

# **Ecotourism: linking biodiversity protection and sustainable development**

**Prof. Jesus Olivero Verbel. Ph.D.**

**Environmental and Computational Chemistry Group  
University of Cartagena**



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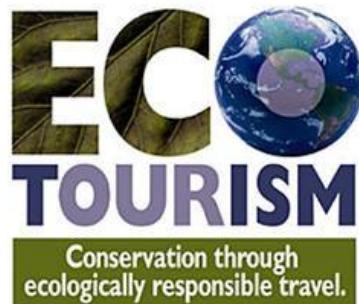


# OUTLINE

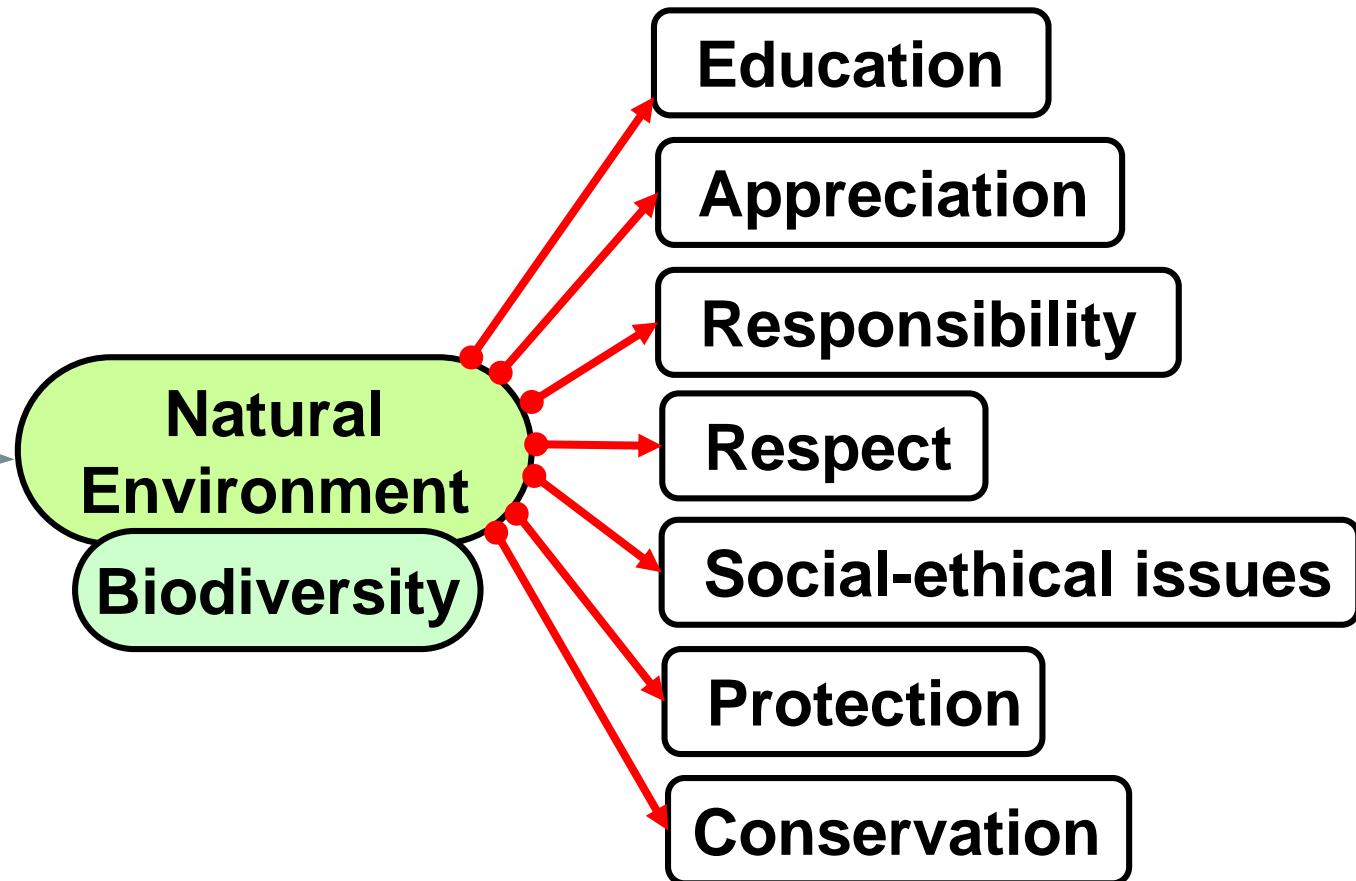
-  **Ecotourism**
-  **Biodiversity**
-  **Sustainable development**
-  **The Colombian case**
-  **Final remarks**

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Ecotourism ➤



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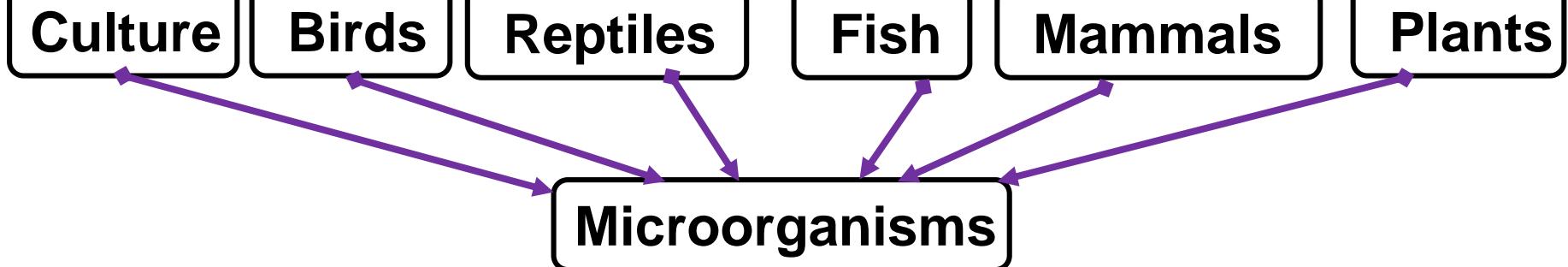
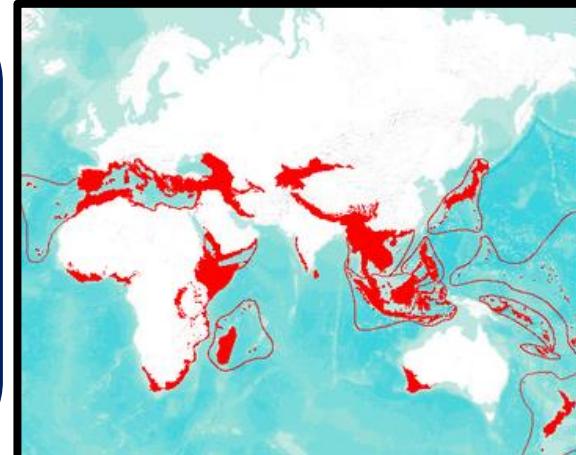
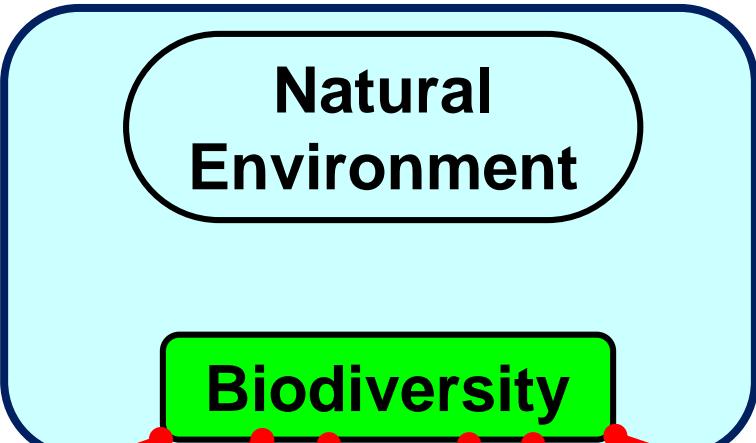


