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CAPE TOWN INTERNATIONAL CONVENTION CENTRE

Avian mercury exposure in Gold mining areas of the Southern Peruvian Amazon

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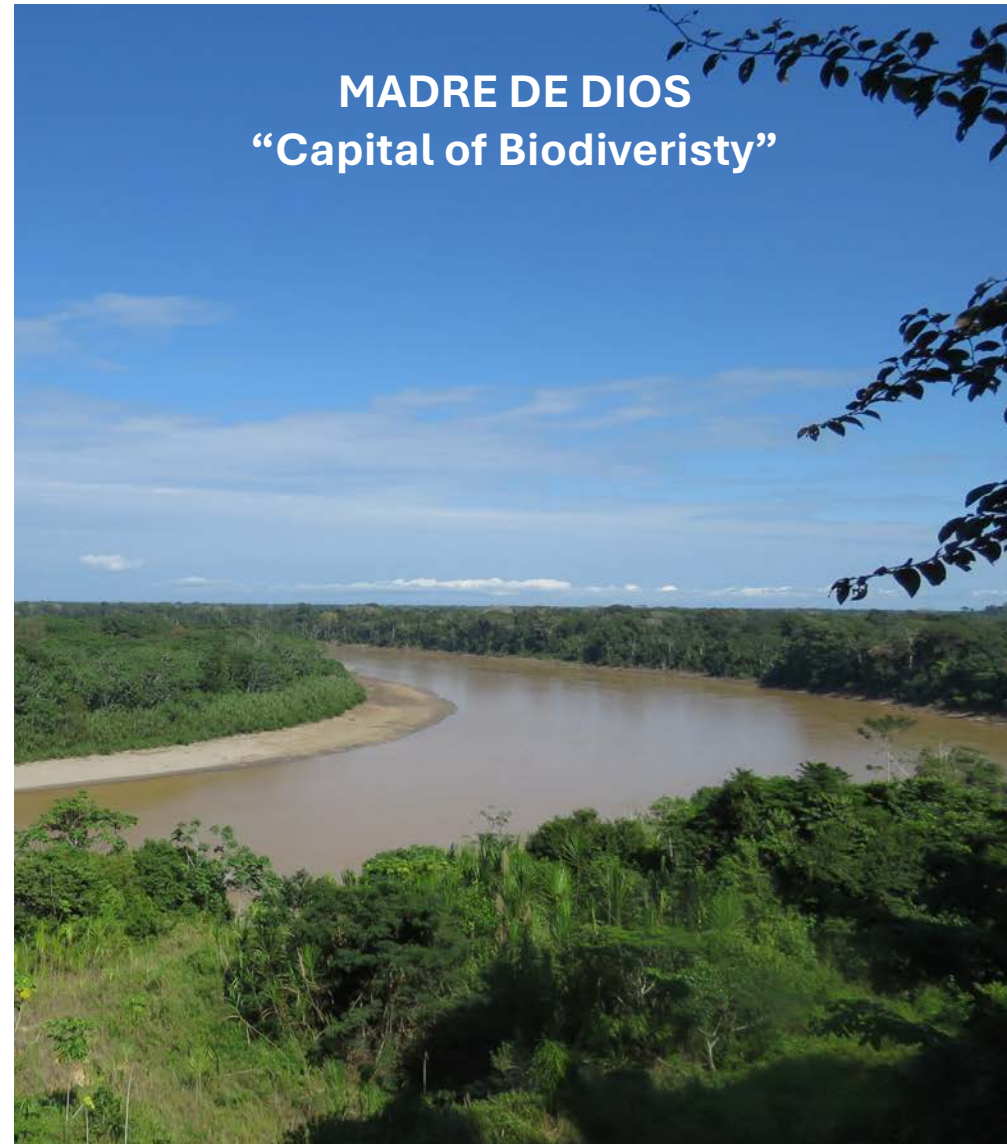
Preliminary Results Field season (June-August 2023)

