

Heavy metals in soils exposed to PCB's at Guánica's Bay

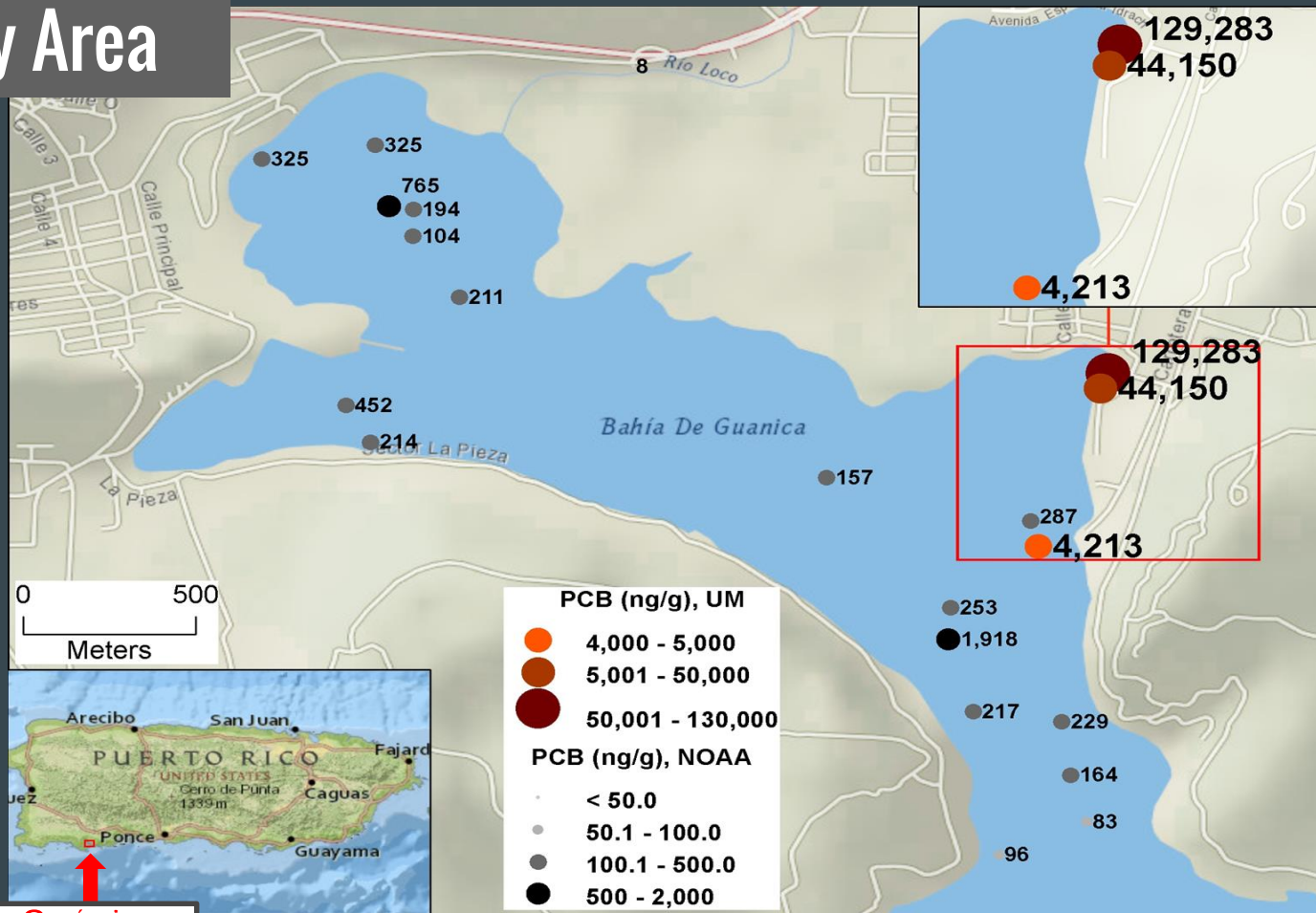
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Background

Guánica has the most contaminated bay in all the Caribbean, and it's contaminated with one of the most dangerous contaminants of all, Polychlorinated Biphenyl or PCB's.

Study Area



Guánica

Problem

Can we find if there is a relation between the quantity of PCB's and heavy metals?

Hypothesis

Since Guánica's Bay is the most contaminated of all the Caribbean's bays, we can say that there is going to be a relation between the PCB's and the heavy metals.