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# Biodiversity



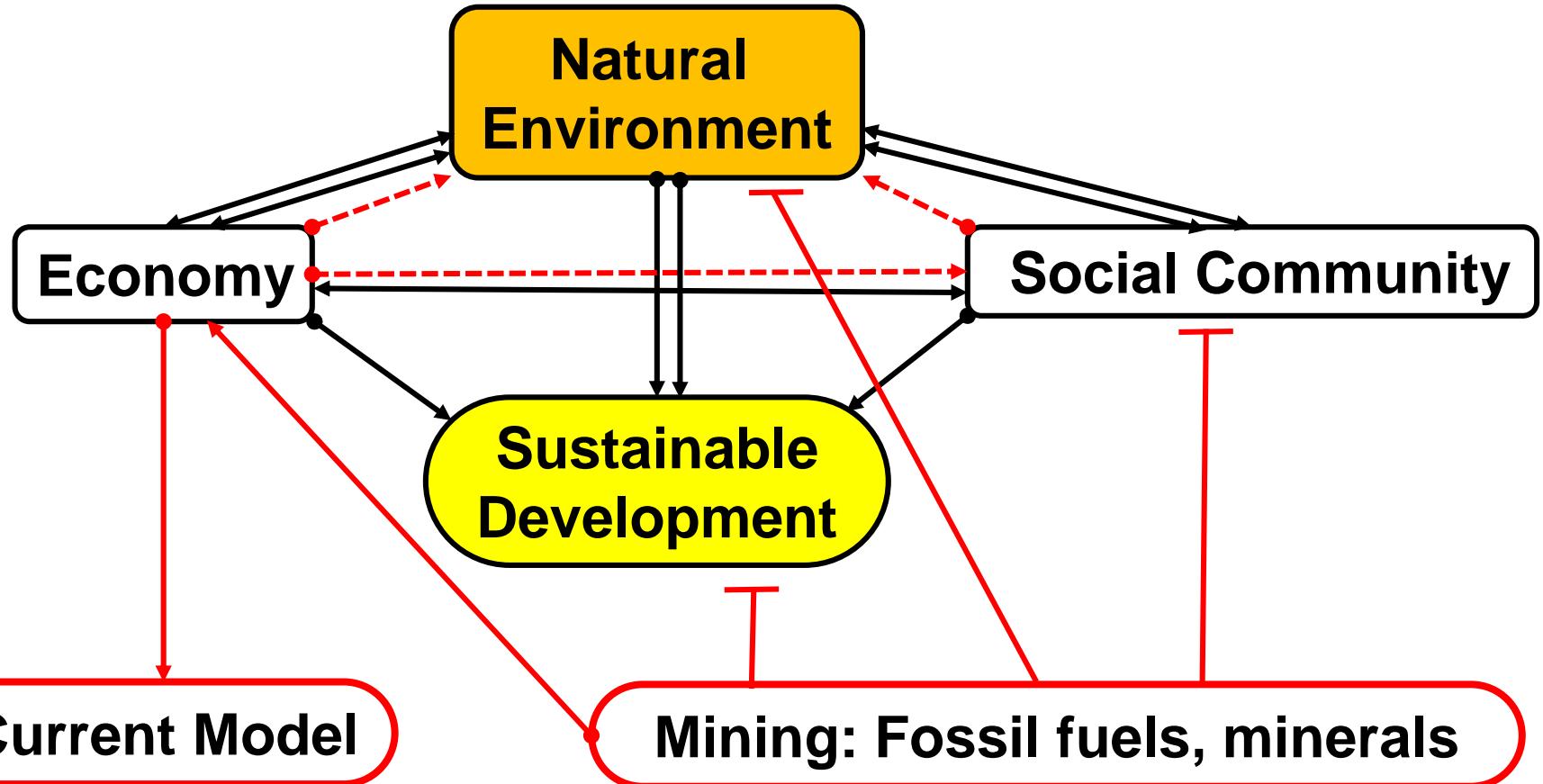


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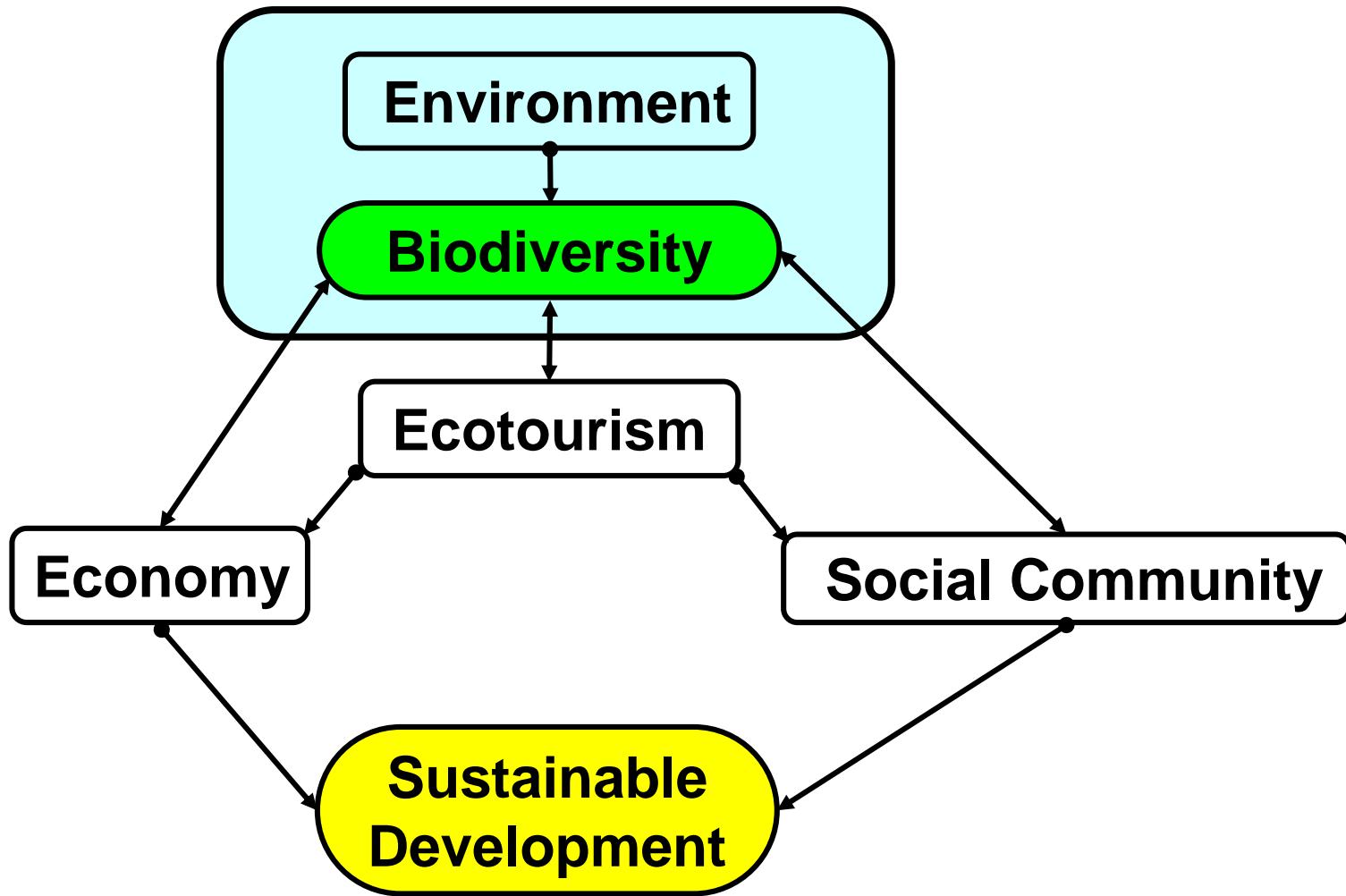
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# Environment and Sustainable Development



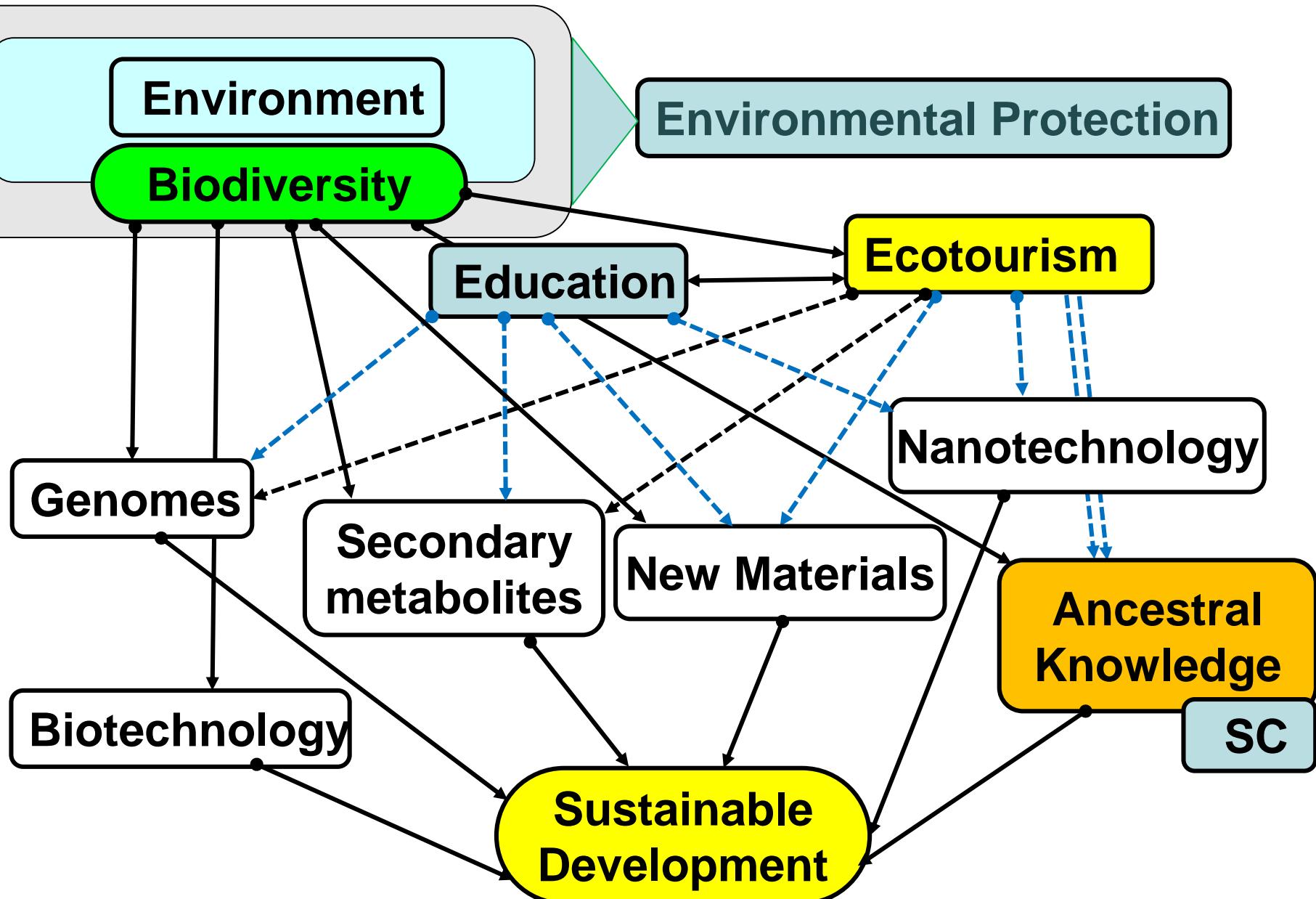
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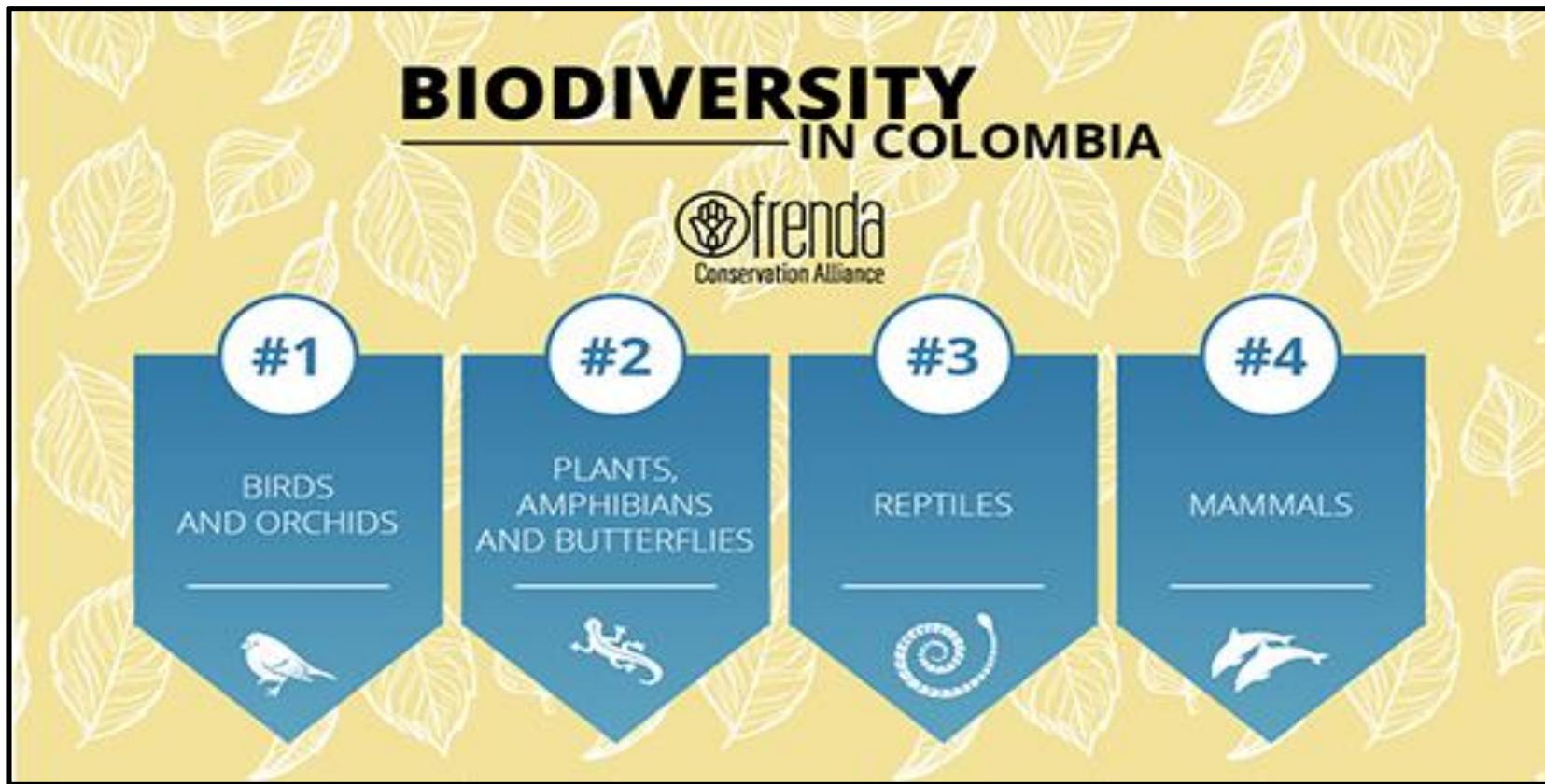




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# The Colombian Case: ¿Ignoring Ecotourism?



## This Country is a Haven for Biodiversity

Home to 10 percent of the world's flora and fauna species, this nation is blossoming into the world's next ecotourism hotspot.