Claudia Vega, PhD, MSc

Mercury Program Coordinator



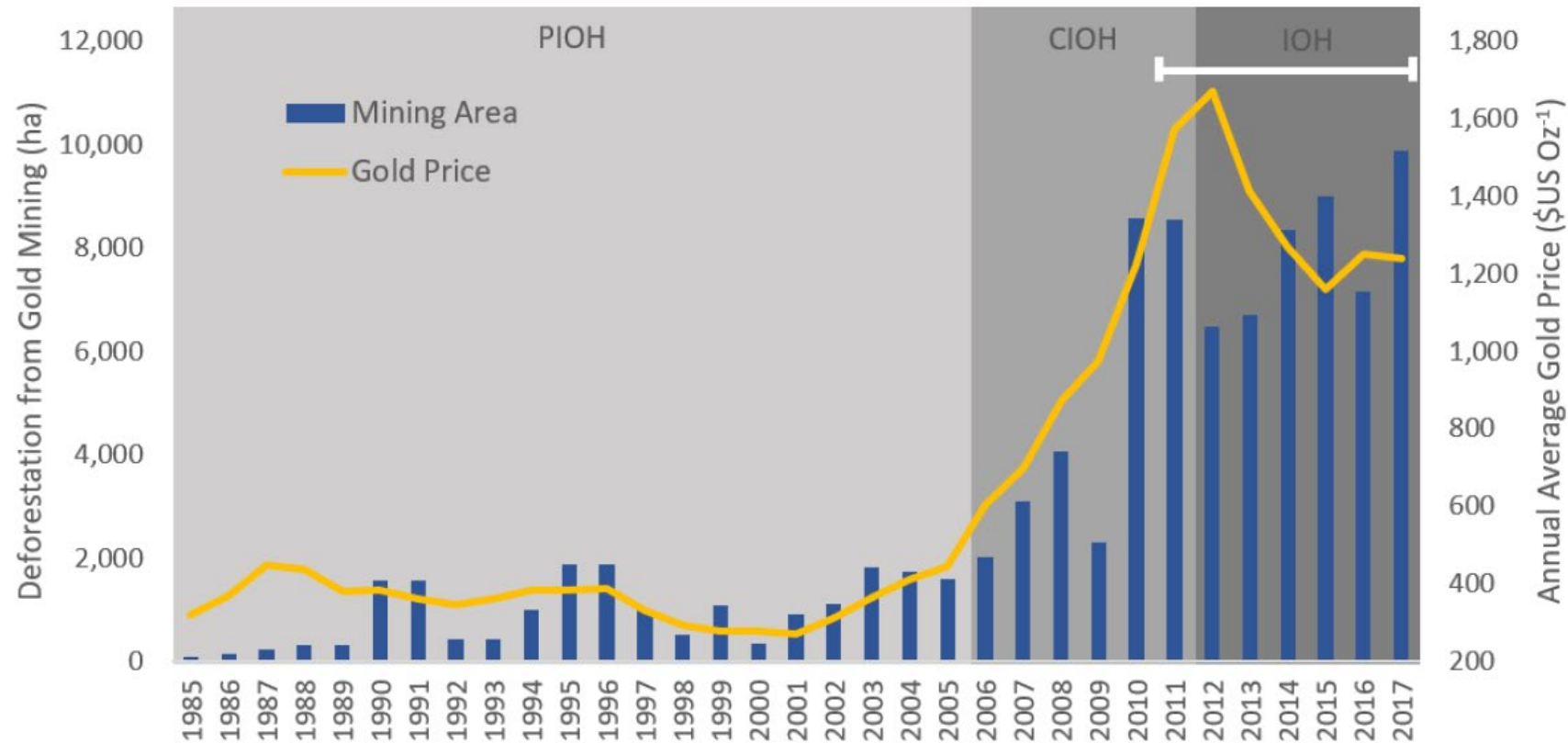
Madre de Dios, Southern Peruvian Amazon



Artisanal Small Scale Gold mining



ASGM Deforestation in Madre de Dios: 1985-2017



Source: Caballeros et al, 2018. Remote Sensing doi:10.3390/rs10121903

Artisanal Small Scale Gold mining

An aerial photograph showing a vast expanse of dense green forest in the upper half, transitioning into a large, irregularly shaped area of deforestation in the lower half. The deforested area is characterized by a light brown, sandy soil with numerous small, interconnected pools of water, creating a mosaic-like pattern. The horizon is visible in the distance under a cloudy sky.

Deforested : **128,000**

240,000 soccer field

Source: CINCIA

ASGM – Low mechanized mining (Suction pumps)



ASGM – Suction pumps



ASGM – Highly mechanized
mining (heavy machinery)



ASGM – Heavy machinery



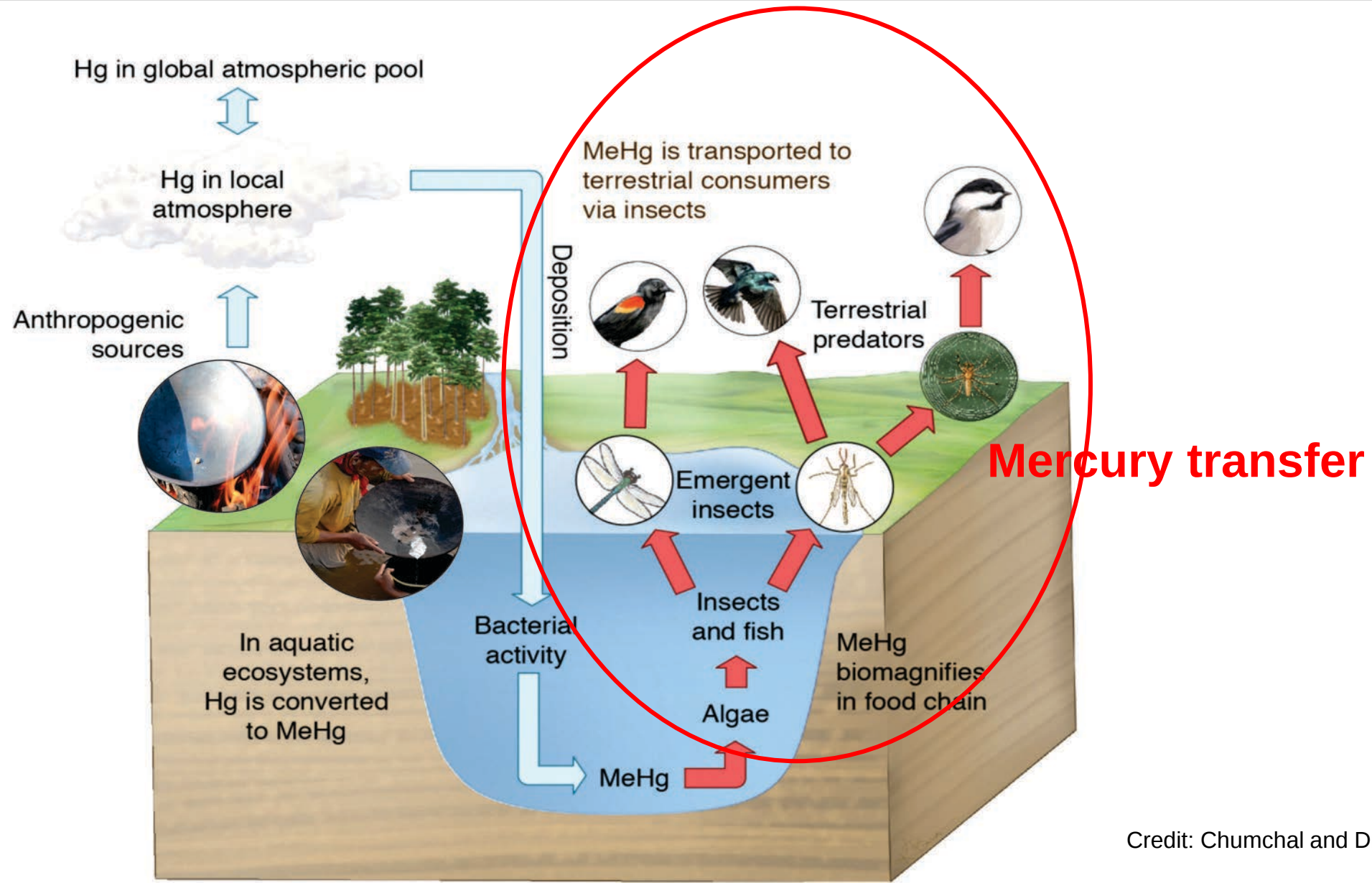
A close-up photograph of a person's hands. The person is wearing a light brown, textured shirt. They are holding a dark, shallow, bowl-like object in their right hand and pouring a white, milky liquid from it into a small, clear plastic container held in their left hand. The liquid is dripping from the bottom of the container. The background is blurred, showing green foliage and a body of water.