Methodology

The investigators:

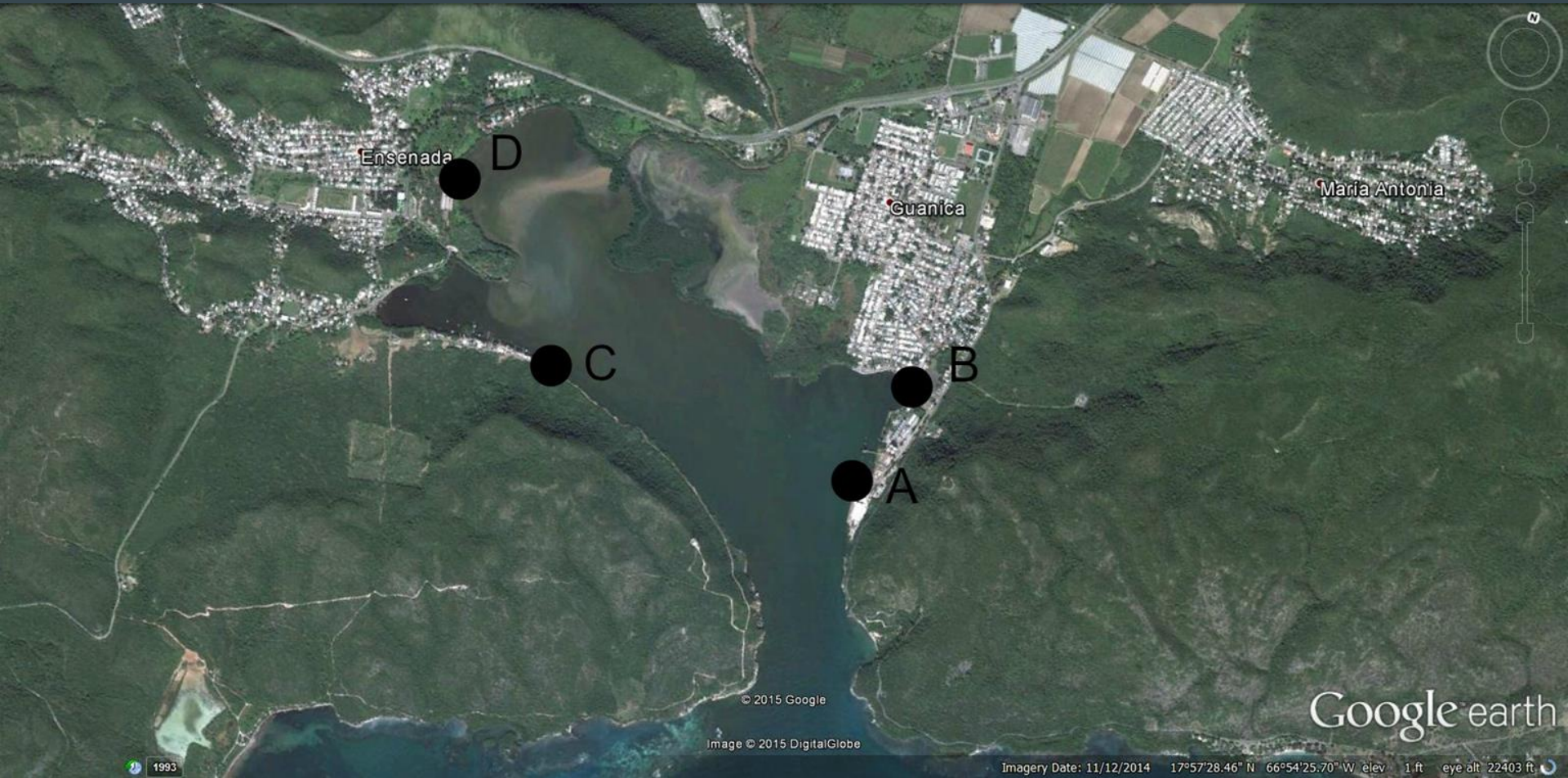
- identified the problems of the community.
- selected the sample locations based on the researched areas studied by the University of Miami in a count of Polychlorinated Biphenyl (PCB's).
- conducted a soil test:
 - NPK (Nitrate, Potassium, Phosphorus)
 - heavy metals test