# **Current Development Model**

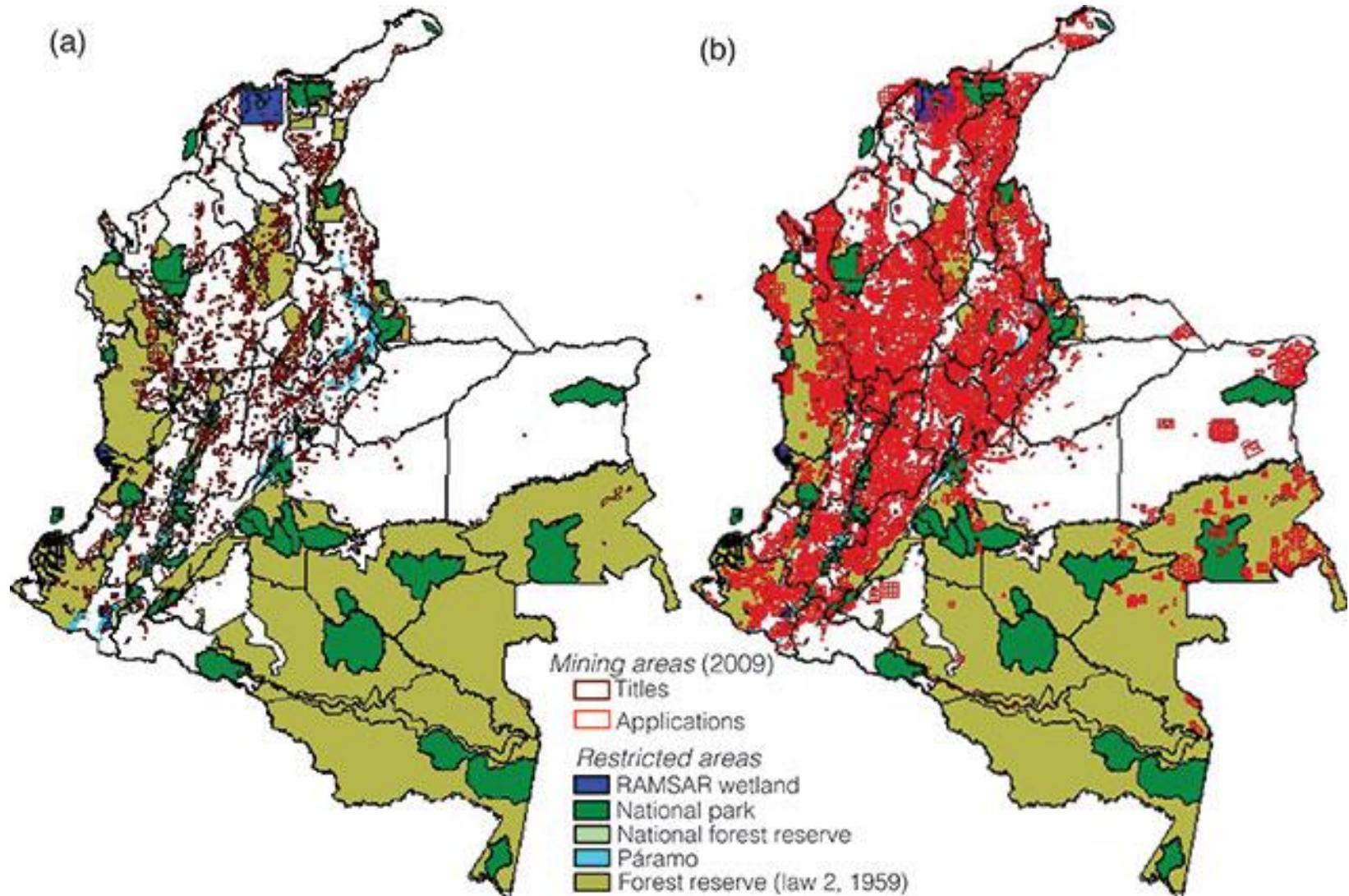
## **Colombian Case**

**Little value to Biodiversity  
Minor Ecotourism  
Extensive Mining**

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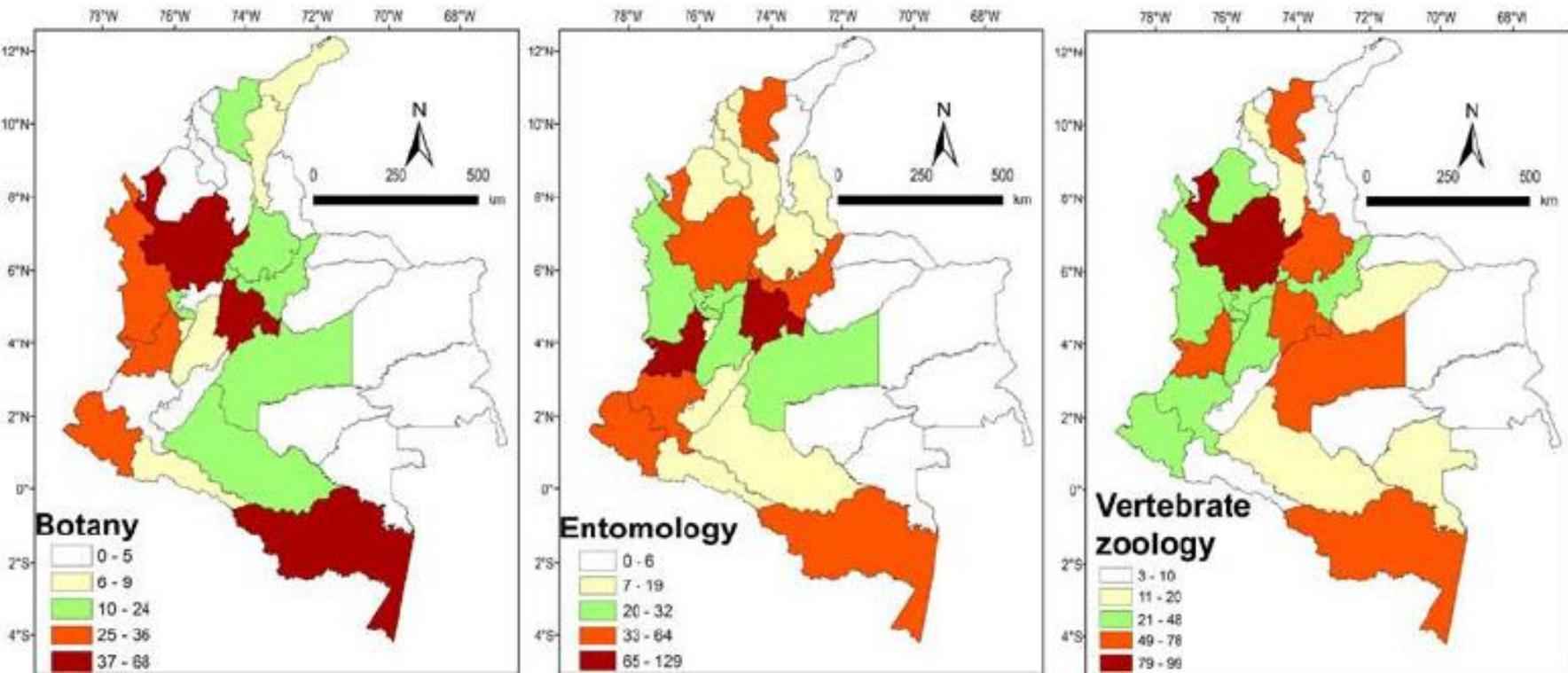


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**Geographic patterns of the number of studies on Colombian biodiversity (1990-2011) for each department according to three major disciplines.**

[Biodiversity and Conservation. 2013. DOI: 10.1007/s10531-013-0560-y](#)

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# Chocó Forest. Global Hotspot for Biodiversity

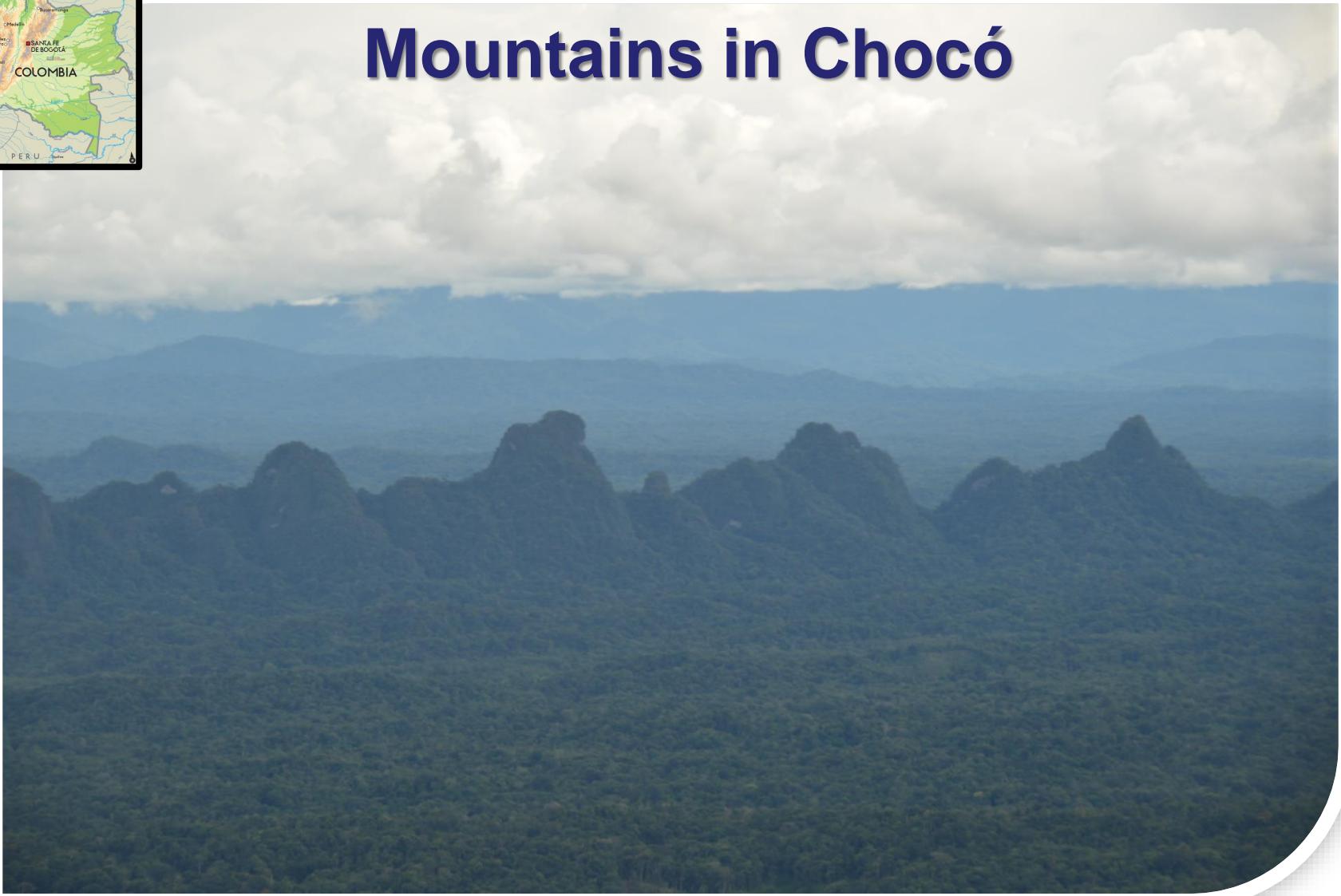


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# Mountains in Chocó



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# Gold mining areas and biodiversity loss



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# Gold mining areas and biodiversity loss



01/29/2016 11:49

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# Gold mining areas and biodiversity loss



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# Destruction on the River



Chocó  
Colombia



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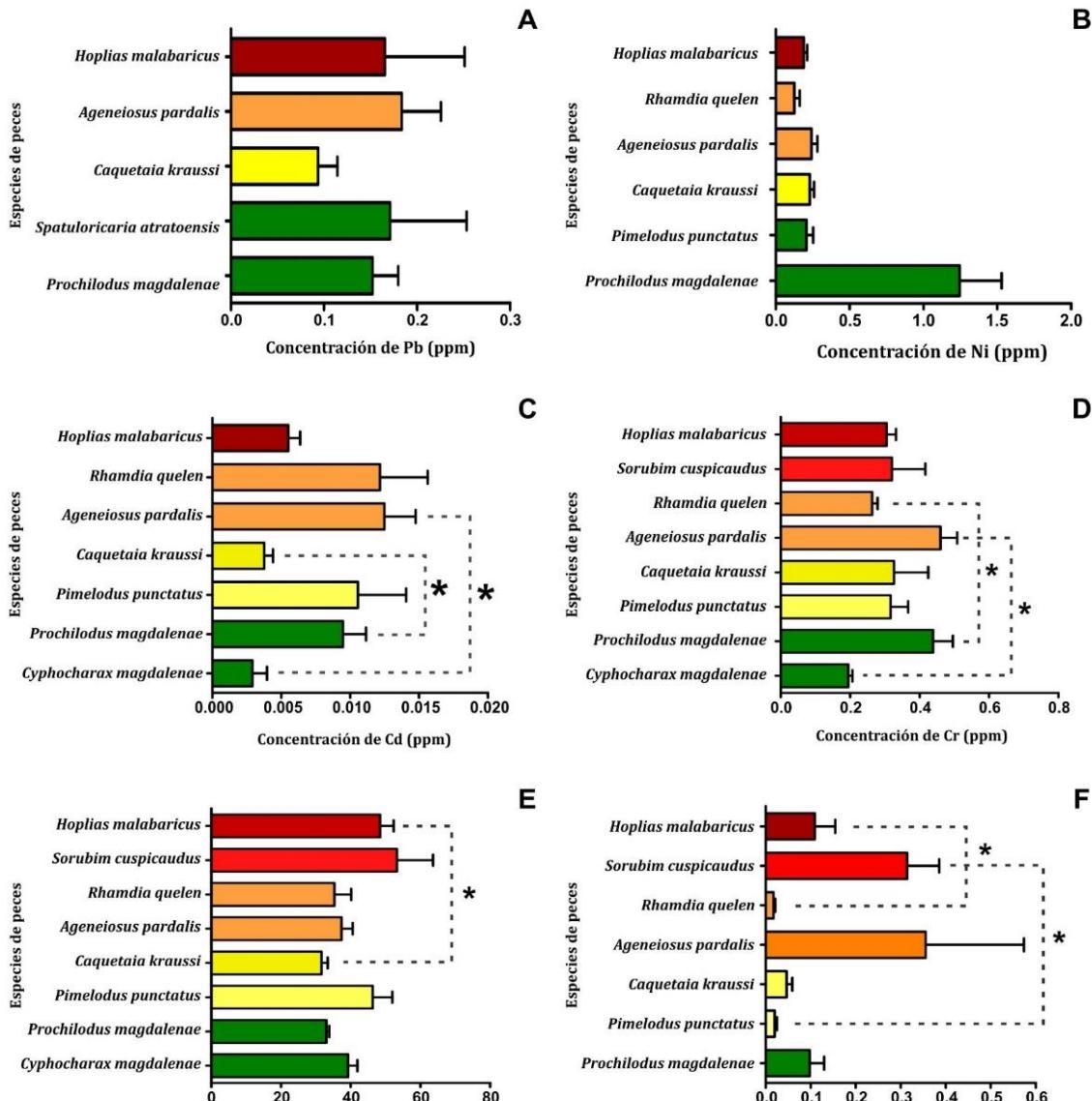


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# Elements in Fish Atrato River