Artisanal Small Scale Gold mining

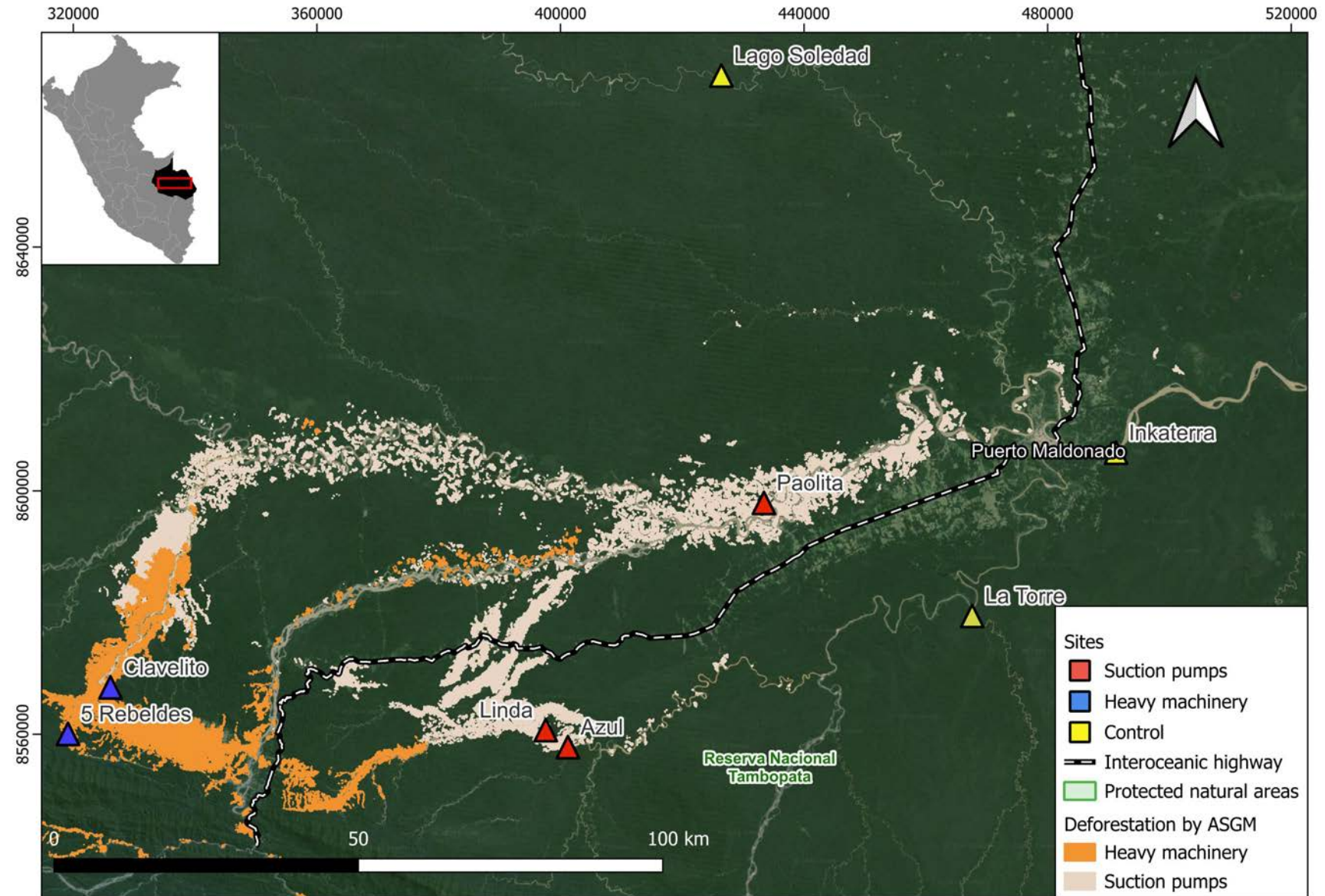
Releases
181 ton mercury/year

Source: *Artisanal Gold Council 2018*

GOAL: Assessing mercury in birds in ASGM sites



Sampling sites



Habitats assessed a ASGM sampling site



Mining ponds



Forested area
(Primary forest)



Non forested area
(forest regeneration)

Captures and bird banding



Indicators sampling



Feathers
(flank and tail)



Blood

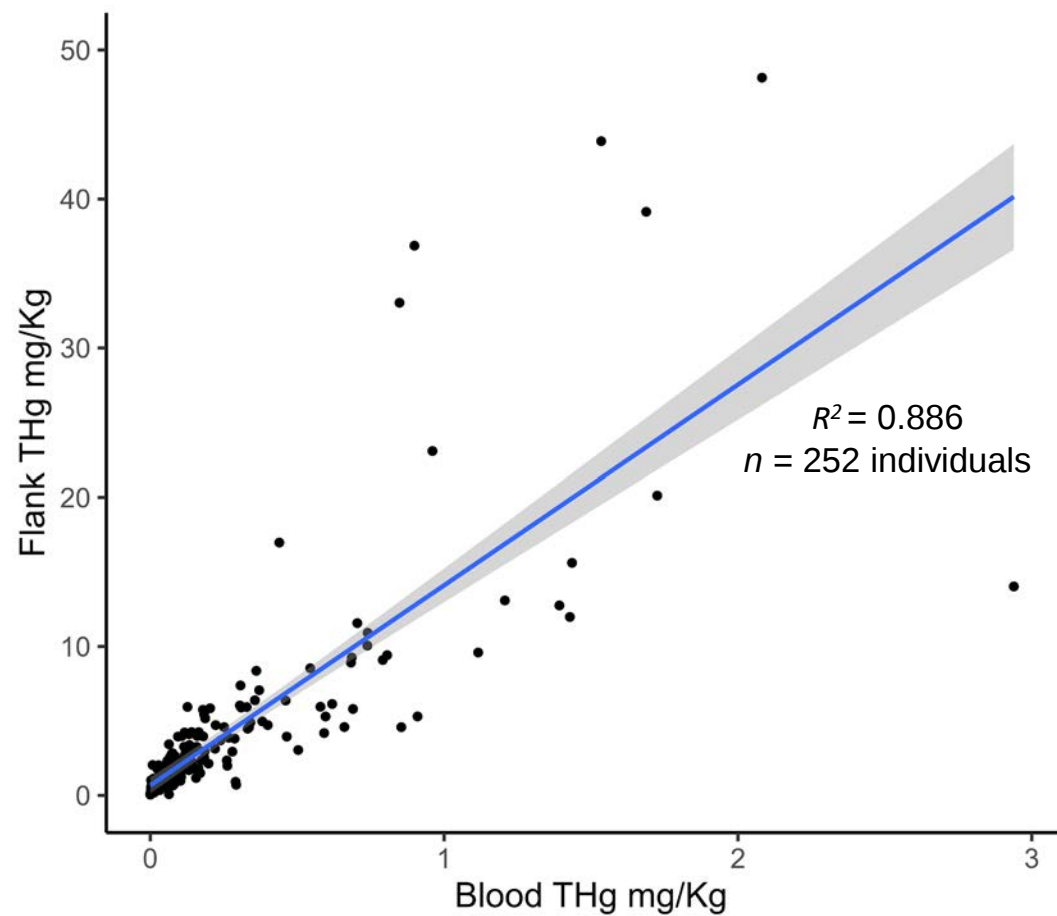
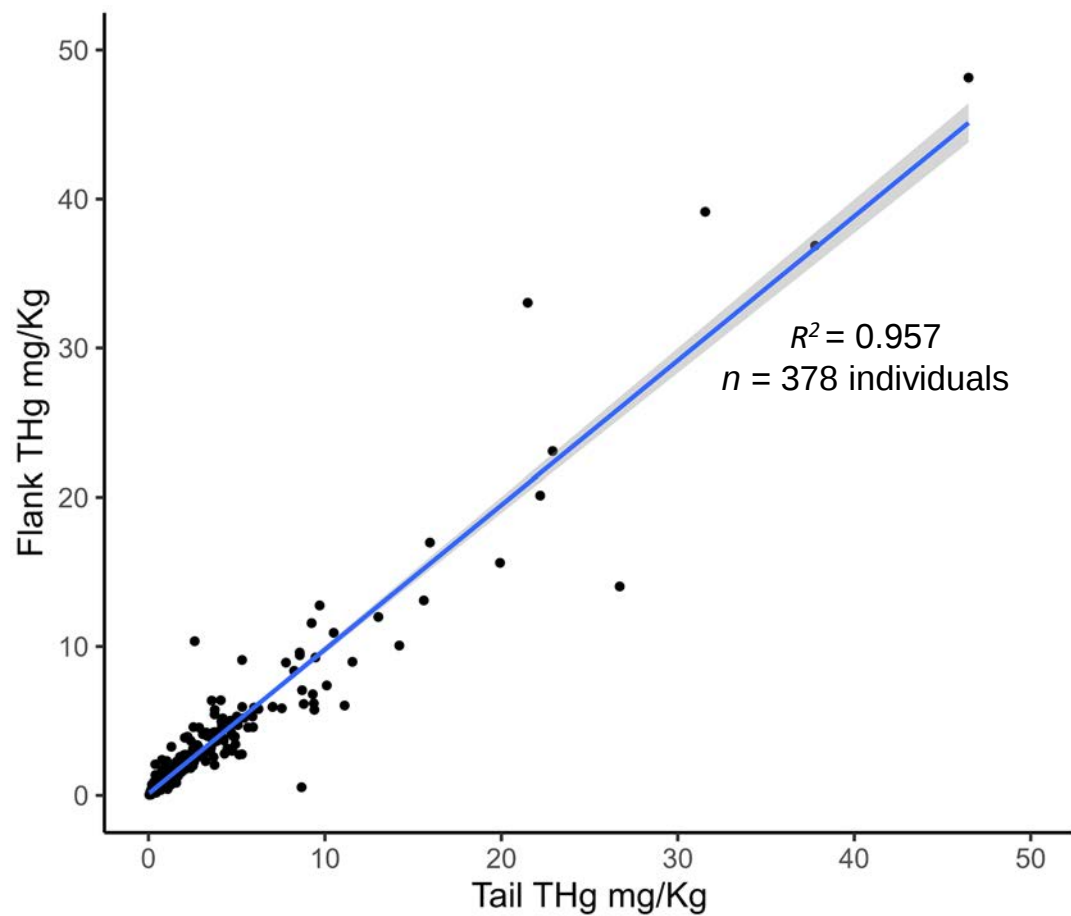




