

2024



BOOKLET 2.0

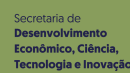
SPORT FISHING IN THE MIDDLE NEGRO
RIVER, BARCELOS, AMAZONAS, BRAZIL

Organized by:

Chiara Lubich, Glenda Bernardino, Flávia Siqueira-Souza and Carlos Freitas



REALIZATION AND SUPPORT



AMAZONAS
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MANAUS, AMAZONAS
OCTOBER 2024

PRESENTATION



Photo: Chiara Lubich (2023)

This booklet is an invitation to you, the reader, to discover, support and value the sport fishing tourism carried out in the Middle Negro River Basin, Amazonas, Brazil. By better understanding the diverse perspectives of the key groups and the results obtained in Chiara Lubich's doctoral research, we can contribute to the promotion of sustainable tourism, for the benefit of the region, its population and the environment. Therefore, the booklet aims to provide an understanding of the sustainability of sport fishing tourism in the Negro River Basin, specifically in the region of Barcelos, Amazonas.

Doctoral research project: The doctoral research project "Sport Fishing in the Middle Negro River Basin, Amazonas, Brazil: Ecological, Economic and Social Assessment" seeks to holistically analyze the aspects and impacts of sport fishing tourism in the region. The research is conducted by Chiara Lubich under the guidance of professors Carlos Freitas and Flávia Souza of the Graduate Program in Animal Science and Fisheries Resources at the Federal University of Amazonas (PPGCARP/UFAM).

Funding: The research project is financially supported by the Fundação de Amparo à Pesquisa do Estado do Amazonas (FAPEAM), through Call No. 008/2022- Kunhã program - C, T&I in Amazonas; support calls FAPEAM-PPG-CARP: POSGRAD 2022/2023 (Resolution 005/2022); and Call No.18/2020 - Graduate Development Program (PDPG - CAPES/FAPEAM/PPGCARP) - Strategic partnerships in the states, support for emerging and consolidating graduate programs in priority areas in the states.





Photo: Chiara Lubich (2023)



Photo: Chiara Lubich (2023)

INTRODUCTION

The incredible beauty of the middle Negro River region in the Amazon, represented in the municipality of Barcelos, Amazonas, attracts many people who love sport fishing. The black waters of paradisiacal settings and the unique diversity of plants and animals are so special that not only the fishers, but also other people interested in nature are attracted to the region.

This booklet highlights the importance of sport fishing tourism in the middle Negro River basin and presents results obtained in the doctoral research entitled "Sport Fishing in the Middle Negro River Basin, Amazonas, Brazil: Ecological, Economic and Social Assessment", developed by Chiara Lubich under the guidance of professors Carlos Freitas and Flávia Souza of the Federal University of Amazonas.

As the main focus of the research, sport fishing tourism plays a crucial role in promoting the conservation of natural resources and stimulating the local economy. In addition to providing unique experiences to sport fishers, the activity generates jobs for guides, traders, businessmen and other community members. Through this study, it will be possible to understand the impact of this activity from different perspectives and generate important information that contributes to the advancement of the activity in the state of Amazonas, Brazil.

ENJOY!





Photo: @marreco.pesca.esportiva

KEY GROUPS

The results found in this booklet are based on data collected via questionnaires applied to five key groups:



Local community: The interaction of the local community with sport fishing tourism is crucial in order to understand the social effects of this activity. The engagement of local residents, their attitudes and their perceptions portray the relationship between tourism and everyday life.



Local commerce: Local businesses play a key role in making products and services available to tourists. Their perspectives on sport fishing tourism provide insights into the direct economic impact on local communities.



Sport-fishing entrepreneurs: Entrepreneurs have a key role in the organization and management of sport fishing operations. Their opinions on the economic viability of the activity and the challenges faced are necessary for the growth and sustainability scenario of the sector.



Fishing guides: Guides play a vital role in providing enriching fishing experiences for tourists. The knowledge acquired about the aquatic environments and fish in the region are essential for the development of the activity and environmental conservation.