- A. Lead**
- B. Nickel**
- C. Cadmium**
- D. Chromium**
- E. Zinc**
- F. Arsenic**

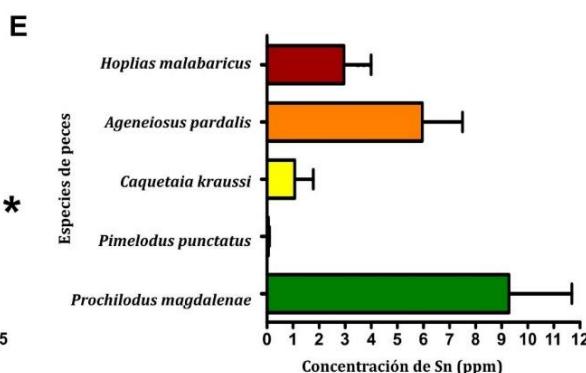
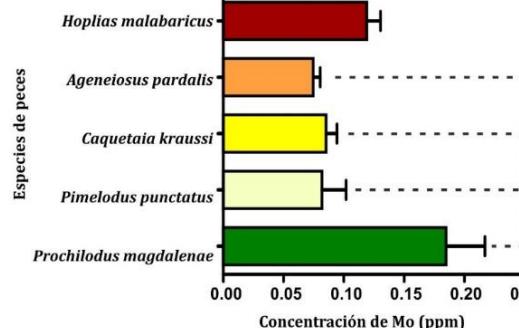
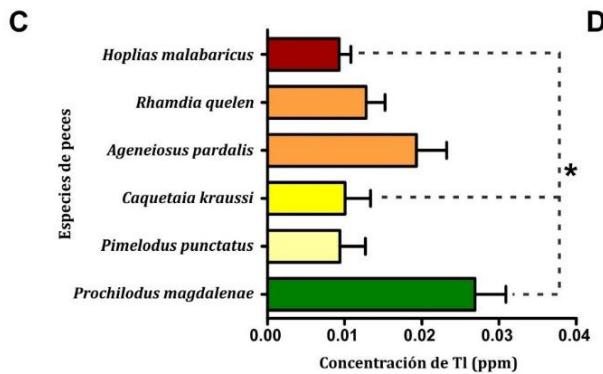
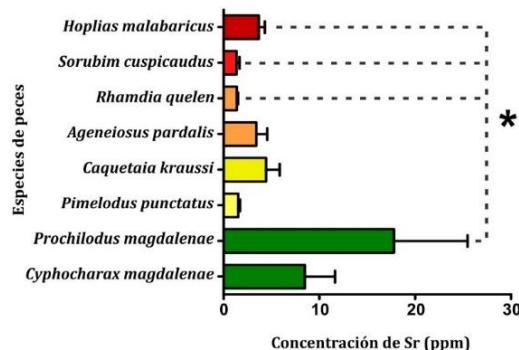
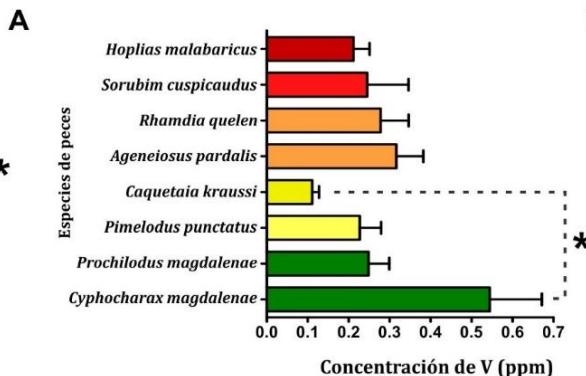
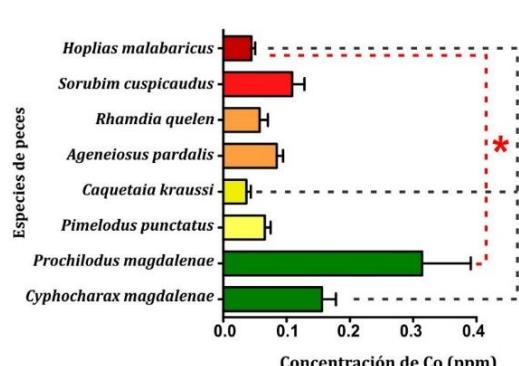


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# Elements in Fish

## Atrato River

- A. Cobalt**
- B. Vanadium**
- C. Strontium**
- D. Thallium**
- E. Molybdenum**
- F. Tin**



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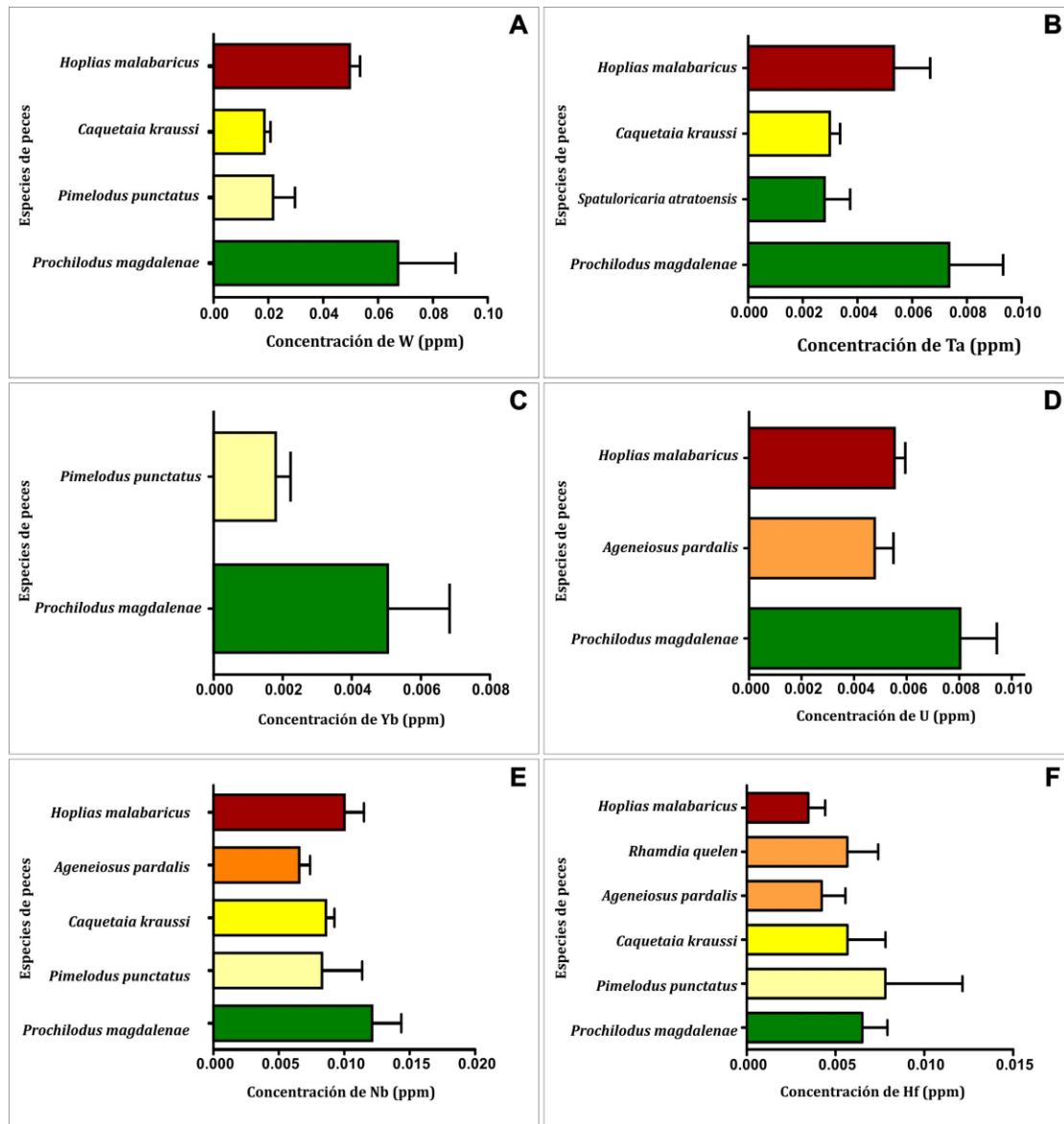
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# Elements in Fish Atrato River

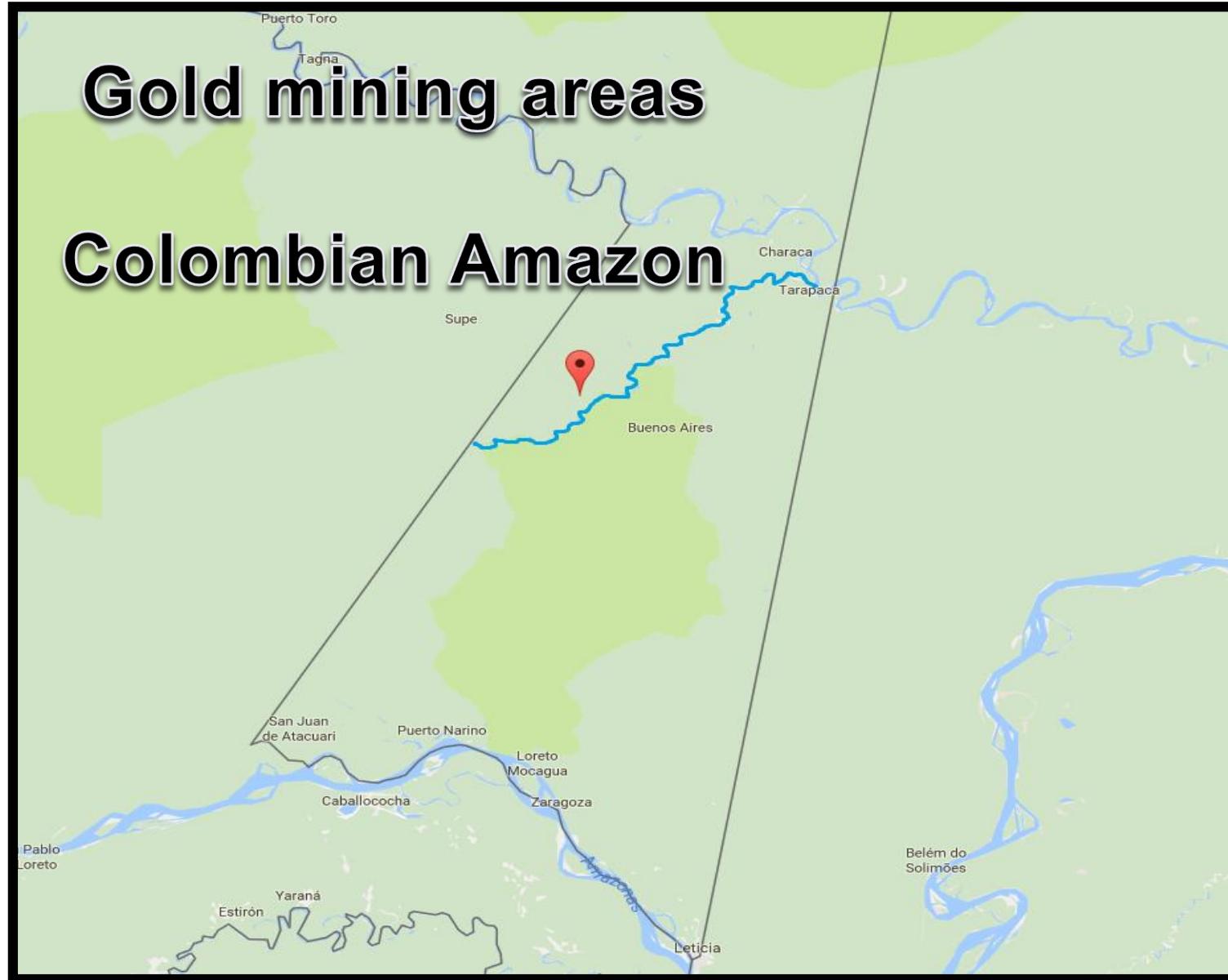
- A. Tungsten**
- B. Tantalum**
- C. Ytterbium**
- D. Uranium**
- E. Niobium**
- F. Hafnium**



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# Gold mining areas and biodiversity loss