Preliminary Results

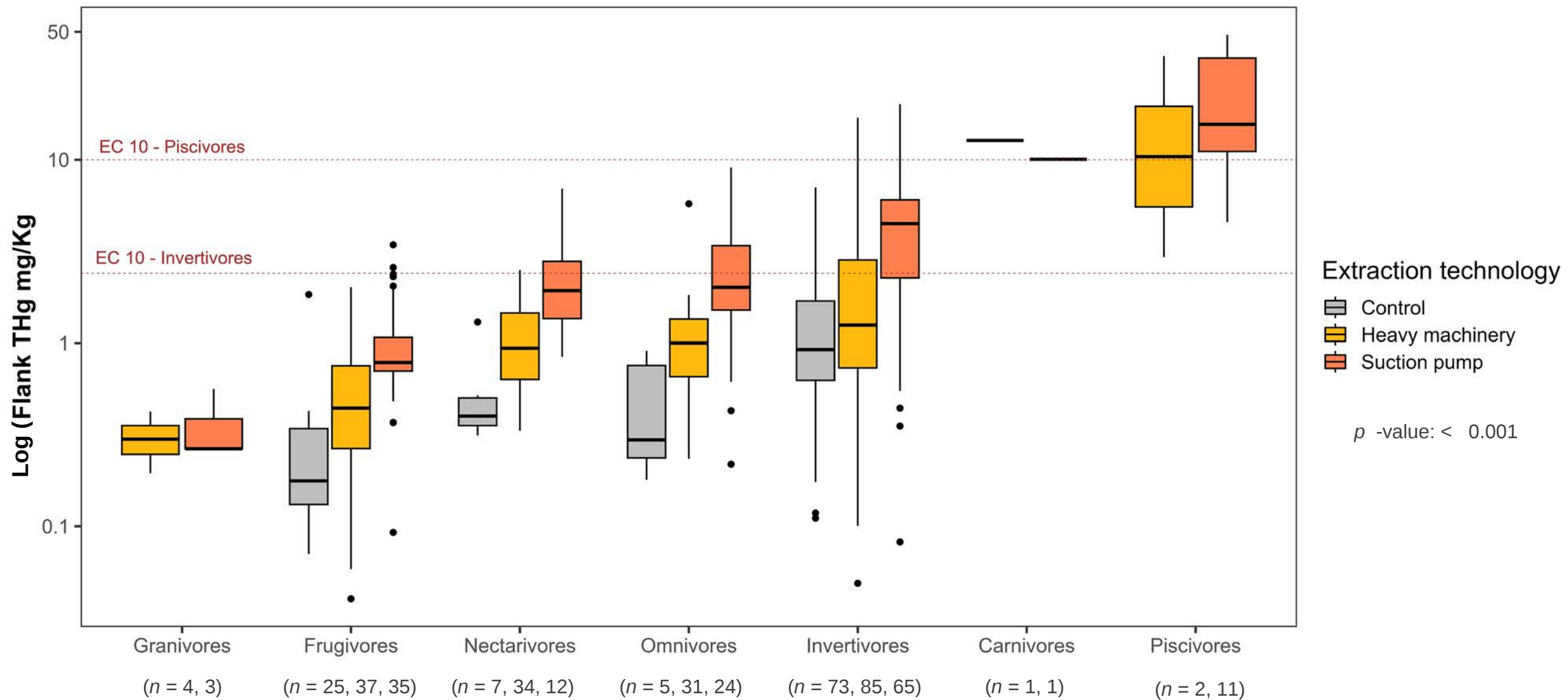


Mercury indicators

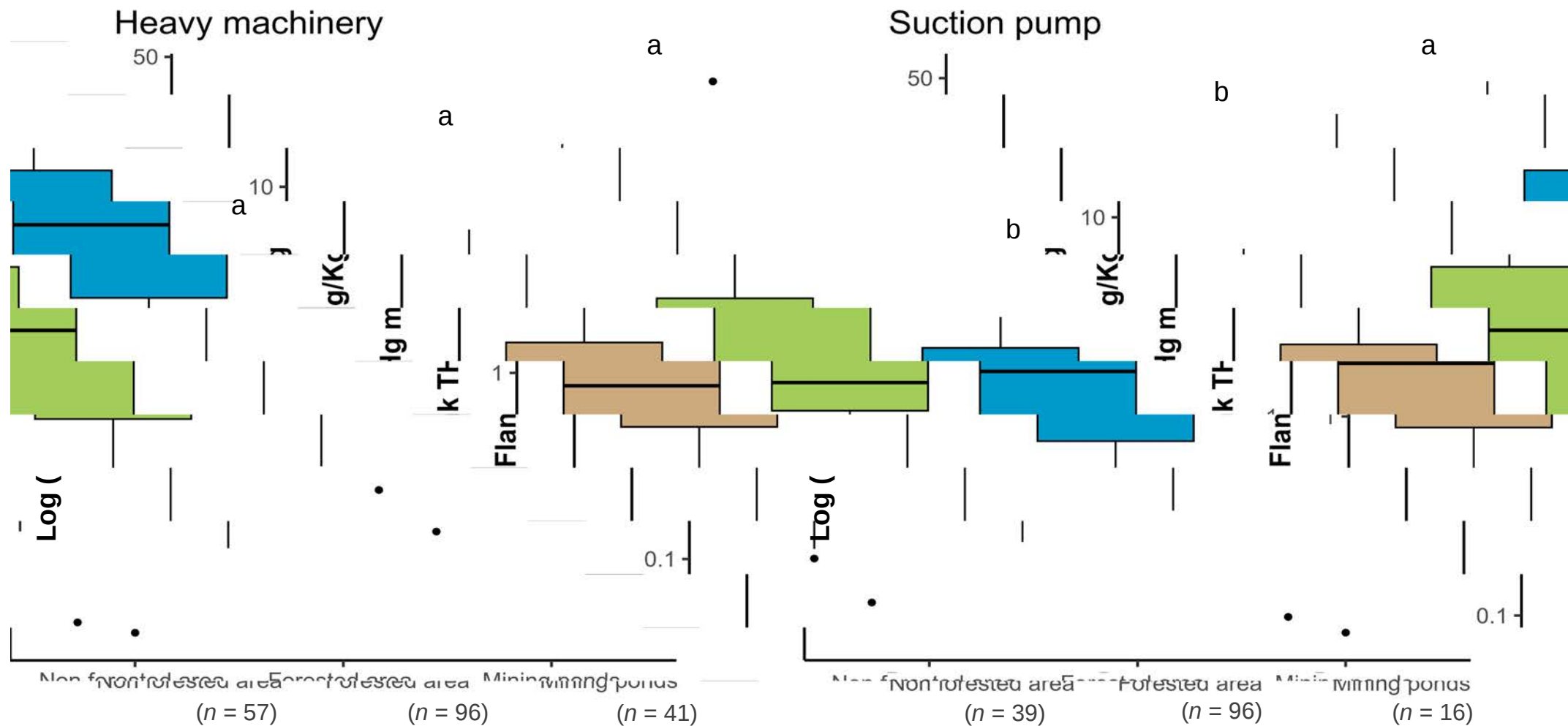