Continuation

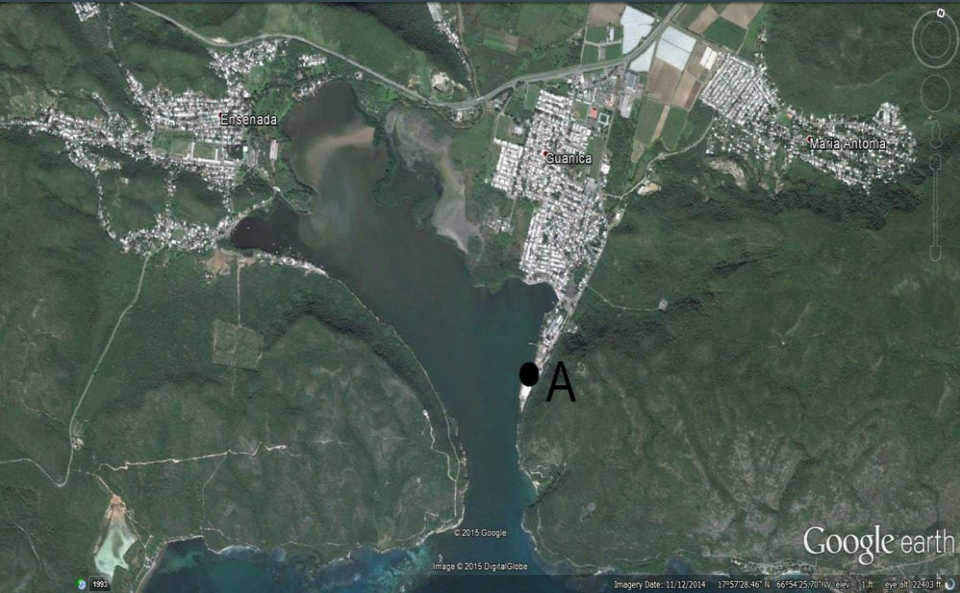
Soil test

- sampled the four selected zones using a shovel to extract the soil samples.
- putted the extracted soil samples in Ziplock bags.
- air dried the samples for one month.
- test for NPK (Nitrate, Potassium, Phosphorus).
- packed some smaller samples to send to lab.
- sended the samples to the Agricultural and Environmental Testing lab in UVM to check the Lead, Nickel, Chromium, Cadmium, Cooper and Zinc.
- compared the result of the heavy metals and the PCB's.