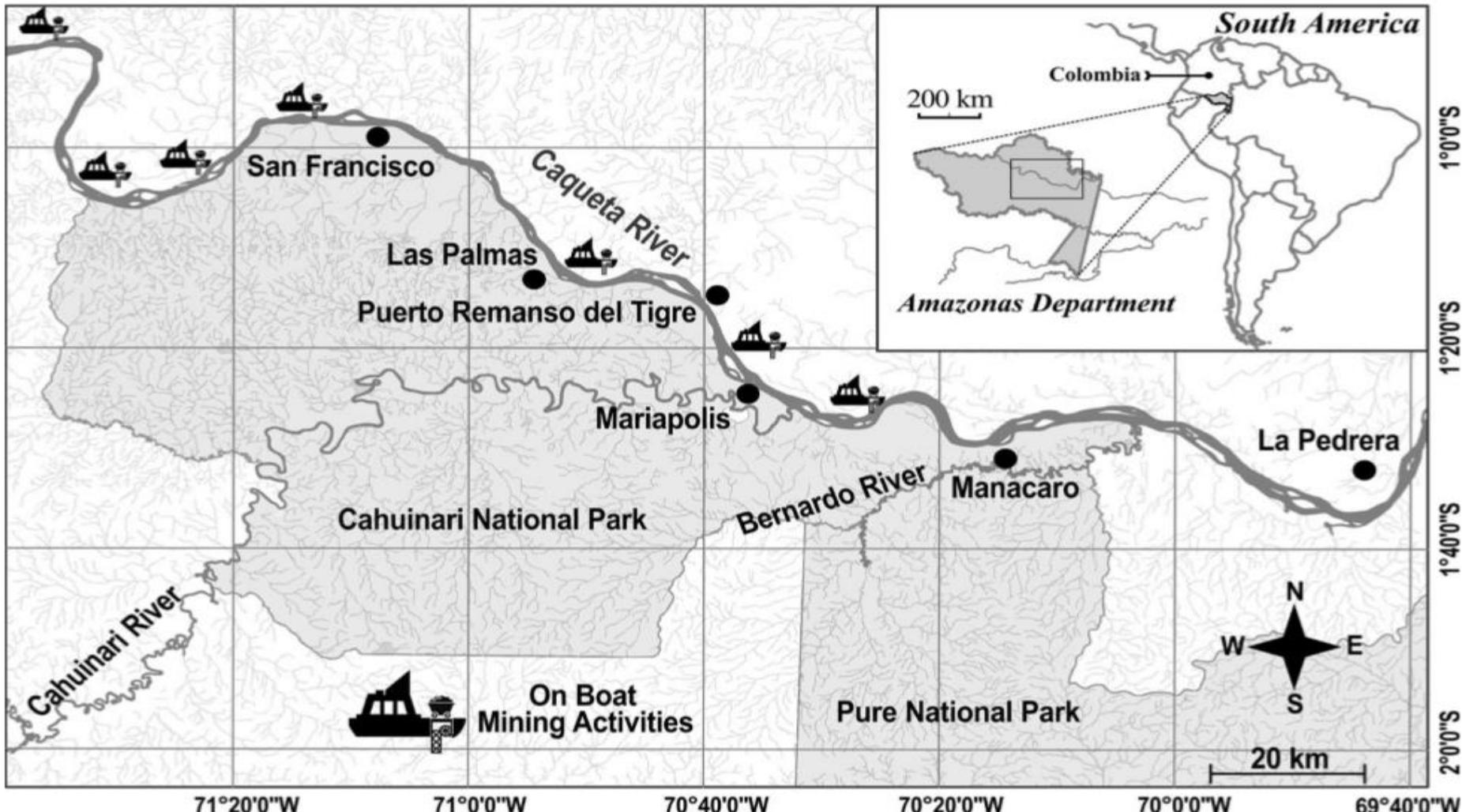
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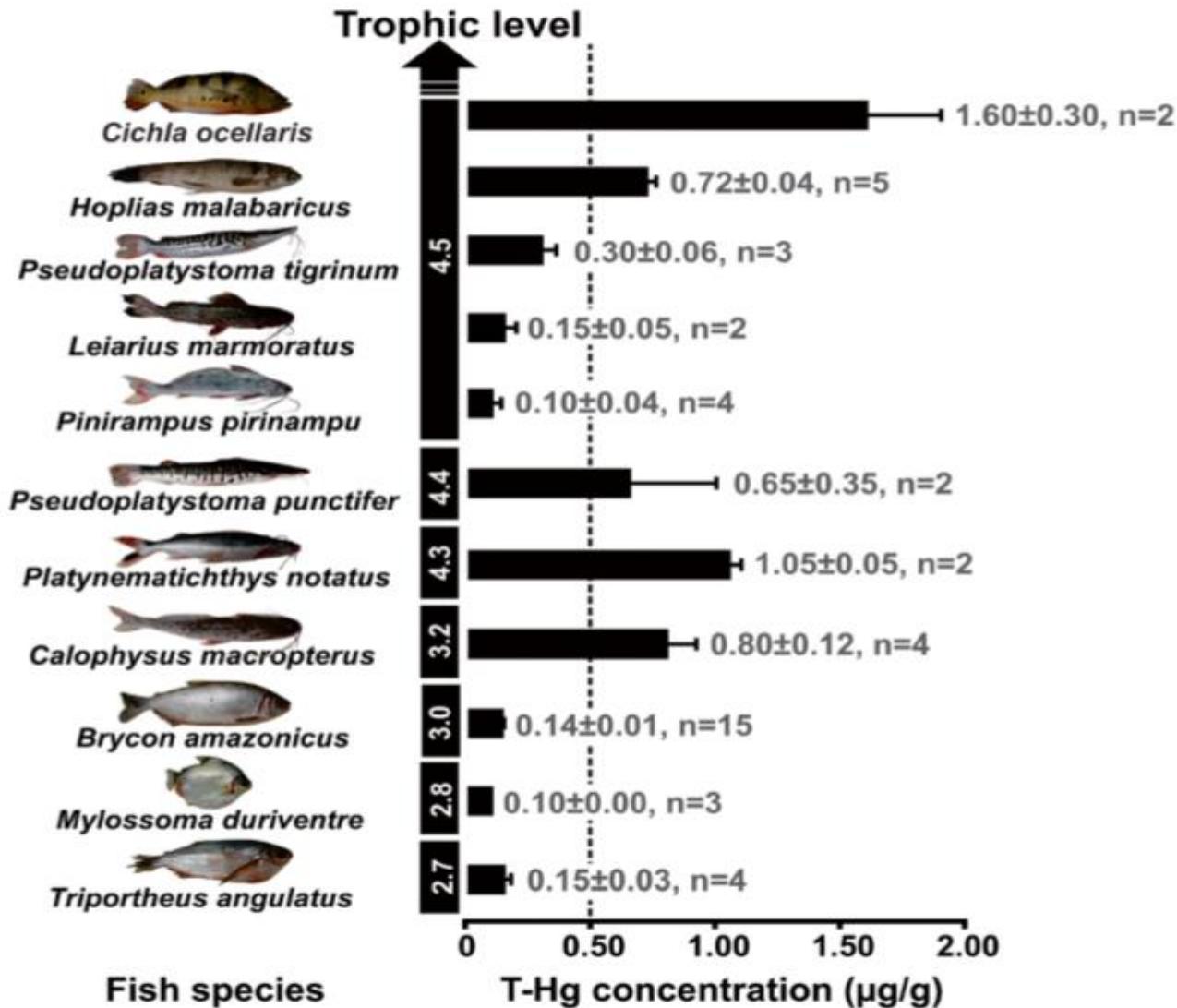
# Caqueta River (Colombian Amazon): Sampling stations.



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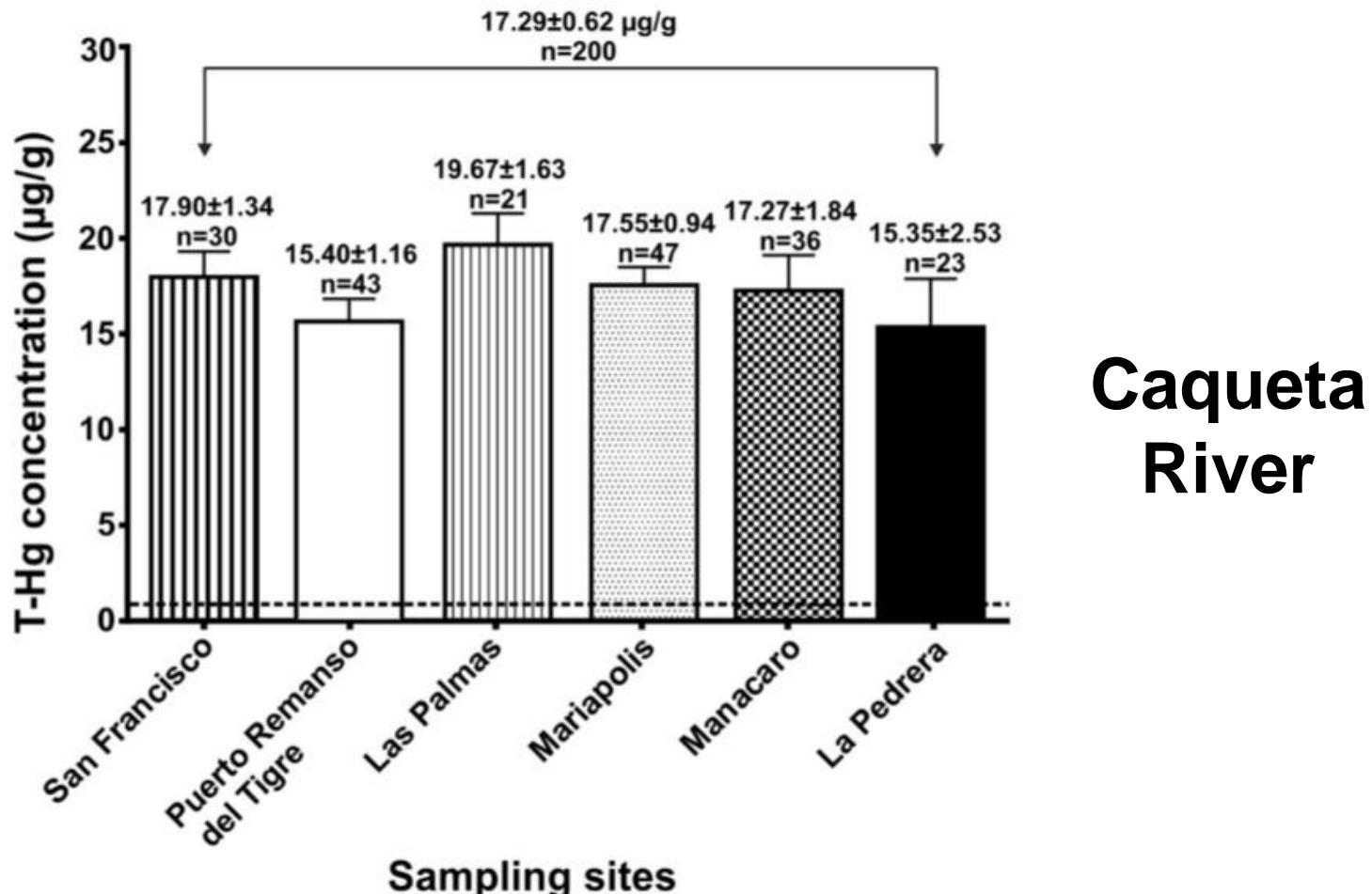
# Hg levels in fish from the Colombian Amazon



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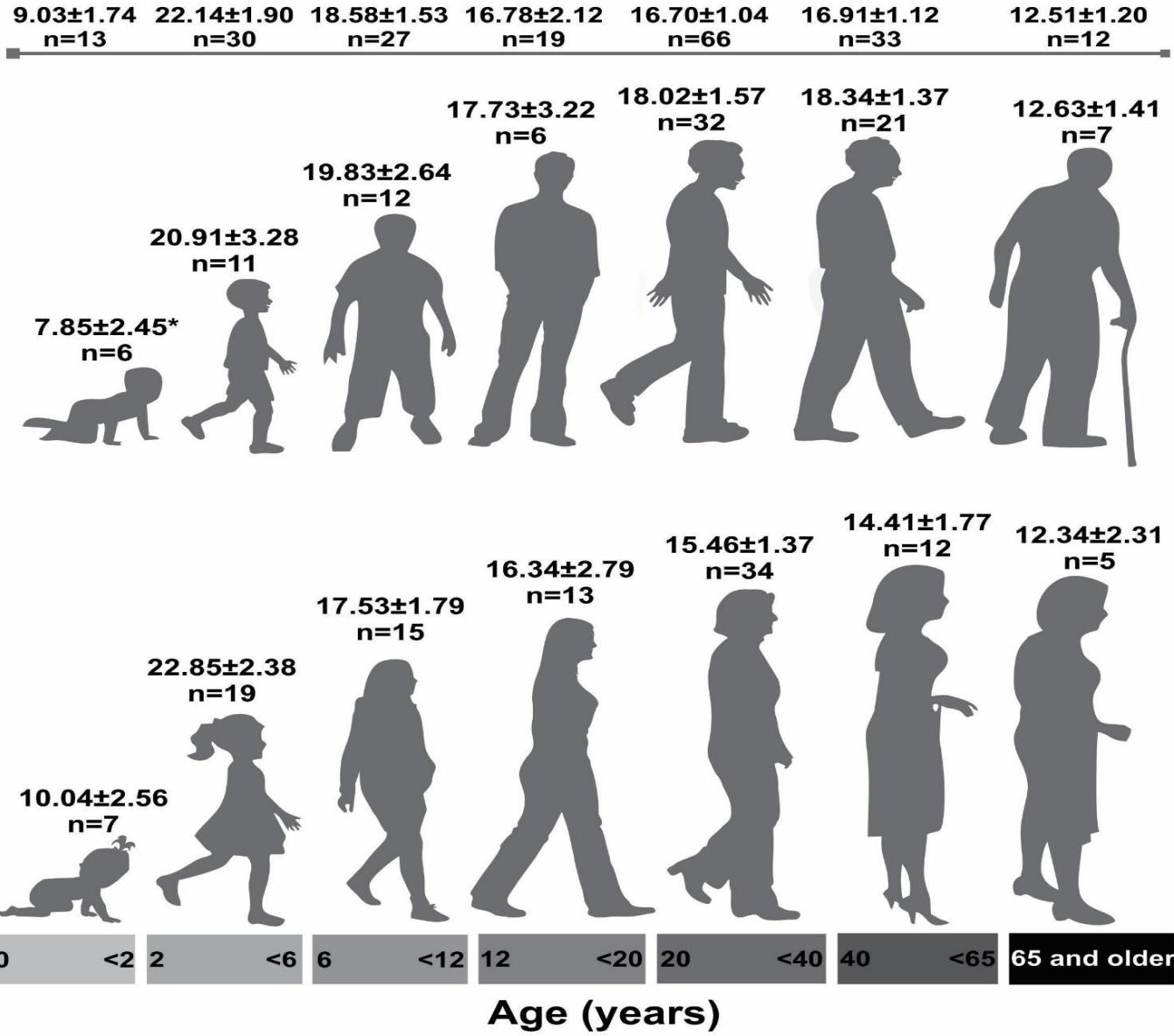
# Mercury levels in Colombian citizens living in the Amazon