We collected 430 individuals of 130 species

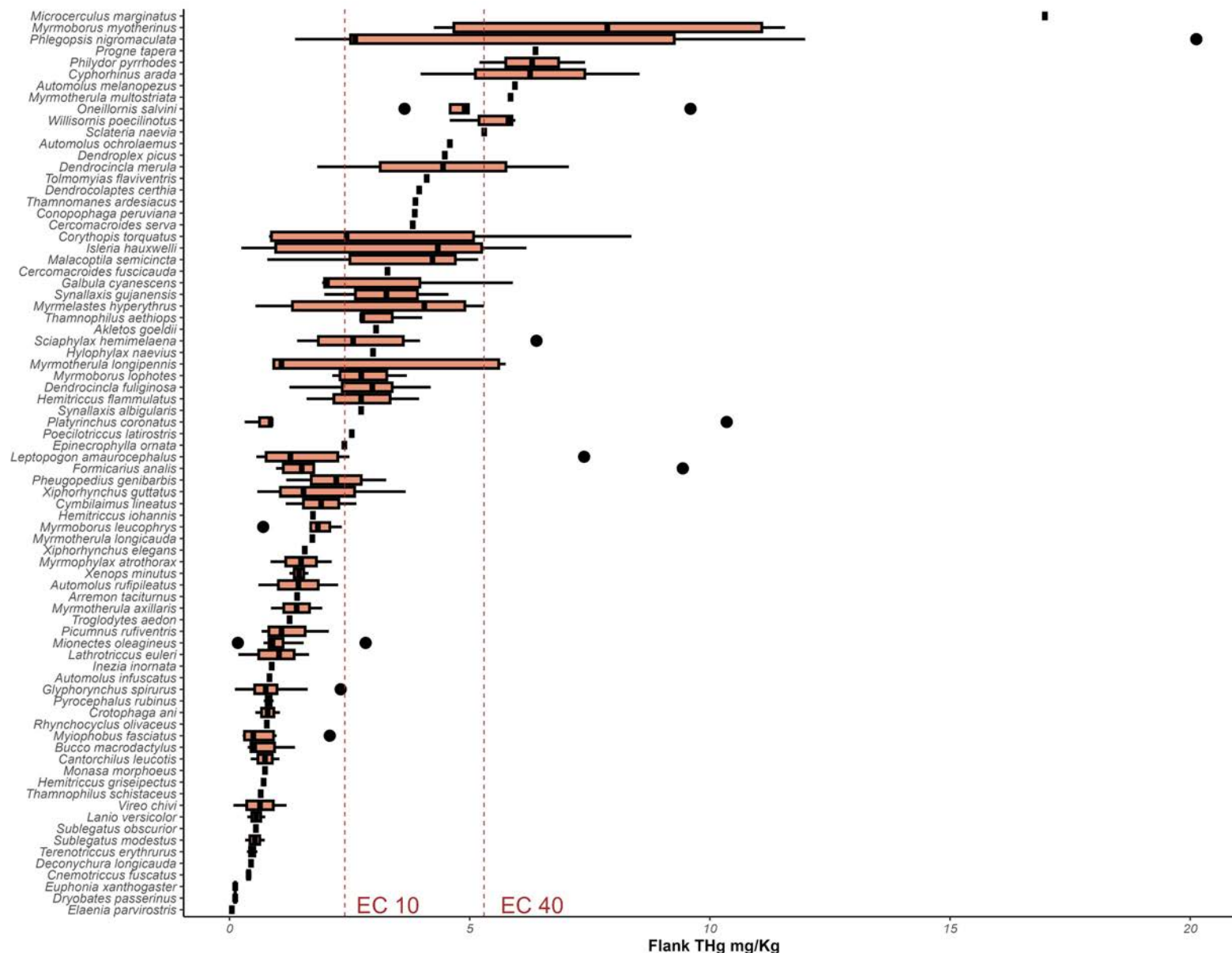
THg in birds from sites with different extraction technology