Samples Points



Zone A



Tests made to the zone

PCB's: 129,283 ng/g

Phosphorus: Medium 8lb A/6" soil

Nitrate: Low 40lb A/6" soil

Potassium: High 160lb A/6" soil

Lead: <1.5 mg/kg

Nickel: 5.6 mg/kg

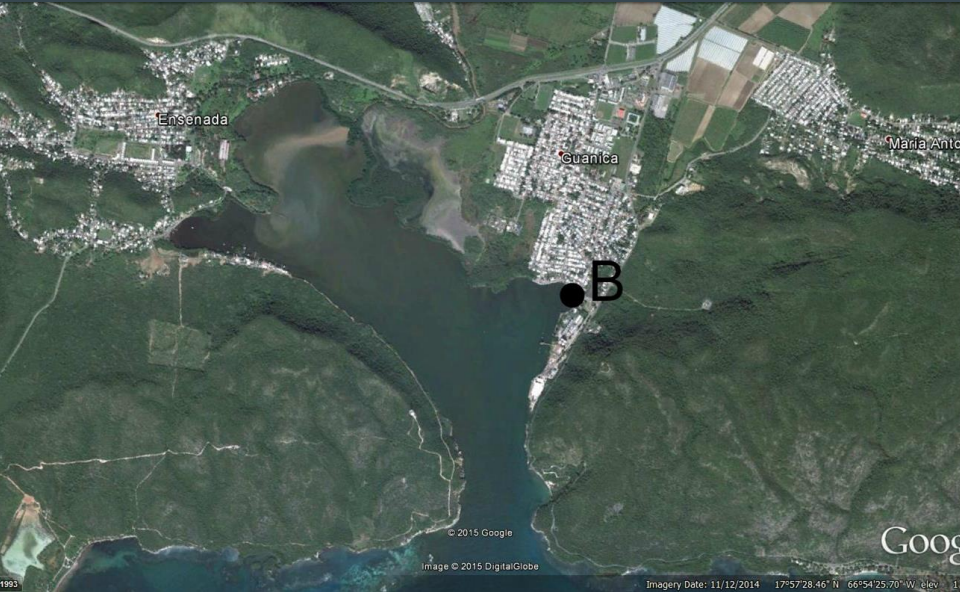
Chromium: <1.5 mg/kg

Cadmium: <1.5 mg/kg

Copper: <1.5 mg/kg

Zinc: 11.3 mg/kg

Zone B



Tests made to the zone

PCB's: 4,213ng/g

Phosphorus: High 64lb A/6" soil