Sport fishers: The fishing experience of the sport fishers themselves are crucial in order to understand their motivations for choosing Barcelos as a main destination, as well as their role in the development of the activity in the municipality.

” DEMOGRAPHIC AND SOCIAL PROFILE

LOCAL COMMUNITY: 201 INTERVIEWEES



Gender: 103 men | 98 women



Average age: men = 45 years | women = 43 years



Monthly income: ^{*} < US\$ 256.58 (61,2%)

LOCAL COMMERCE: 10 INTERVIEWEES

Gender: 8 men | 2 women



Average age: men = 45 years | women = 47 years



Monthly income: ^{*} US\$ 513.16 - US\$ 1,026.33 (57%)



SPORT-FISHING ENTREPRENEURS: 14 INTERVIEWEES



Gender: 13 men | 1 woman



Average age: men = 44 years | women = 33 years (partner)



Monthly income: ^{*} US\$ 1,026.33 - US\$ 1,539.49 (35%)

FISHING GUIDES: 52 INTERVIEWEES

Gender: 52 men | 0 women



Average age: men = 44 years



Monthly income: ^{*} US\$ 256.58 - US\$ 513.16 (42%)



SPORT FISHERS: 190 INTERVIEWEES



Gender: 185 men | 5 women



Average age: men = 53 years | women = 51 years



Monthly income: ^{*} > US\$ 1,539.49 (94%)

^{*} Value of Brazilian real (BRL) converted to US dollar (USD) is 5.07 BRL per 1 USD on 07/05/2024.

PROFESSIONS AND OCCUPATIONS

OF THE KEY GROUPS ASSESSED



LOCAL COMMUNITY |
N= 201

LOCAL COMMERCE |
N= 10

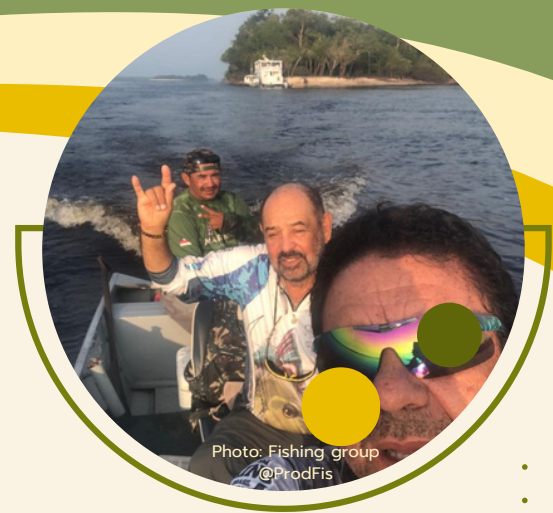
SPORT-FISHING
ENTREPRENEURS | N= 14

FISHING GUIDES | N= 52

SPORT FISHERS |
N= 190



” FISHING EXPERIENCE: FISHING GUIDES & SPORT FISHERS



SPORT FISHERS| N=190

NATIONALITY:



94.21% Brazilian



5.79% Foreigners

For 37.37% of the fishers, the trip made in 2023 was their first to Barcelos.

Some sport fishers have been fishing on the middle Negro River since 1996, while others have started only recently, in 2022.

The data revealed that the majority of fishers (43.16%) started fishing in the region in the last 10 years.



Some fishing guides have been in business since 1991, while others started recently, in 2022.



The majority (82.69%) of fishing guides started in the last 15 years.

61.54% of the fishing guides interviewed had experience in fishing-related professions before becoming guides, with 62.50% having worked in commercial



fishing, 34.38% in ornamental fishing and 3.23% in subsistence fishing.





Photo: Fishing group
@ProdFishers



Photo: Fishing group
@ProdFishers

VIEWS OF SPORT FISHERS

ON TUCUNARÉ POPULATIONS (*Cichla* sp.) IN THE
MIDDLE NEGRO RIVER, AMAZONAS



54%

**NOTICED CHANGES IN THE
SIZE OF THE TUCUNARÉ***

*34.23% believe that the tucunaré have grown in recent years, 19.82% think they have decreased in size, and 45.95% have not noticed any changes.