THg in birds in mining area habitats



THg in invertivores birds from mining area habitats

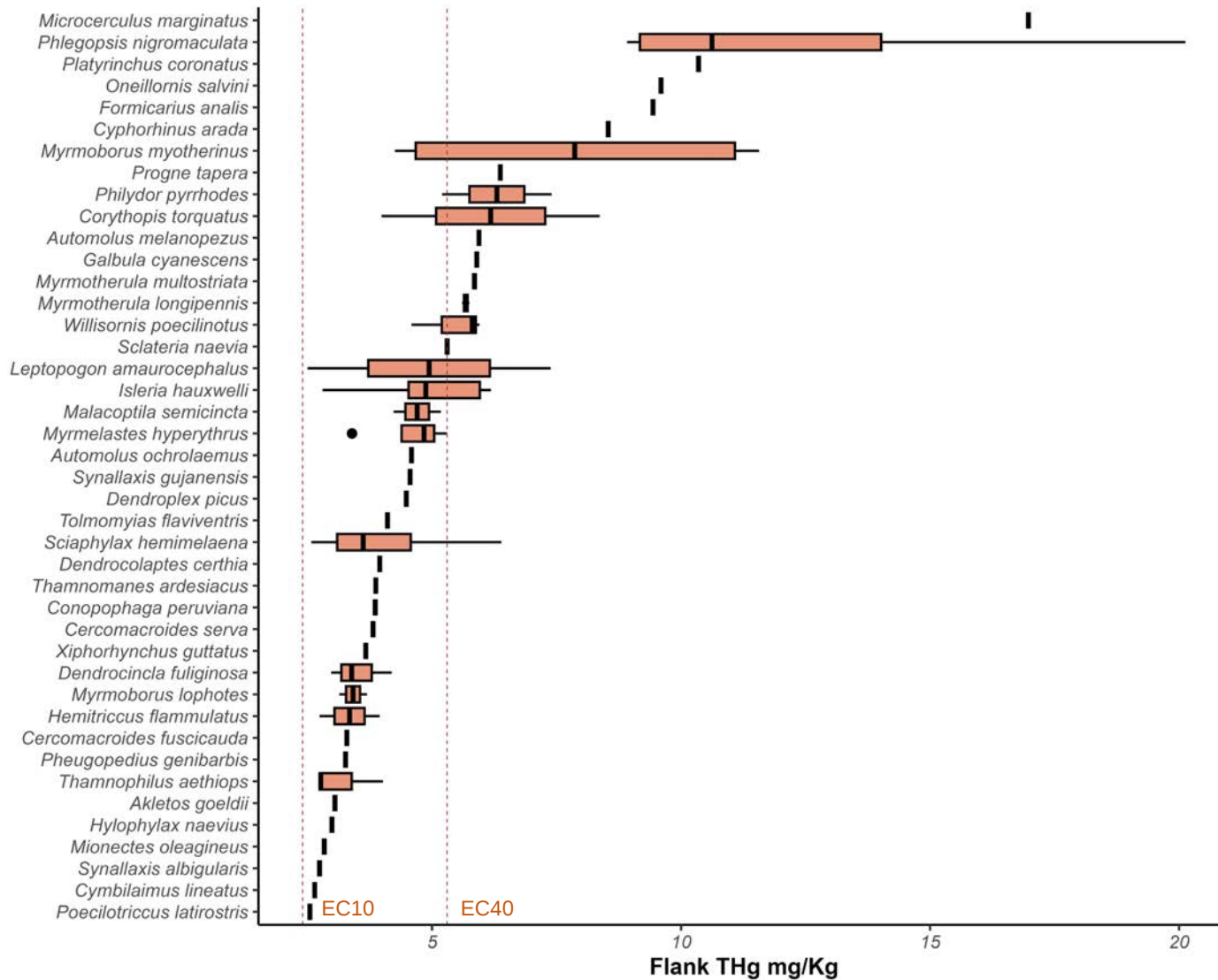


60% exceed EC10
(2.4 ppm)

28% exceed EC40
(5.3ppm))

EC: Effective concentration in which reproductive success can be affected

THg in invertivores birds from mining sites



Forested area



Black-spotted Bare-eye
Phlegopsis nigromaculata
20.13 mg/Kg



Scaly-breasted Wren
Microcerculus marginatus
16.97 mg/Kg

Mining ponds



Brown-chested Martin
Progne tapera
6.37 mg/Kg



Amazonian Streaked-Antwren
Myrmotherula multostriata
5.85 ppm

Non forested area



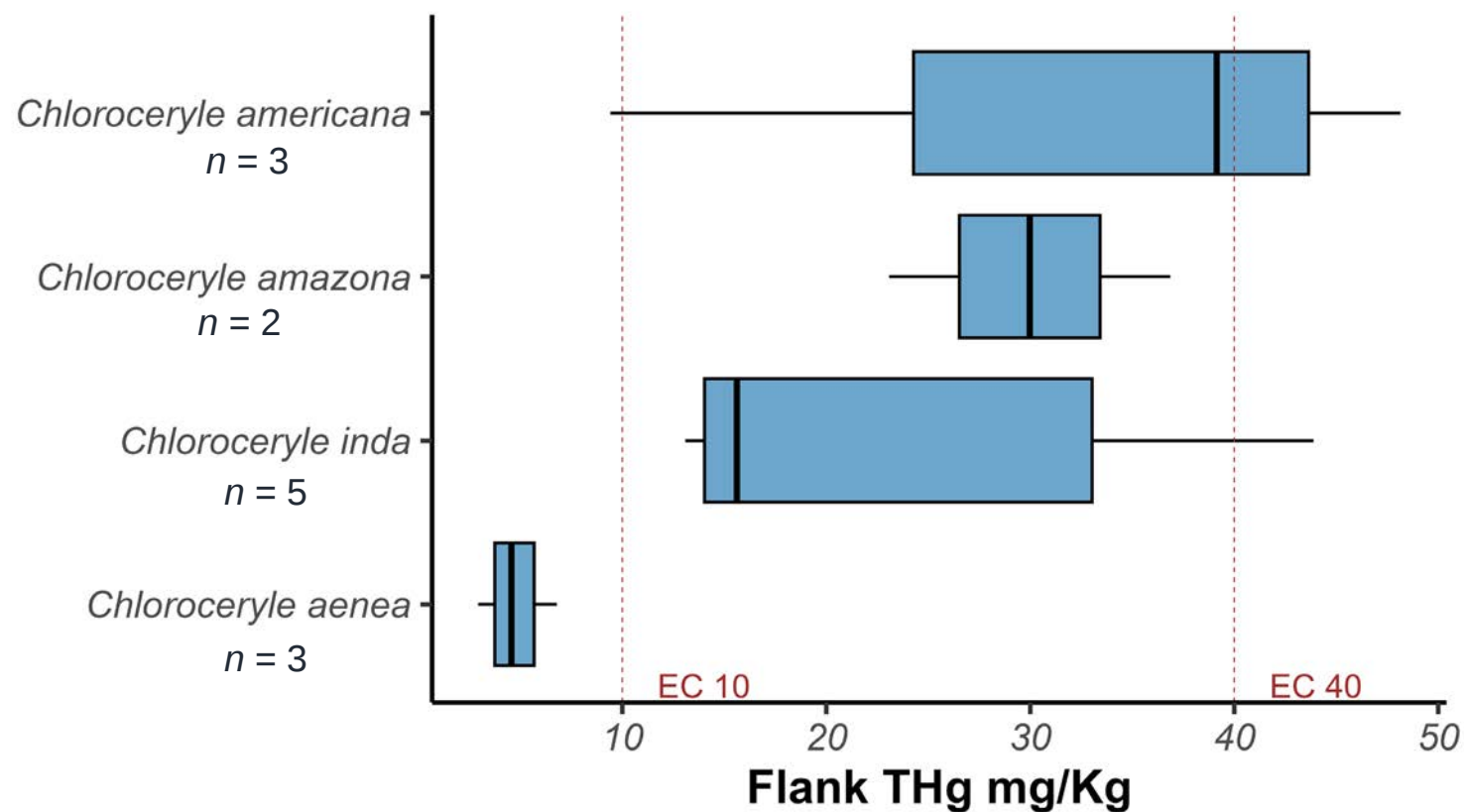
Bluish-fronted Jacamar
Galbula cyanescens
5.9 mg/Kg