Nitrate: Low 40lb A/6" soil

Potassium: High 160lb A/6" soil

Lead: 13.9 mg/kg

Nickel: 12.3 mg/kg

Chromium: <1.5 mg/kg

Cadmium: <1.5 mg/kg

Copper: <1.5 mg/kg

Zinc: 8.2 mg/kg

Zone C



Tests made to the zone

PCB's: 214ng/g

Phosphorus: Medium 8lb A/6" soil

Nitrate: Low 40lb A/6" soil

Potassium: Medium 80lb A/6" soil

Lead: 5.9 mg/kg

Nickel: 4.9 mg/kg

Chromium: <1.5 mg/kg

Cadmium: <1.5 mg/kg

Copper: <1.5 mg/kg

Zinc: <1.5 mg/kg

Zone D



Tests made to the zone

PCB's: 325ng/g

Phosphorus: Medium 8lb A/6" soil

Nitrate: Medium 160lb A/6" soil

Potassium: Low 40lb A/6" soil

Lead: 39.0 mg/kg

Nickel: 31 mg/kg

Chromium: 8.5 mg/kg

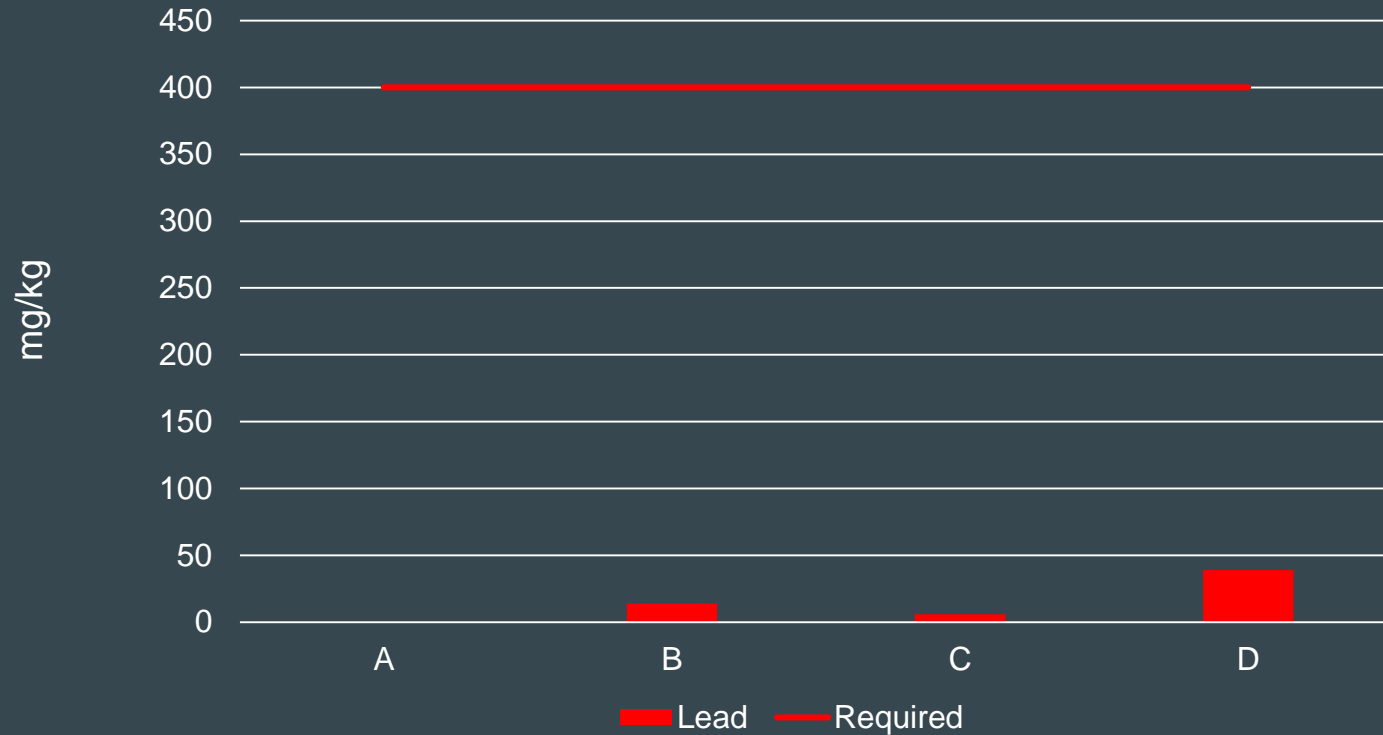
Cadmium: <1.5 mg/kg

Copper: 10.3 mg/kg

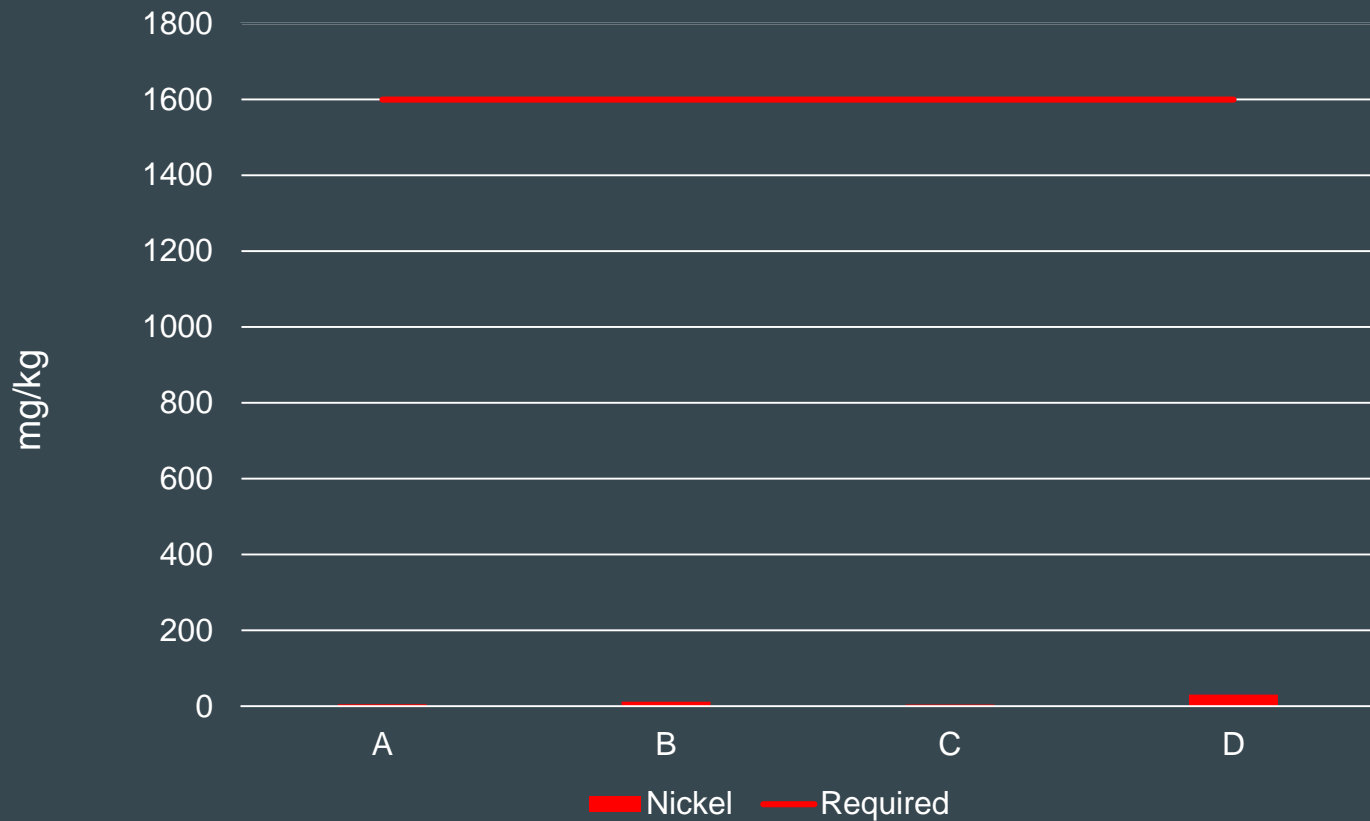
Zinc: 126 mg/kg

COMPARISON OF HEAVY METALS BETWEEN ZONES