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## Overall average

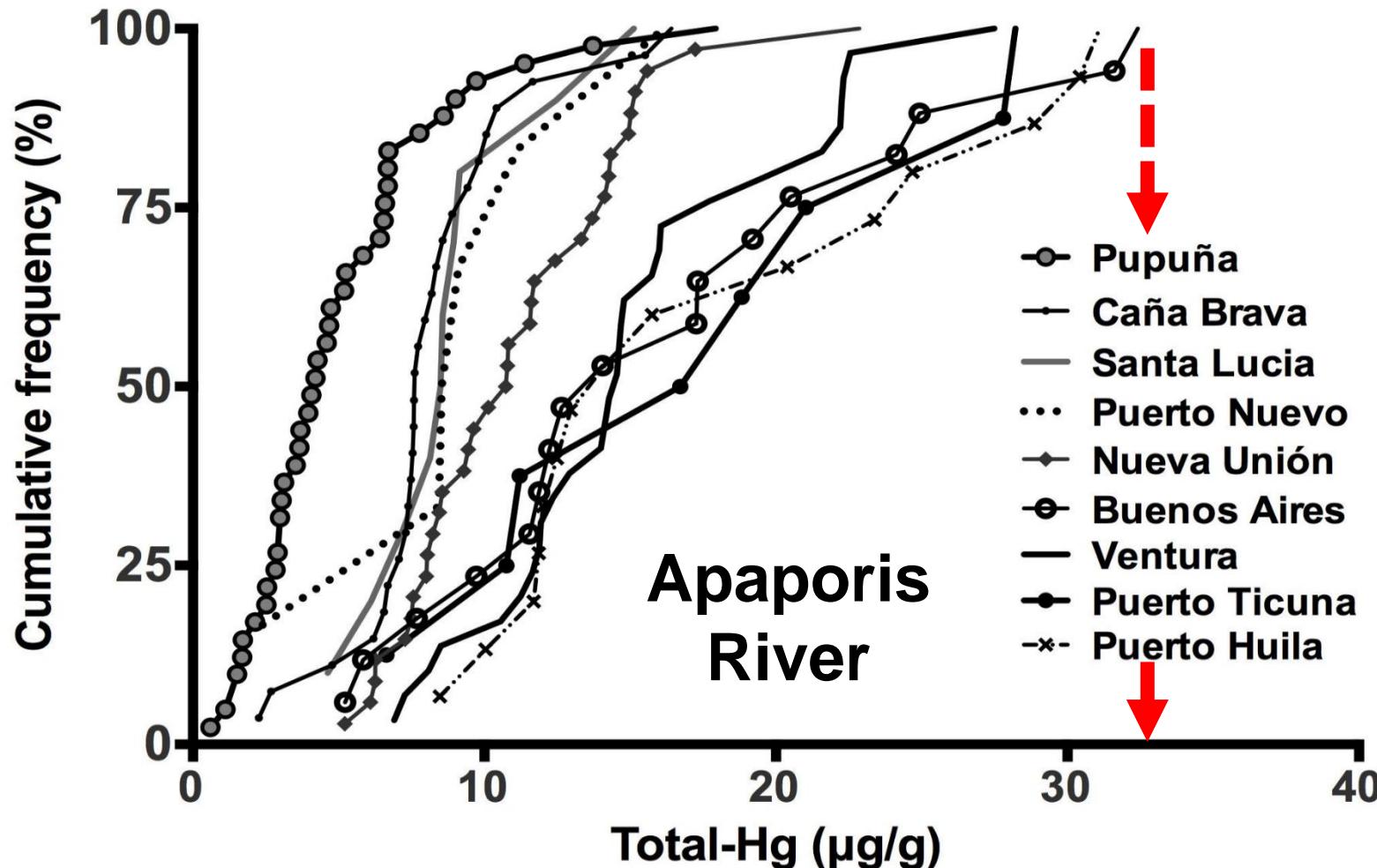


# Total Hg in indigenous communities

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# Mercury levels in Colombian citizens living in the Amazon



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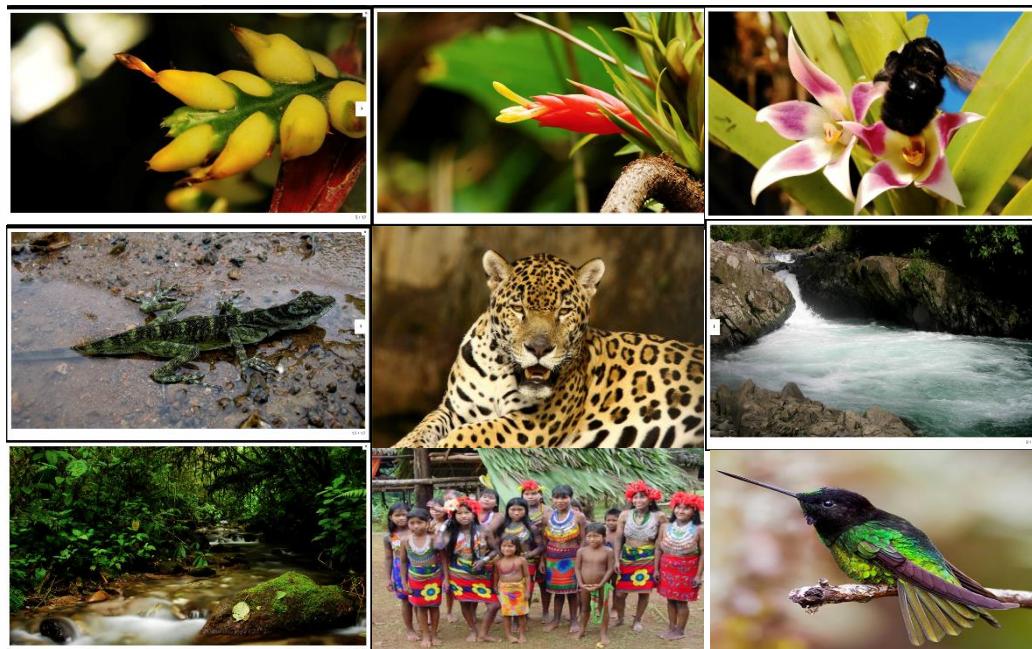
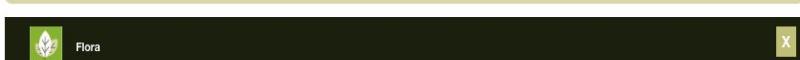
# Las Orquideas National Natural Park

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Parques Nacionales Naturales de Colombia > Parques Nacionales > Parque Nacional Natural Las Orquídeas

Parque Nacional Natural Las Orquídeas



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# Bird species captured for mercury analysis from Las Orquideas National Natural Park.

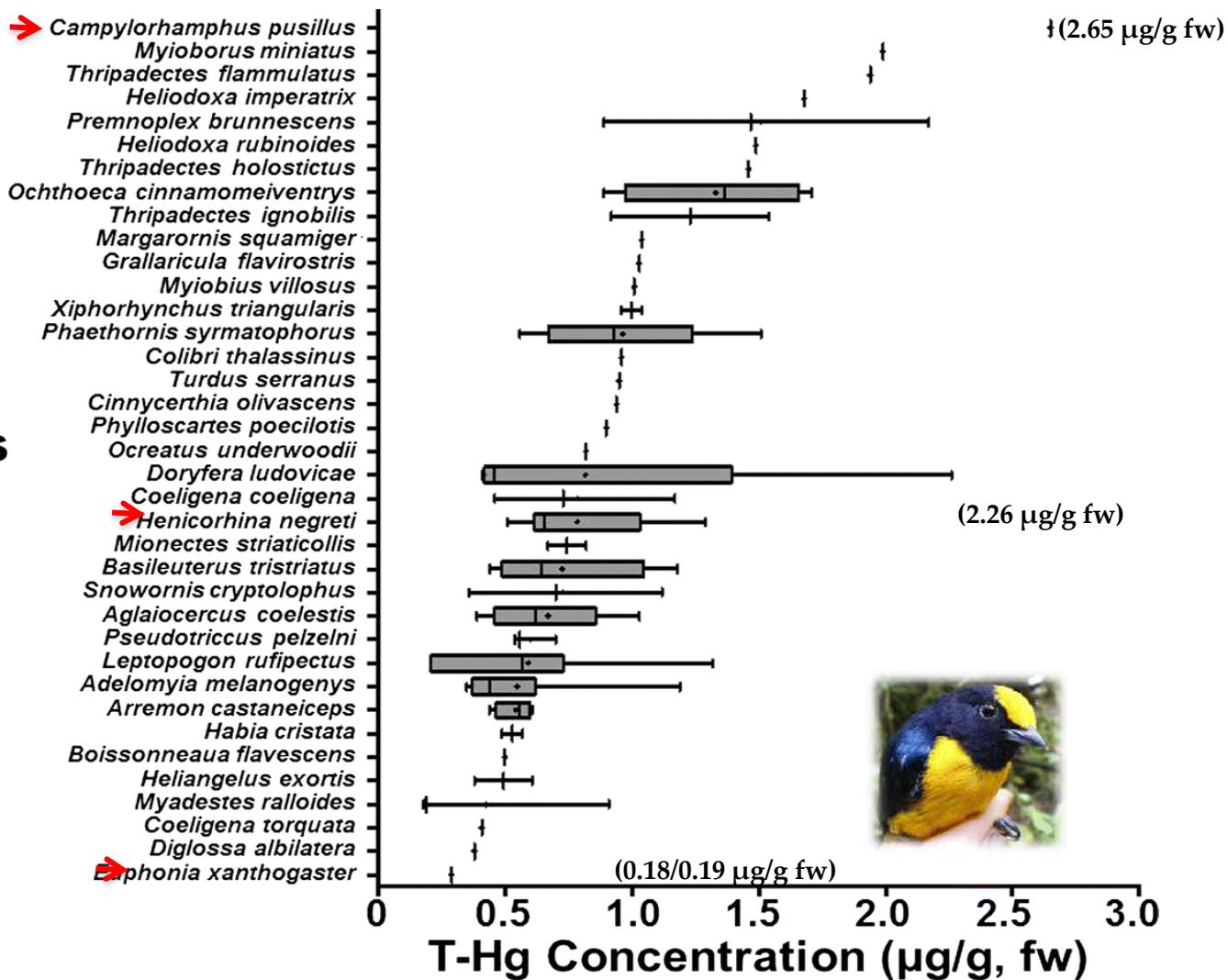


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# Total Hg concentrations in feathers obtained from birds collected at Las Orquideas National Natural Park

## Species



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# The city surrounded by water



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# Biodiversity

# Tourism



# Food



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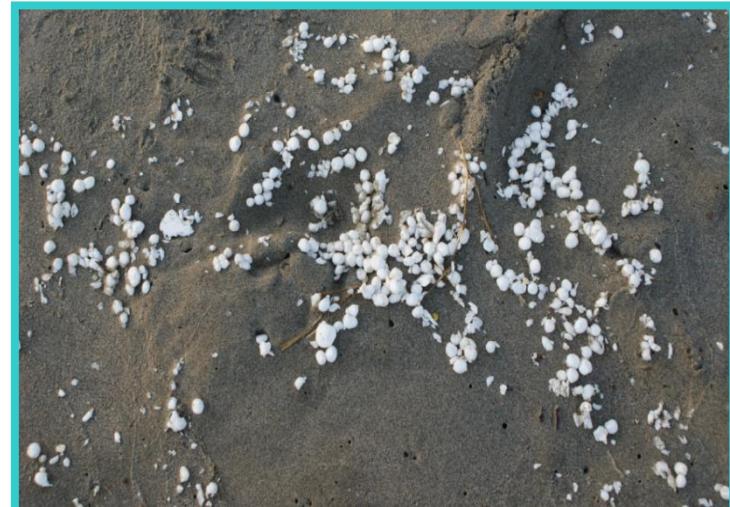
# Littering