Plain-crowned Spinetail
Synallaxis gujanensis
4.5 mg/Kg

65% of the species in the mining areas inhabit the forested area

THg in piscivores birds from mining area habitats



75% Exceed EC10(PIS) of 10ppm and 50% exceed EC40 (PIS) of 40ppm

Forested area



American Pygmy Kingfisher
Chloroceryle aenea
6.79 mg/Kg



Green-and-rufous Kingfisher
Chloroceryle inda
33.03 mg/Kg

Mining ponds



Green Kingfisher
Chloroceryle americana
46.48 ppm



Amazon Kingfisher
Chloroceryle amazona
36.87 mg/Kg



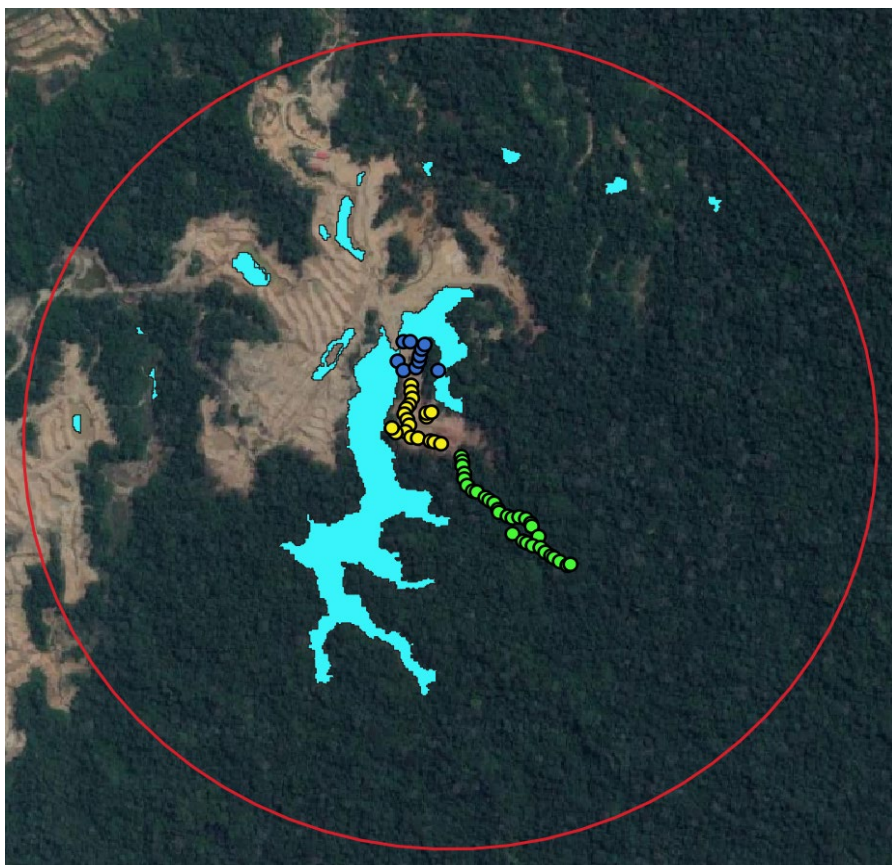
Green-and-rufous Kingfisher
Chloroceryle inda
43.88 mg/Kg