41.3%

**NOTED THE INCREASE
IN THE AMOUNT OF
FISH CAUGHT DURING
SPORT FISHING**



15.5%

**AGREE THAT SPORT
FISHING CAN
NEGATIVELY AFFECT THE
TUCUNARÉ POPULATION
(*Cichla* sp.)**

96.5%

**BELIEVE THAT THESE ARE THE
FACTORS THAT MOST AFFECT THE
TUCUNARÉ POPULATION IN THE
MIDDLE NEGRO RIVER, AMAZONAS**

- OVERFISHING
- COMMERCIAL FISHING OF TUCUNARÉ
- POLLUTION
- LACK OF ENVIRONMENTAL EDUCATION
- CLIMATE CHANGE
- BAD MANAGEMENT



TUCUNARÉ SPECIES

(*Cichla* sp.) OF THE MIDDLE NEGRO RIVER AND THEIR MAXIMUM SIZES

Cichla monoculus Agassiz, 1831



Photo: Chiara Lubich (2024)

Common name: tucunaré amarelo or popoca

Maximum length: 70.0 cm (Std. length)¹

Maximum weight: 9.0 kg¹

Maturity (L50): 15.01 - 26.2 cm²

Source: [1] Froese and Pauly (2024; www.fishbase.se);

[2] Chellapa et al. (2003); Gomiero and Braga (2004);

Sousa et al. (2015)

Cichla nigromaculata Jardine & Schomburgk, 1843

Common name: tucunaré tauá

Maximum length: 39.0 cm (Total length)¹

Maximum weight: 0.68 kg²

Maturity (L50): Information unavailable

Source: [1] BGFA (2024; <https://www.bgfarecordes.com.br>);

[2] IGFA (2024; www.igfa.org)



Photo: Kullander and Ferreira (2006)

Cichla orinocensis Humboldt, 1821



Photo: Chiara Lubich (2024)

Common name: tucunaré borboleta

Maximum length: 75.0 cm (Total length)¹

Maximum weight: 7.31 kg¹

Maturity (L50): 26.0 - 30.0 cm²

Source: [1] IGFA (2024; www.igfa.org);

[2] Froese and Pauly (2024; www.fishbase.se)

Cichla temensis Humboldt, 1821

Common name: tucunaré açu, paca or paca-açu

Maximum length: 94.0 cm (Total length)¹

Maximum weight: 13.19 kg¹

Maturity (L50): 31.1 cm²

Source: [1] IGFA, (2024; www.igfa.org);

[2] Campos et al. (2015)



Photo: Chiara Lubich (2024)

“FISHING GUIDES

AS AN EXAMPLE OF GOOD BEHAVIOR FOR SPORT
FISHERS IN THE MIDDLE NEGRO RIVER, AMAZONAS



Photo: Fishing group
@ProdFishers

Sport fishers were asked four questions in relation to the fishing guides who accompanied them on their fishing trips:

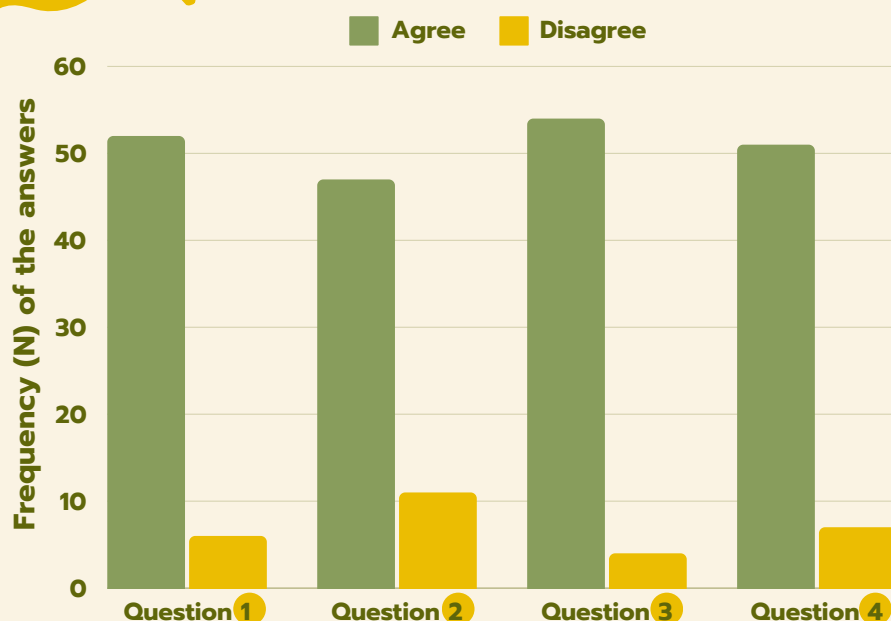


- 1 Are local fishing guides better qualified and more skilled than a sport fisher visiting Barcelos to fish?
- 2 By adopting the techniques and tactics of the fishing guides, do you believe that this can contribute to your success as a sport fisher?
- 3 Do you value the professionalism of the fishing guides from Barcelos in regards to caring for the fish, from capture to release?
- 4 Are the skills and knowledge acquired from the guides while fishing in Barcelos applied by you in other fishing trips?

Responses obtained from the 58 fishers interviewed:

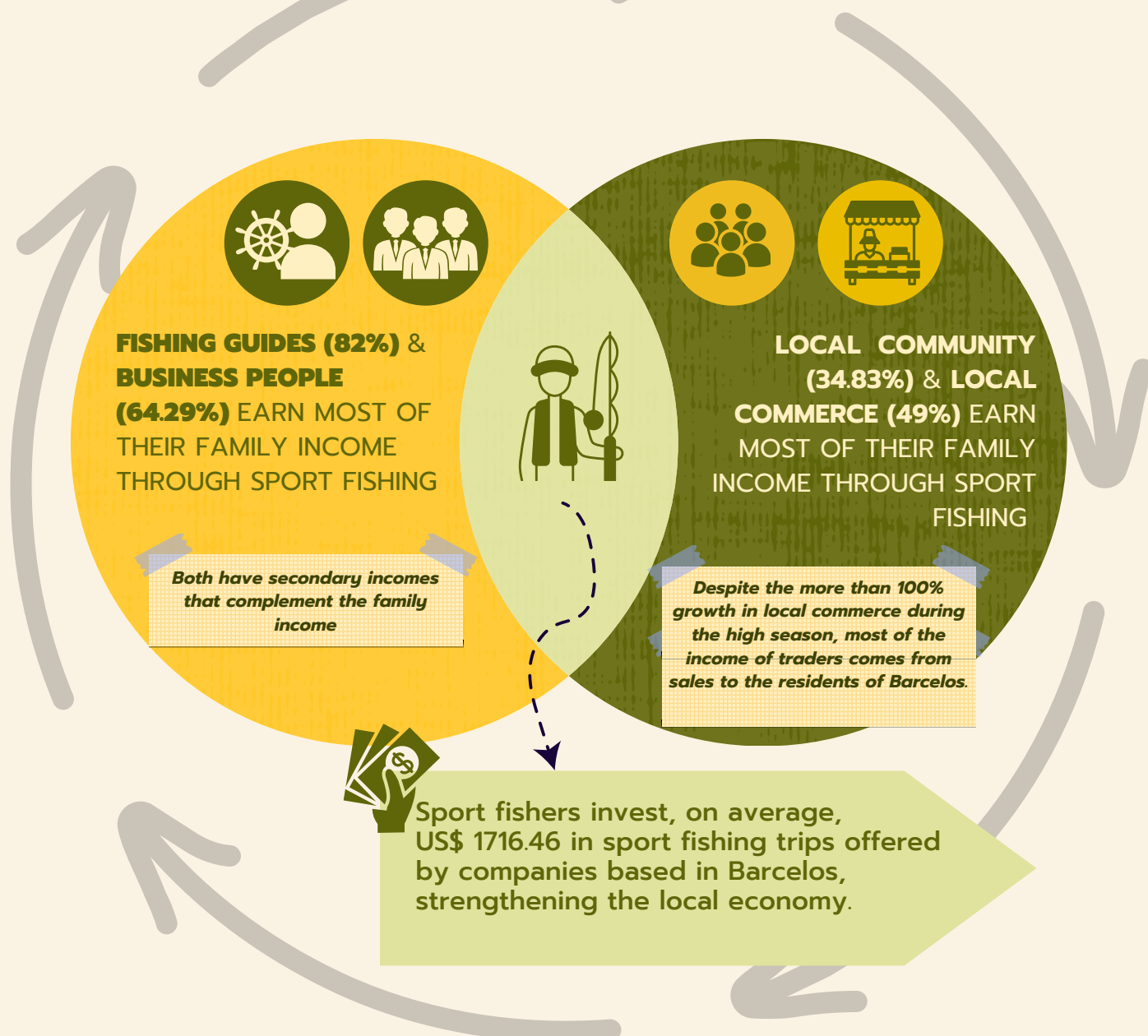


In summary, most fishers agree that fishing guides have skills that make them good behavioral models when fishing.



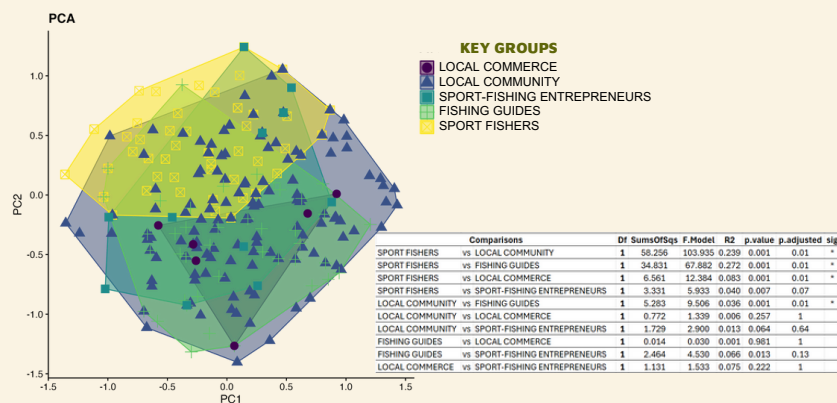
ECONOMIC IMPACT

OF SPORT FISHING ON THE MIDDLE NEGRO RIVER, BARCELOS,
AMAZONAS



VIEWS OF THE KEY GROUPS

REGARDING THE ECOLOGICAL, ECONOMIC AND SOCIAL ISSUES OF
SPORT FISHING IN THE MIDDLE NEGRO RIVER



DID YOU UNDERSTAND?

LET US EXPLAIN...

Source: Chiara Lubich (2024)



Sport fishers think differently about the ecological, economic and social aspects of sport fishing compared to the local community, fishing guides and traders, since they spend little time in the region and they do not have an overview of the activity in the region. While the local community, local traders and fishing guides reside in the region and know it better.

OTHER GROUPS SUCH AS

Sport-fishing entrepreneurs and sport fishers think in a similar way about the aspects studied.



Some of the questions asked:



Aspecto ecológico:

- Has the size of the tucunaré decreased in the last 10 years?
- Does sport fishing (companies and fishers) pollute the environment?



Economic aspects:

- Is sport fishing important for the economy of Barcelos?
- Does sport fishing (companies and fishers) pollute the environment (aquatic and terrestrial)?



Social aspects:

- Are there any conflicts between sport and commercial fishing in the region?
- Is the sport fishing in Barcelos well organized?



Fishing guides think about the ecological, economic and social aspects of sport fishing in a **different** way to the **local community**.