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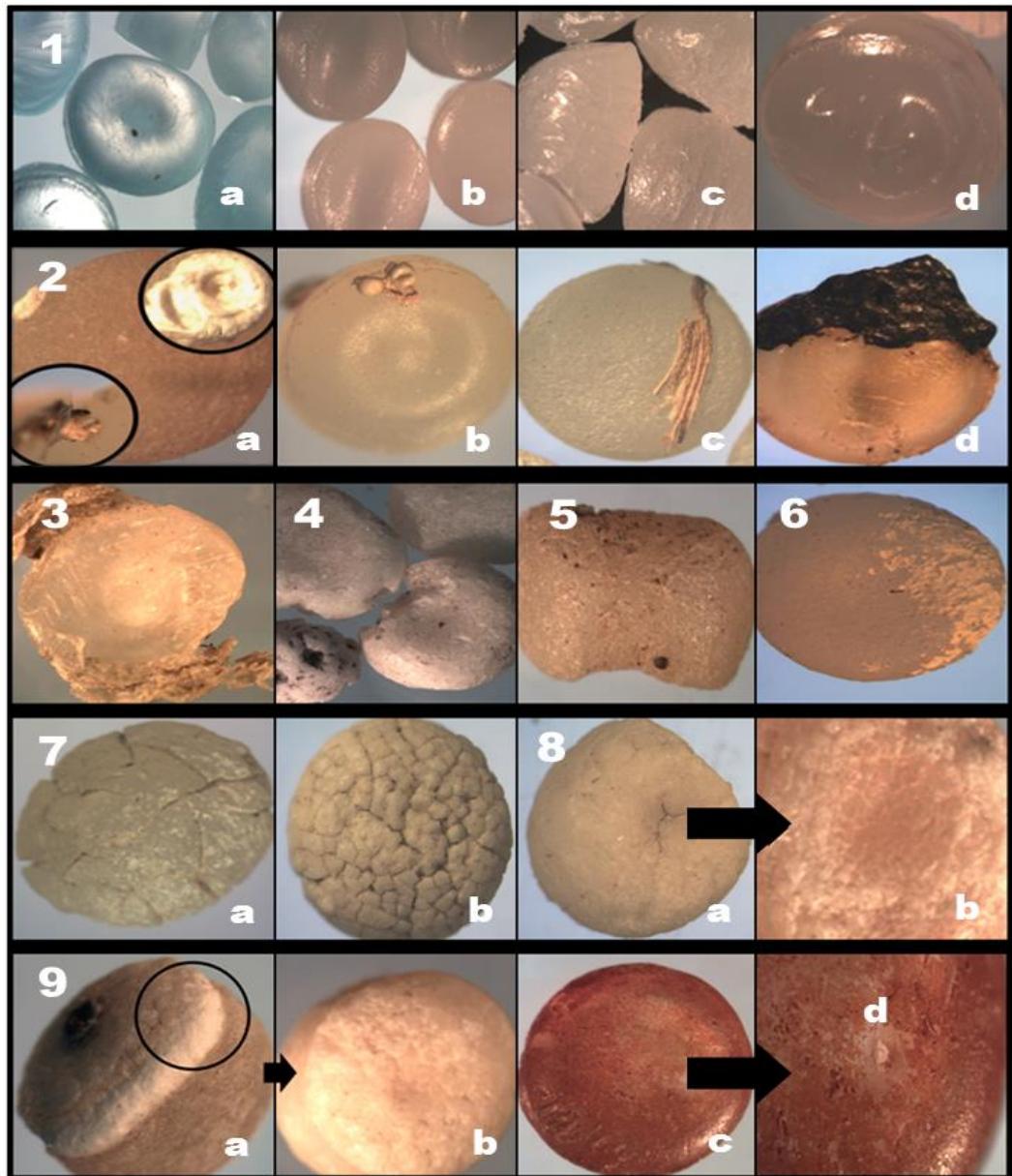


# Littering



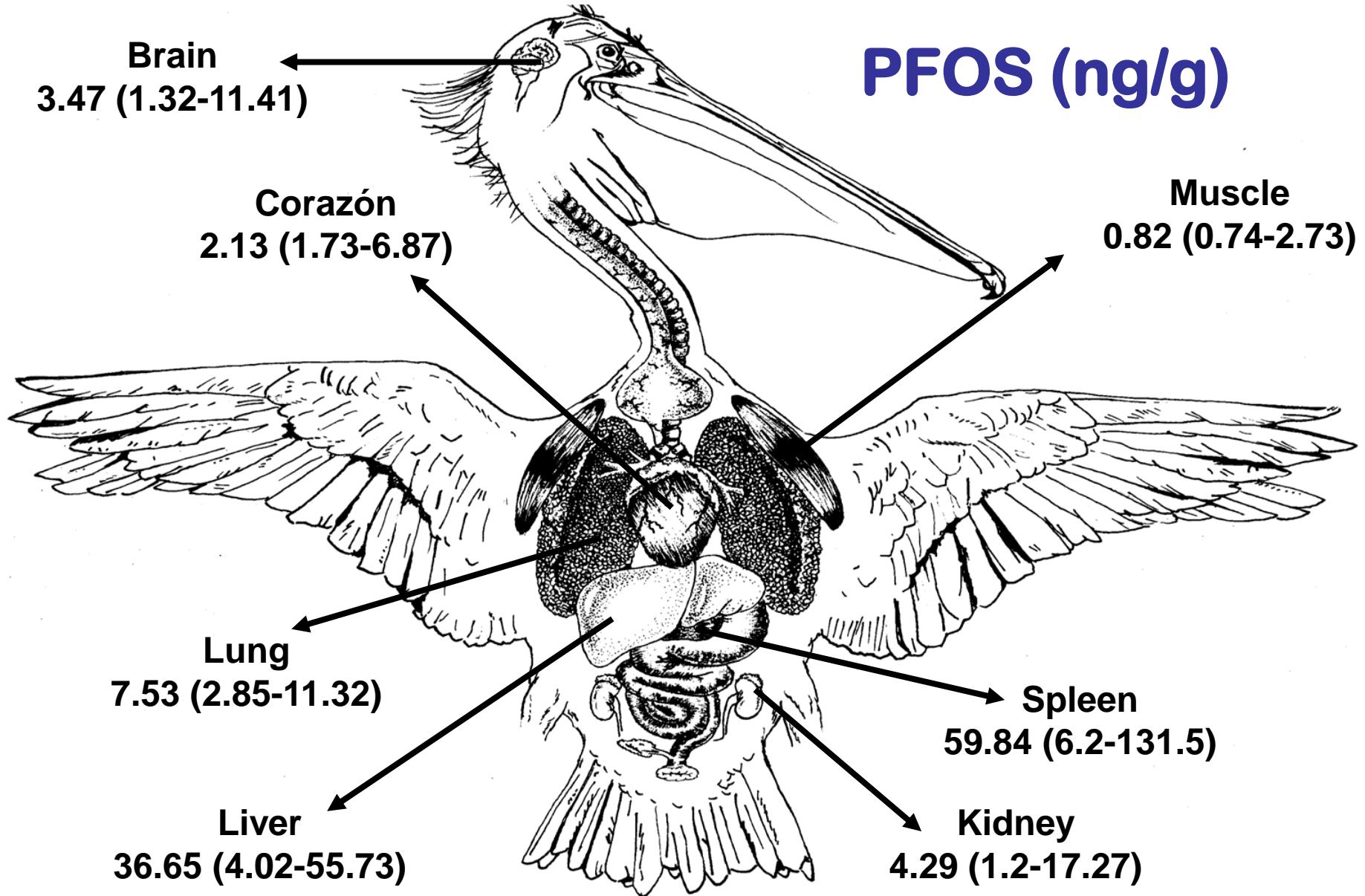
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# Industrial Littering



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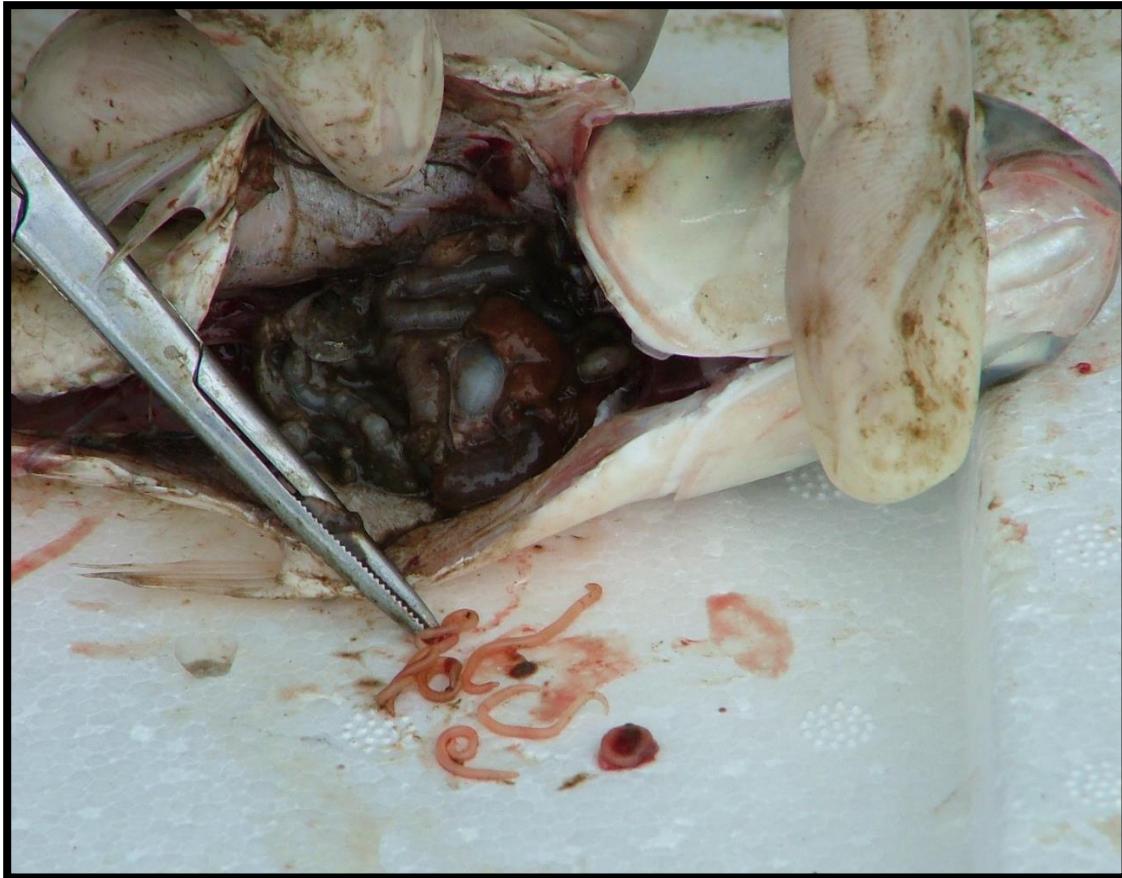




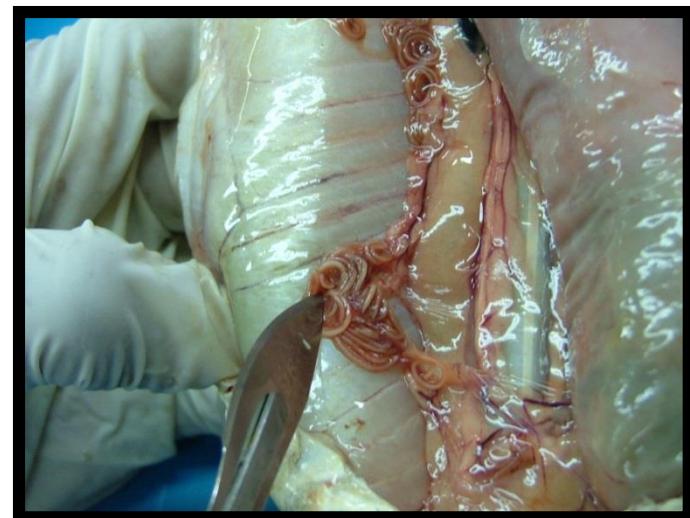
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# Lisa (*Mugil incilis*)