Waterbodies analysis

Heavy Machinery

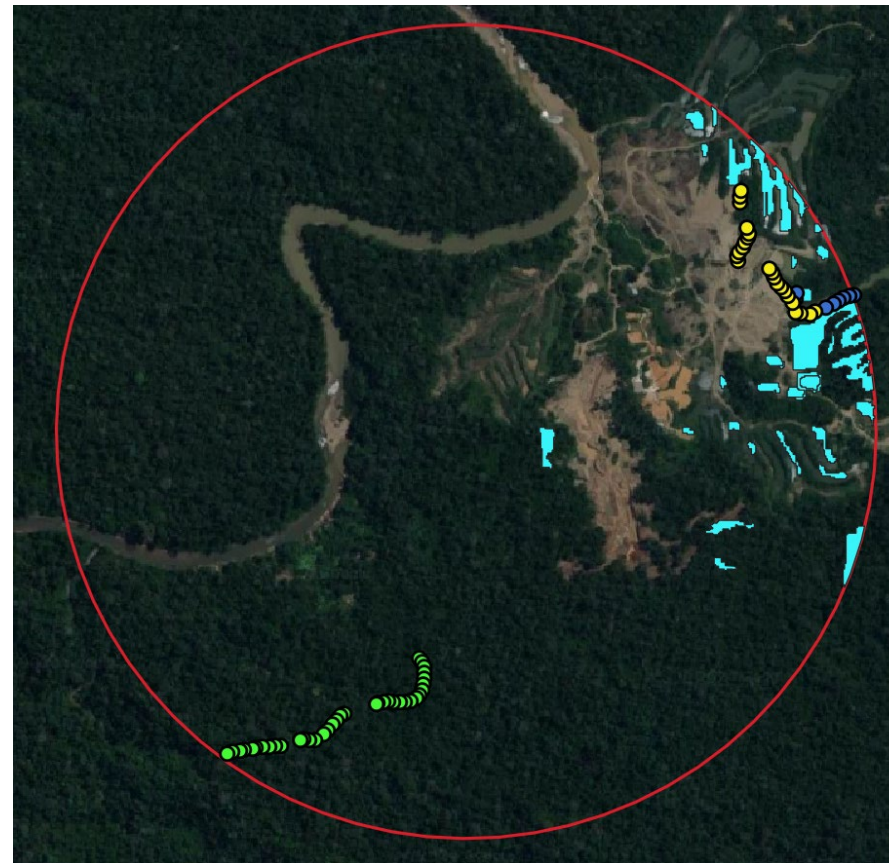
Clavelito

9.02 Ha



Cinco Rebeldes

4.29 Ha



Sampling points by habitat

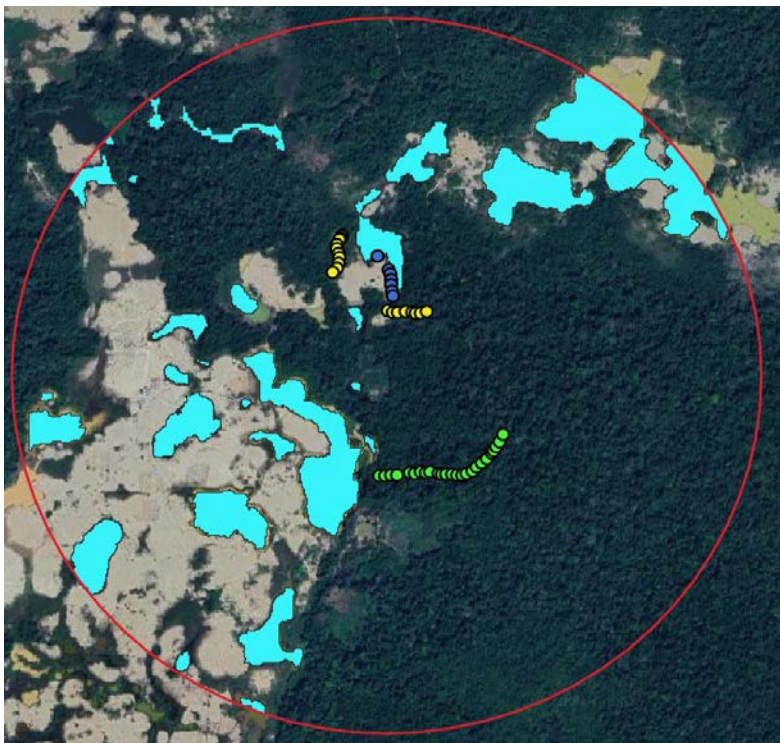
● Mining ponds ● Non forested area ● Forested area

Waterbodies analysis

Suction pumps

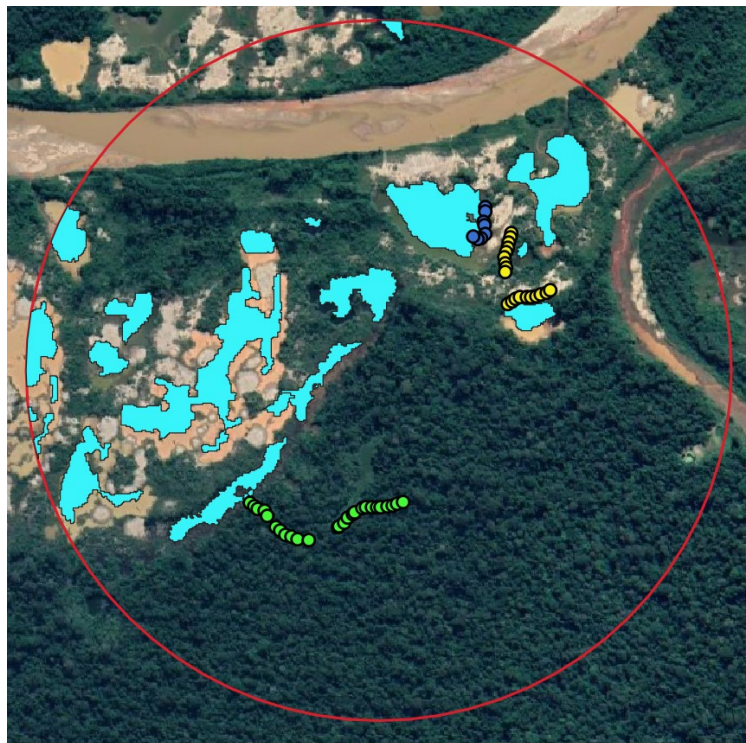
Linda

9.02 Ha



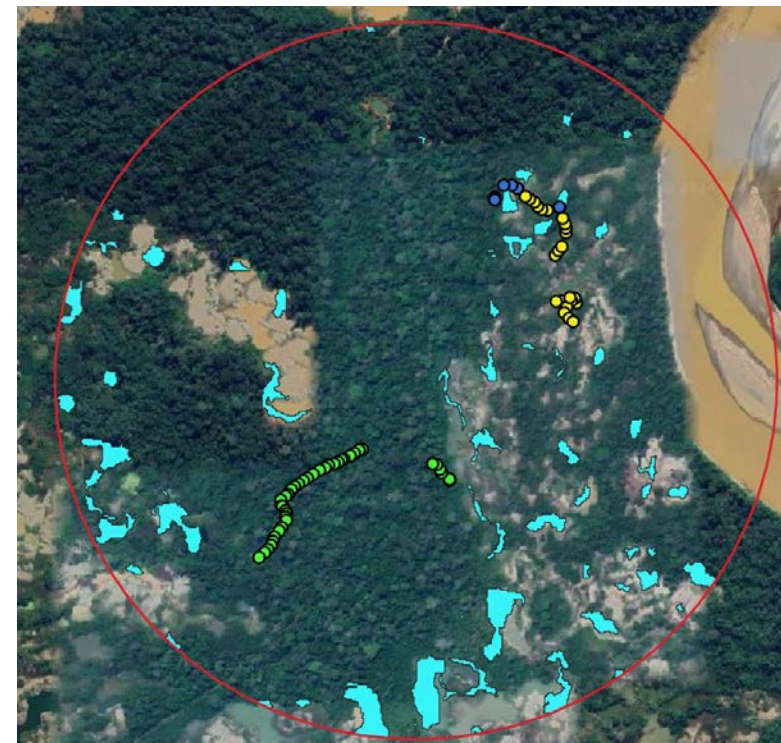
Azul

9.02 Ha



Paolita

9.02 Ha



Sampling points by habitat

● Mining ponds ● Non forested area ● Forested area

AGRADECIMIENTOS

Collaborators:

- Christopher Sayers
- Noe Roger Huaraca Charca
- Julio Salvador
- Raul Mandujano

Institutions

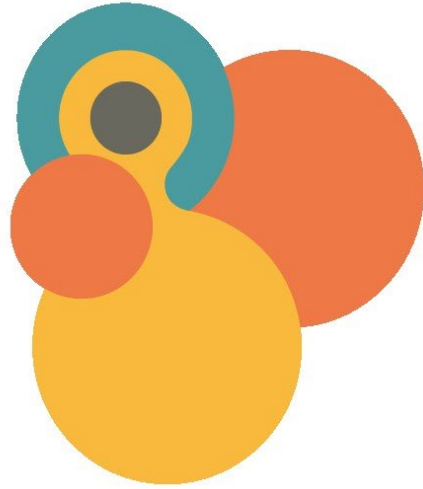
- Inkaterra
- Lago Soledad
- SERNANP

Field crew:

- Ruth Caviedes
- Jhoana Cortegano
- Erick Waldir Huaman Vargas
- Julissa Barrios
- Arturo Mamani
- Cristina Siguas
- Darwin Mamani
- Adamelita Quispe
- Daniel Quillahuaman
- Teresa Avalo
- Jorge Novoa
- Victor Ramos
- Lola Ibañez



THANKS!



CINCIA

CENTRO DE INNOVACIÓN
CIENTÍFICA AMAZÓNICA