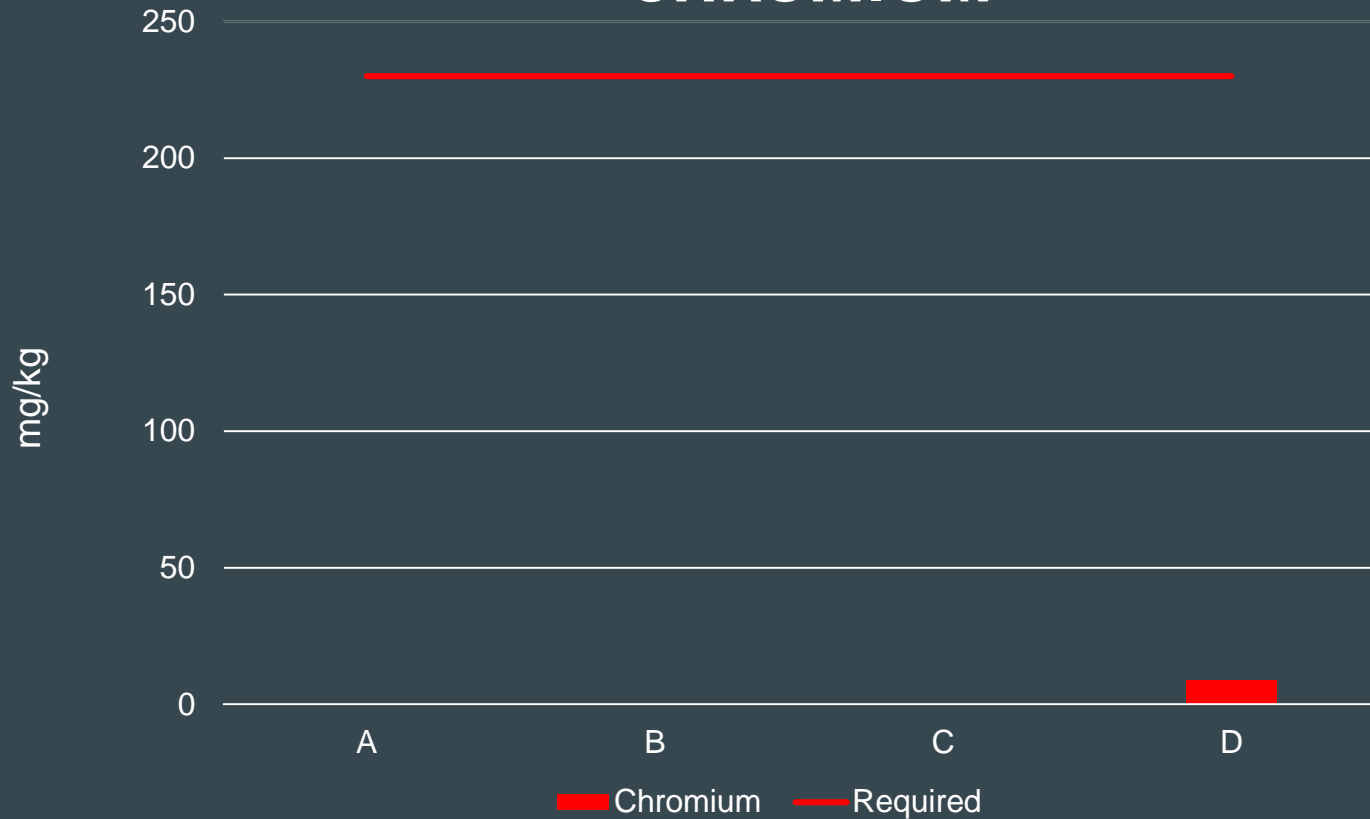
LEAD



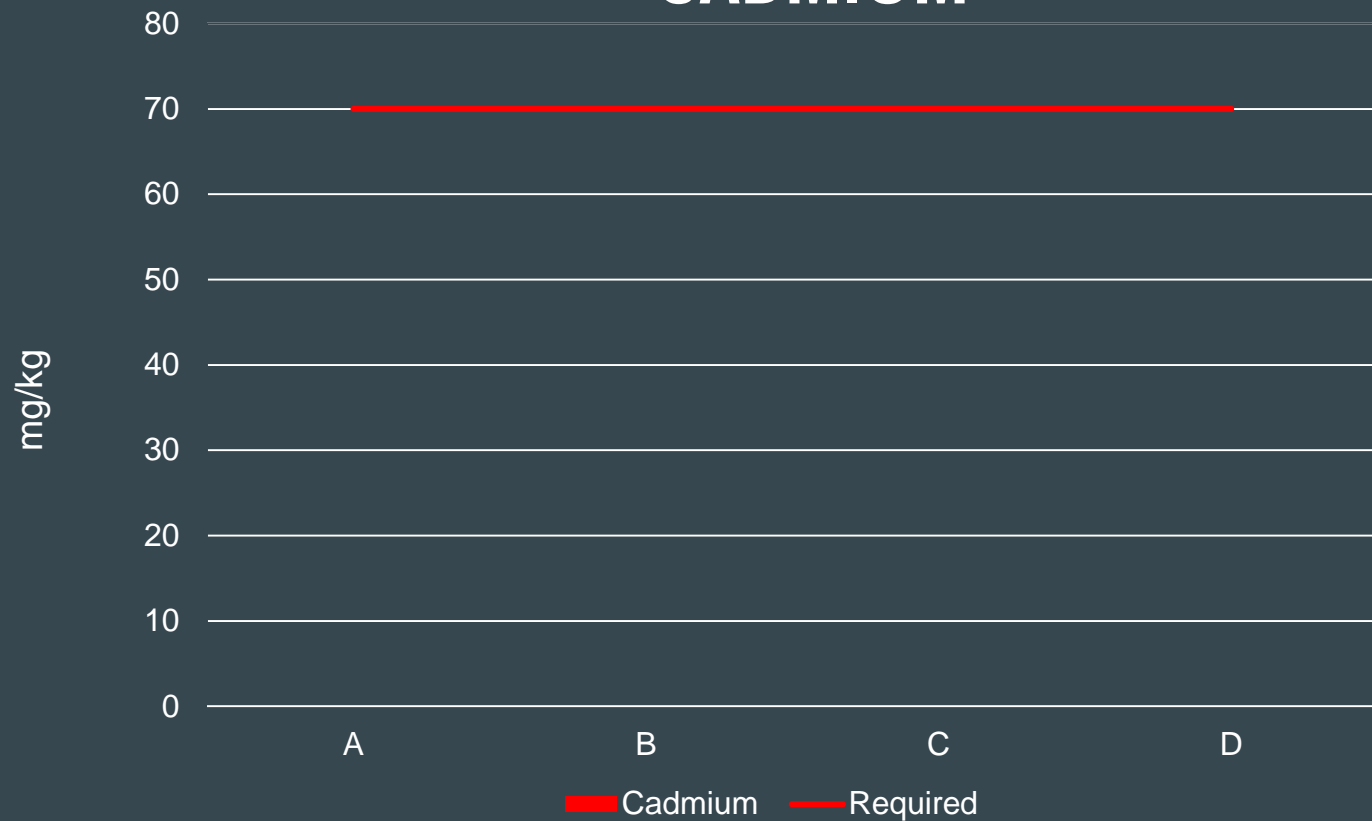
NICKEL



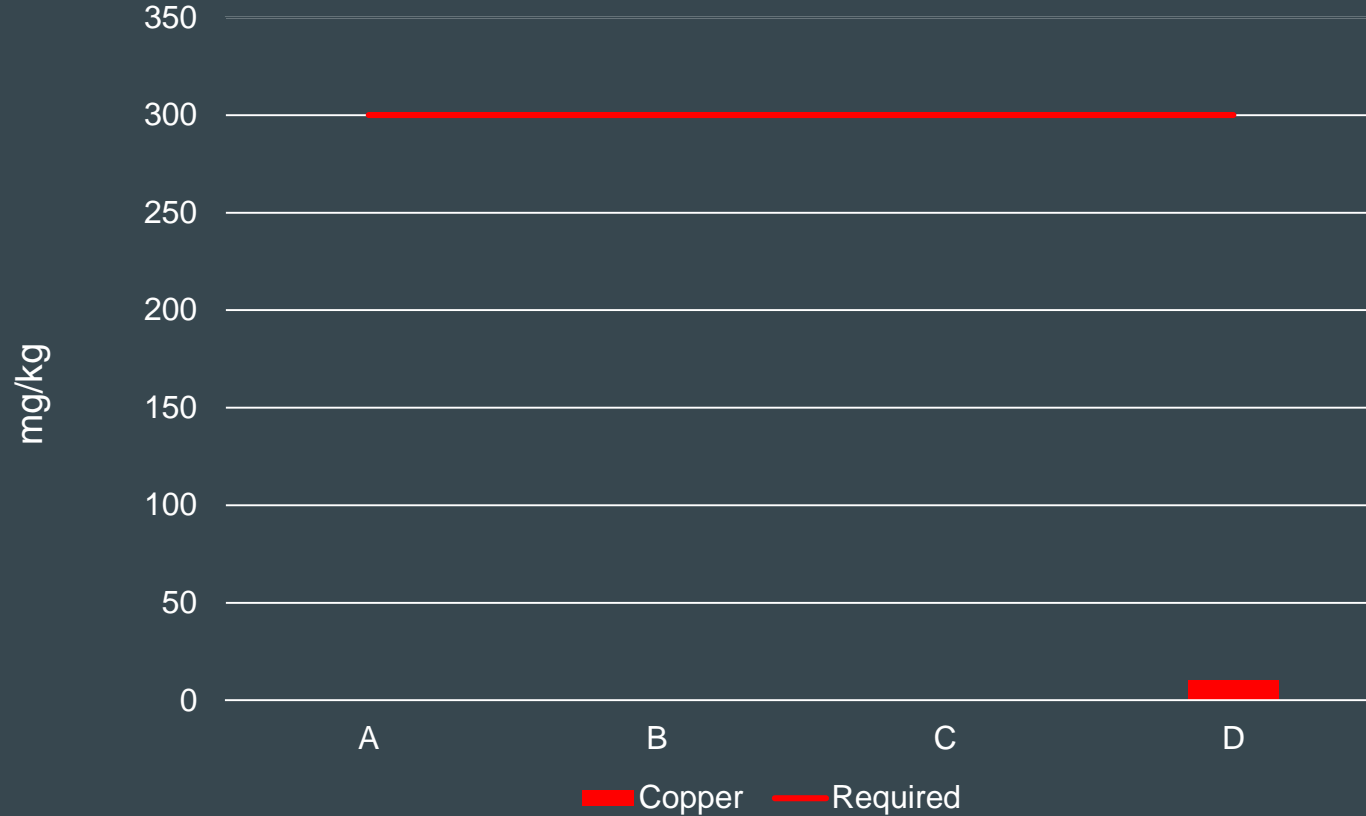
CHROMIUM



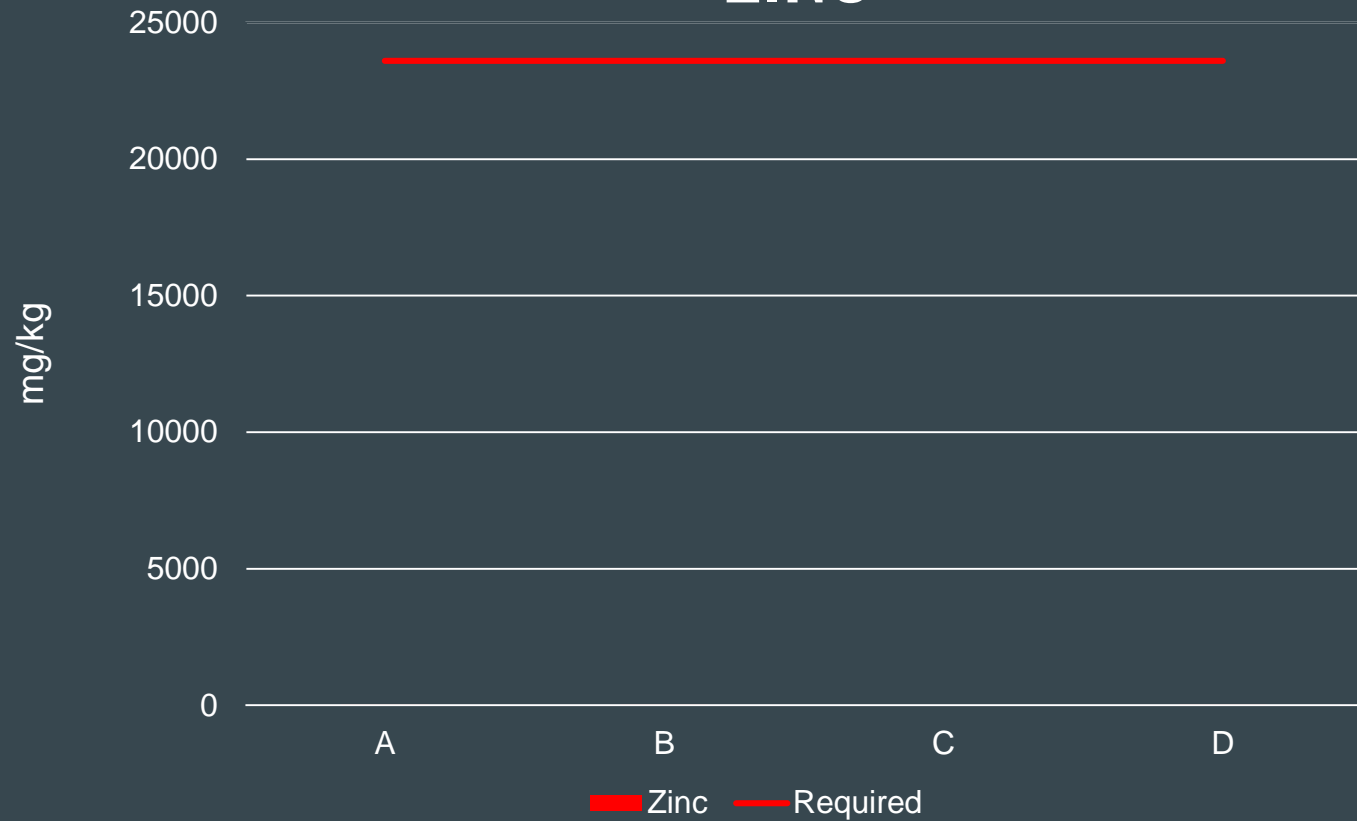
CADMIUM



COPPER



ZINC



CONCLUSION

In conclusion, the hypothesis was denied. There was no relation between the PCB's and the presence of heavy metals in the soil. Guánica's bay might be the most contaminated with the fact of the PCB's, but with the tests made of the heavy metals is clean.

IN THE FUTURE

We will like to make the test in a deeper part of the bay, instead of the shallow part of the bay to see if there are some changes in the presences of heavy metals.

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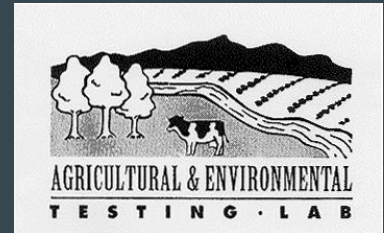
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QUESTIONS?