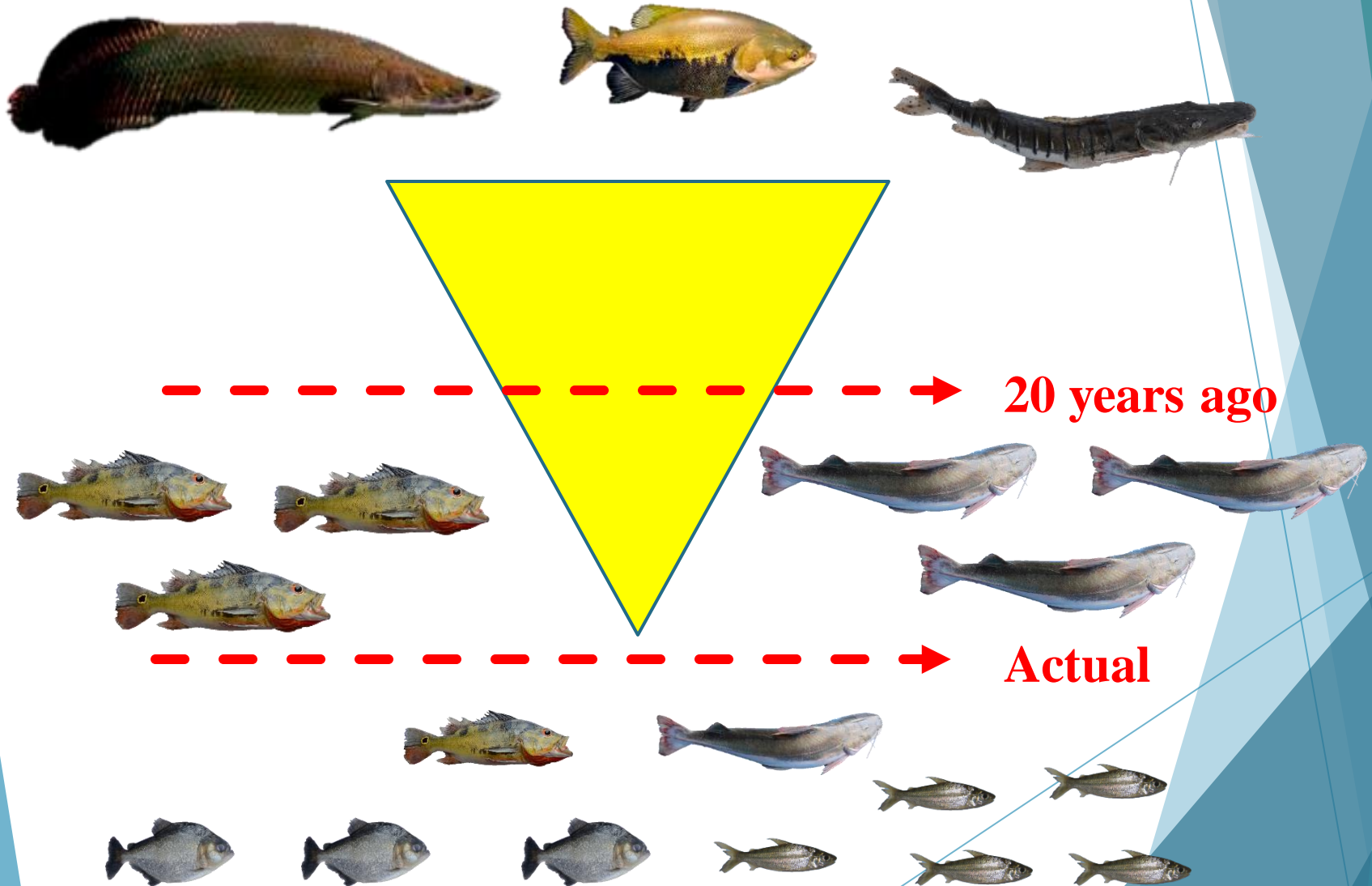
+ Increased inside the RESEX

- Decreased outside



Concluding remarks:

Ecological filter before 20 years ago + reduced abundance of exploited fish?



Invaluable information provided by fishers' LEK:

- Tucunare: important remaining commercial fish, management needs and potential
- Piranhas increasingly exploited in Negro River: adaptive strategy to cope with declining fish stocks?
- RESEX in the Negro River has been more effective: better enforcement, no commercial fishing
- Fishing pressure by outside commercial fishers reduced fish abundance in Tapajos: **fishing agreement**



Photo: Pedro Peixoto

Acknowledgments

- To fishers for their cooperation
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Questions??



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