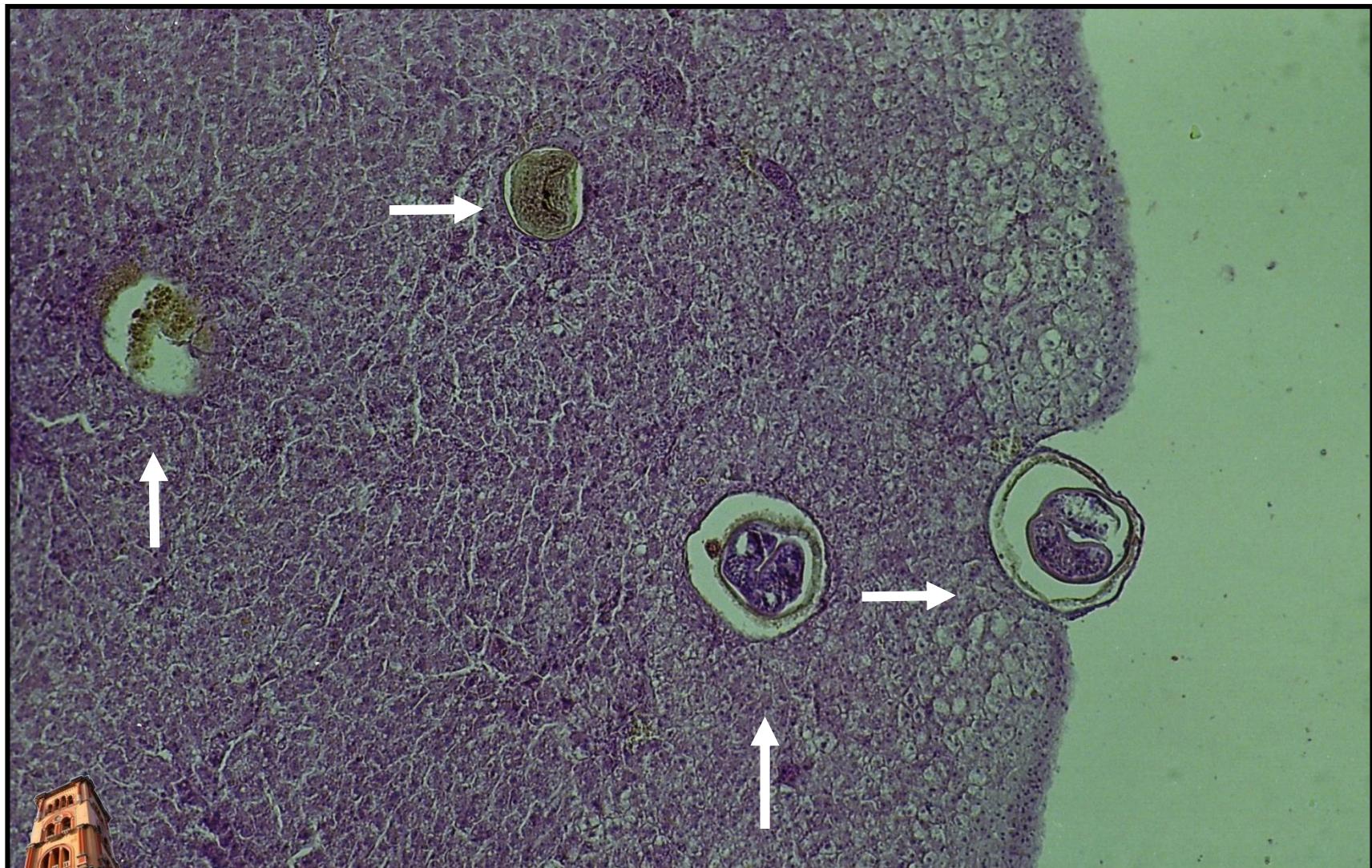
# *Hoplias malabaricus*



Regional Consultation Meeting “Water Quality in Europe: Challenges and Best Practices”  
Koblenz, Germany, 1-4 December 2015.



# Lisa (*Mugil incilis*)



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# White heron (*Egretta thula*)

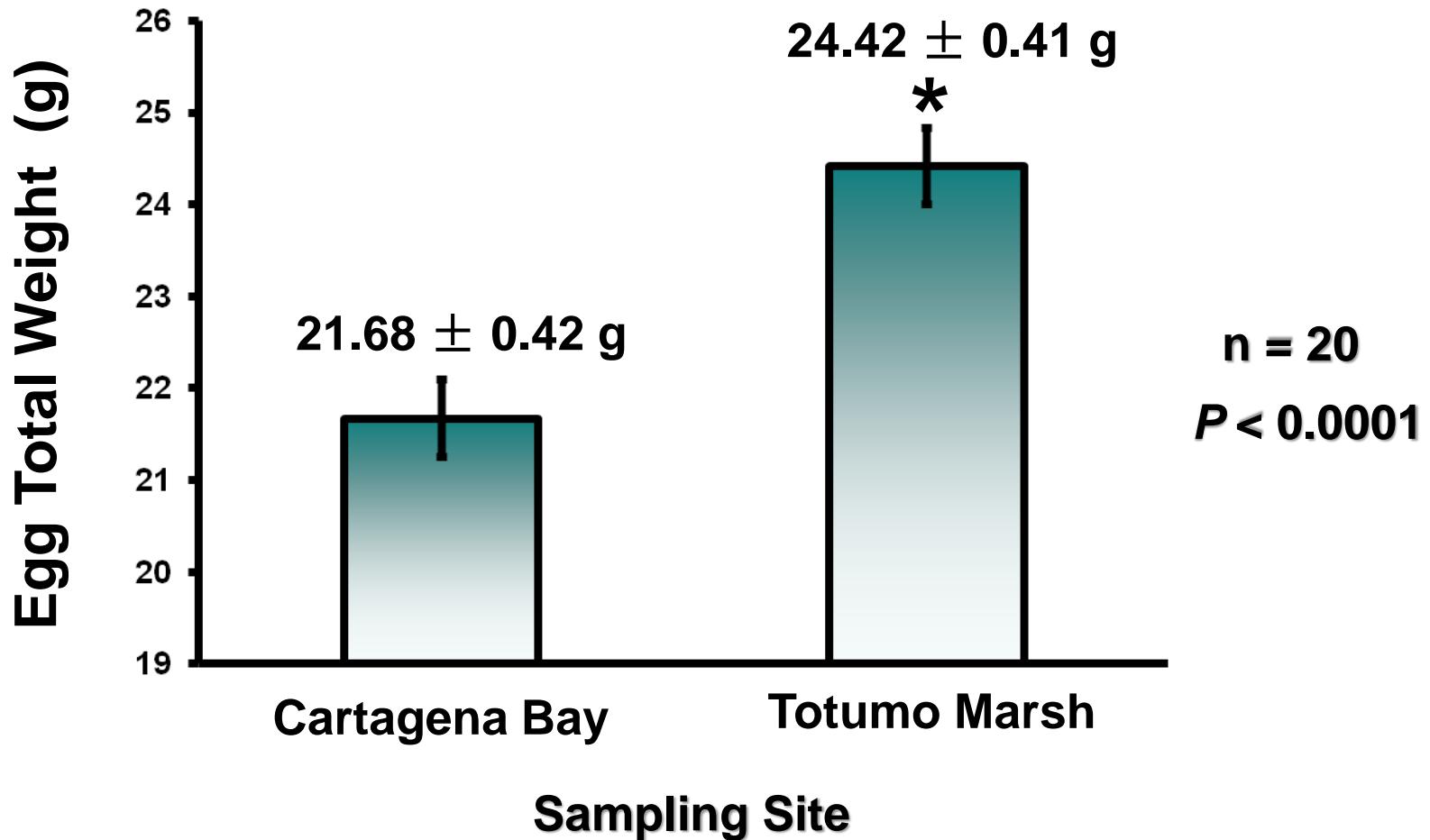


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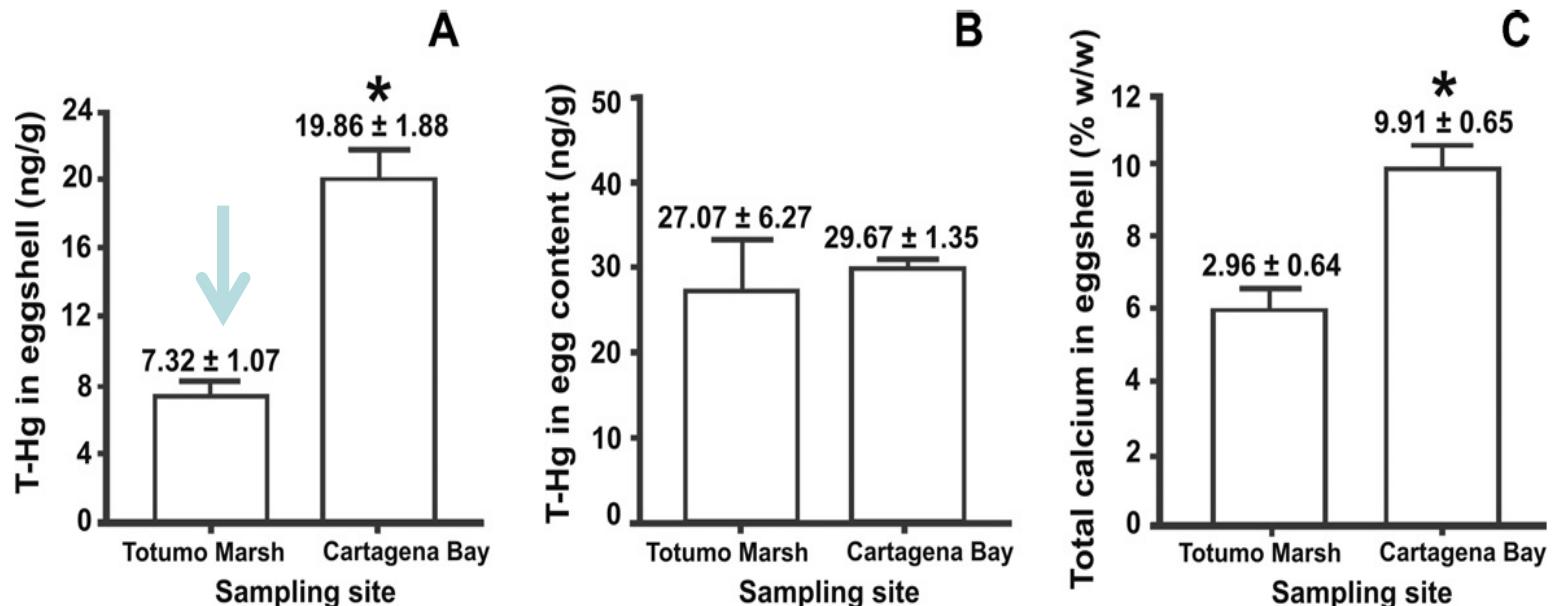


Fig. 4. Total mercury concentrations in eggshell (A), egg content (B), and total calcium in eggshell (C) of *Egretta thula* from Totumo Marsh and Cartagena Bay.

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# Final Considerations

Natural  
Environment

Biodiversity

**Species-Rich countries are not using Biodiversity**

**Eco-Tourism is just a word, just to sell tickets**

**Biodiversity is being replaced by mines and pollution**

**Gold: 1 g 52.1 €**

**Coal: 1 ton. \$38.5 USD**

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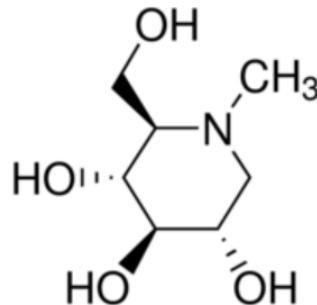
# N-Methyl-1-deoxynojirimycin

≥98%

Synonym: 1,5-Dideoxy-1,5-imino-1-methyl-D-sorbitol

Just two molecules from a single plant species  
found in a Colombian Forest

CAS Number 69567-10-8 | Empirical Formula (Hill Notation) C<sub>7</sub>H<sub>15</sub>NO<sub>4</sub> | Molecular Weight 177.20 | Beilstein/REAXYS Number 1524564 | MDL number MFCD00133609 |  
PubChem Substance ID 24896690 | NACRES NA.32



❖ SDS Specification Sheet

Similar Products

SKU-Pack Size	Availability	Pack Size	Price (USD/EUR)
M1777-5MG	Estimated to ship on 21.12.20	5 mg	584.19 ★ ⓘ

To order products, please contact your local dealer. [Click here](#)

5 mg

584 USD



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R314525

0.5 mg

1075 USD

## Rehmaionoside A



Pack Size	Quantity	Price (USD)	Sub Total
0.5mg	- 0 +	\$ 1075.00	0.0
1mg	- 0 +	\$ 2045.00	0.0
2.5mg	- 0 +	\$ 4555.00	0.0
5mg	- 0 +	\$ 8645.00	0.0
Exact Weight Packaging	- 0 +	\$ 75.00 / Vial	0.0

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# **Final Considerations**

**We need to act now!**

**Protecting Biodiversity  
is a good business**

**Comprehensive Ecotourism  
is critical for environmental protection  
and sustainable development**

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# Acknowledgements



- University of Cartagena. Cartagena, Colombia
  - Environmental and Computational Chemistry Group
  - Ph.D. Program of Environmental Toxicology
  - Minciencias. Bogotá, Colombia. WWF
  - Amenet
  - Instituto Tides: Universidad de las Palmas de Gran Canaria

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The background of the image is a beautiful sunset over a wide river. The sun is low on the horizon, casting a warm orange glow across the sky and reflecting off the water. In the distance, there are dark silhouettes of mountains. The foreground shows a grassy bank with some small trees and bushes.

# Thanks

**joliverov@unicartagena.edu.co**  
**@joliverov**