The **guides**, because they have more contact with sport fishing, have unique perspectives that result in distinct responses compared to those of the **local community**.



Gnathostoma spp. larva
Figure: Higuita and Bruminhent (2022)



Sashimi made from tucunaré from the middle Negro River, Amazonas
Photo: Alair Neto (2023)



TAKING CARE OF YOUR HEALTH: THE CASE OF SASHIMI



Vargas et al. (2012)

A 37-year-old man from Rio de Janeiro sought medical attention in 2005 because of a slight fever, cough, abdominal tenderness and pain in his left shoulder. The symptoms began 15 days after a recreational trip to Tocantins, where he had been sport fishing and ate raw freshwater fish (*Cichla* sp.) freshly caught in form of sashimi. Two weeks later, sinuous, linear, reddish lesions appeared on his back, which lasted for 3 days



Reddish deep migratory nodules (arrows) in the lateral region of the chest
Photo: Vargas et al. (2012)

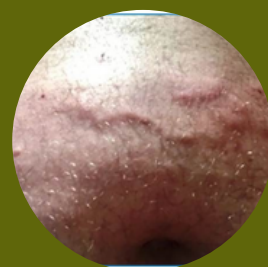
For more information about the article,

[click here](#)



Graeff-Teixeira et al. (2024)

The authors report a case of eosinophilic meningitis associated with the ingestion of raw fish (*Cichla* sp.) from the Brazilian Amazon, probably caused by *Gnathostoma*. A 36-year-old man visited the Juruena River to fish. After 50 days, the patient had a severe frontal headache. Another individual who ingested raw fish developed linear dermatitis on the abdominal wall.



Picture of linear dermatitis on the abdominal wall
Photo: Graeff-Teixeira et al. (2024)

For more information about the article,

[click here](#)



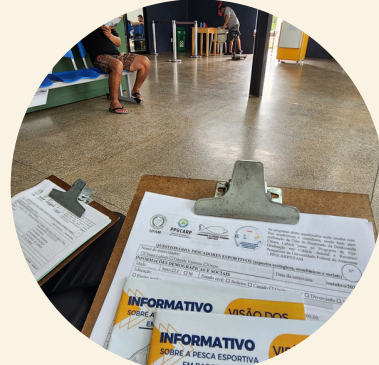
The studies indicate that both the Brazilian patients acquired infections during recreational fishing. In addition, the consumption of raw tucunaré (*Cichla* sp.) is the most common source of infection in Brazil.

By disseminating this information, we aim to warn fishers about the potential risks to human health when consuming raw fish. It is crucial to understand the microbiological and parasitic hazards present in this type of food, which can result in serious illnesses such as food poisoning and parasitic infections.

REMEMBER:
Eat sashimi only in places that specialize in Japanese cuisine.
Choose cooked food!!!



PHOTO ARQUIVE



Photos: Chiara Lubich (October 2022, April and October 2023)

PHOTO ARQUIVE

”

To protect the identity of the interviewees, their faces have been blurred.



Photos: Chiara Lubich (October 2022, April and October 2023)

TEAM



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ACKNOWLEDGMENTS

Our sincere thanks to everyone that participated in the interviews in the study. Our gratitude goes especially to the people of the local community and the sport fishing guides who welcomed us into their homes, even at night, with patience and generosity, as well as to the sport fishing entrepreneurs who gave us their time. Their contributions have brought the data to life, offering a very solid perspective on the sport fishing in the municipality of Barcelos, Amazonas state.

The collaboration of each of you was fundamental to the success of this study. Your stories, experiences and knowledge have enriched our understanding of the sport fishing activity and have provided much valuable information.

We hope that these results will help to understand sport fishing and benefit the people of Barcelos by promoting sustainable fishing tourism and bringing benefits to the region and the environment.

THANK YOU!



Photo: @marreco.pesca.esportiva | Location: Serra do Aracá, Barcelos, Amazonas

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SPORT FISHING IN THE MIDDLE NEGRO
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