Environmental Influences on freshwater biota in Cerrado Biome

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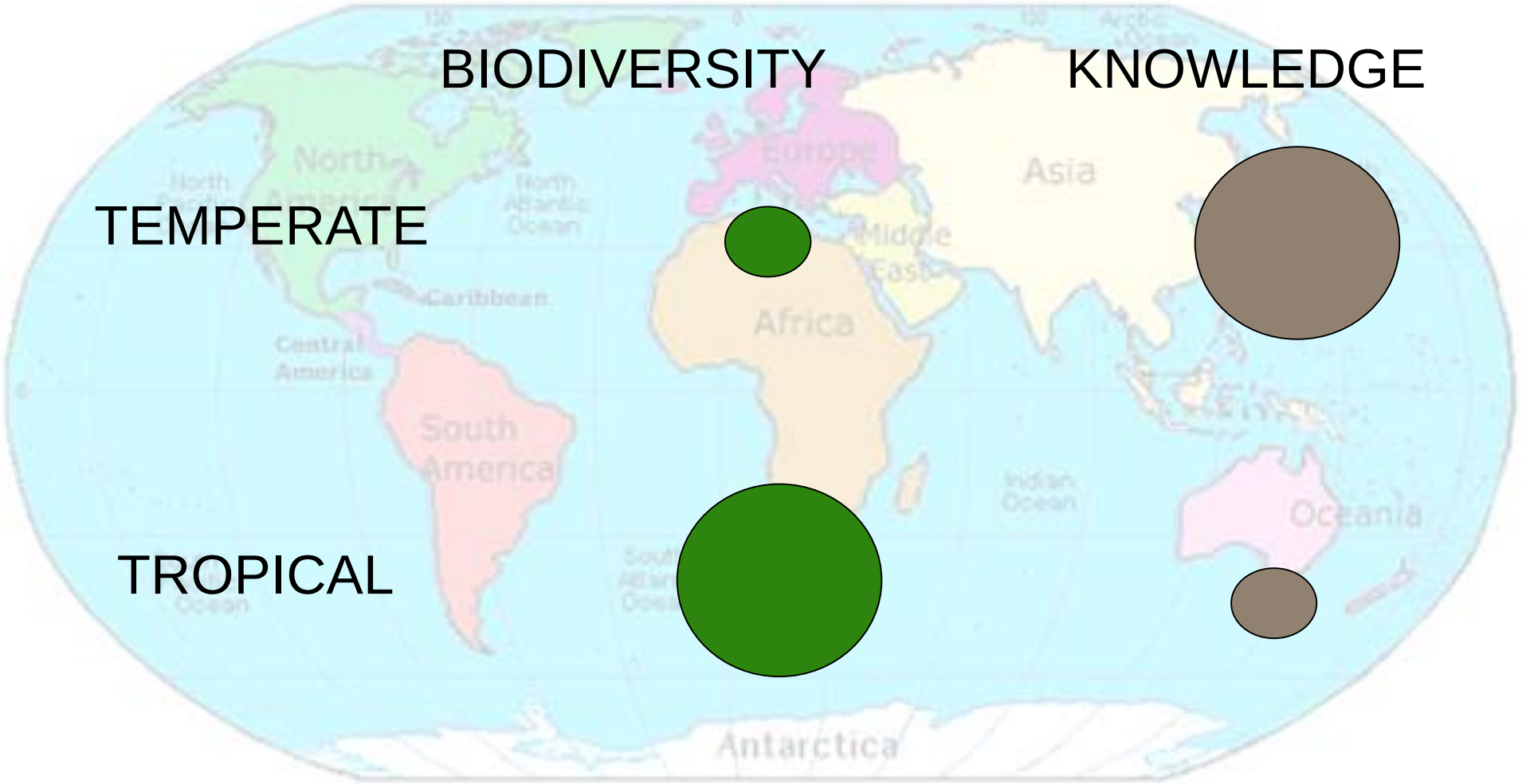
Freshwater ecossystems



We know a lot about temperate zones, but tropical zone is more rich

Threats

- Pollution
- Loss of habitats
- Flow changes

- Death of biota
- Loss of biodiversity

- How we can use environmental features to explain freshwater biodiversity?

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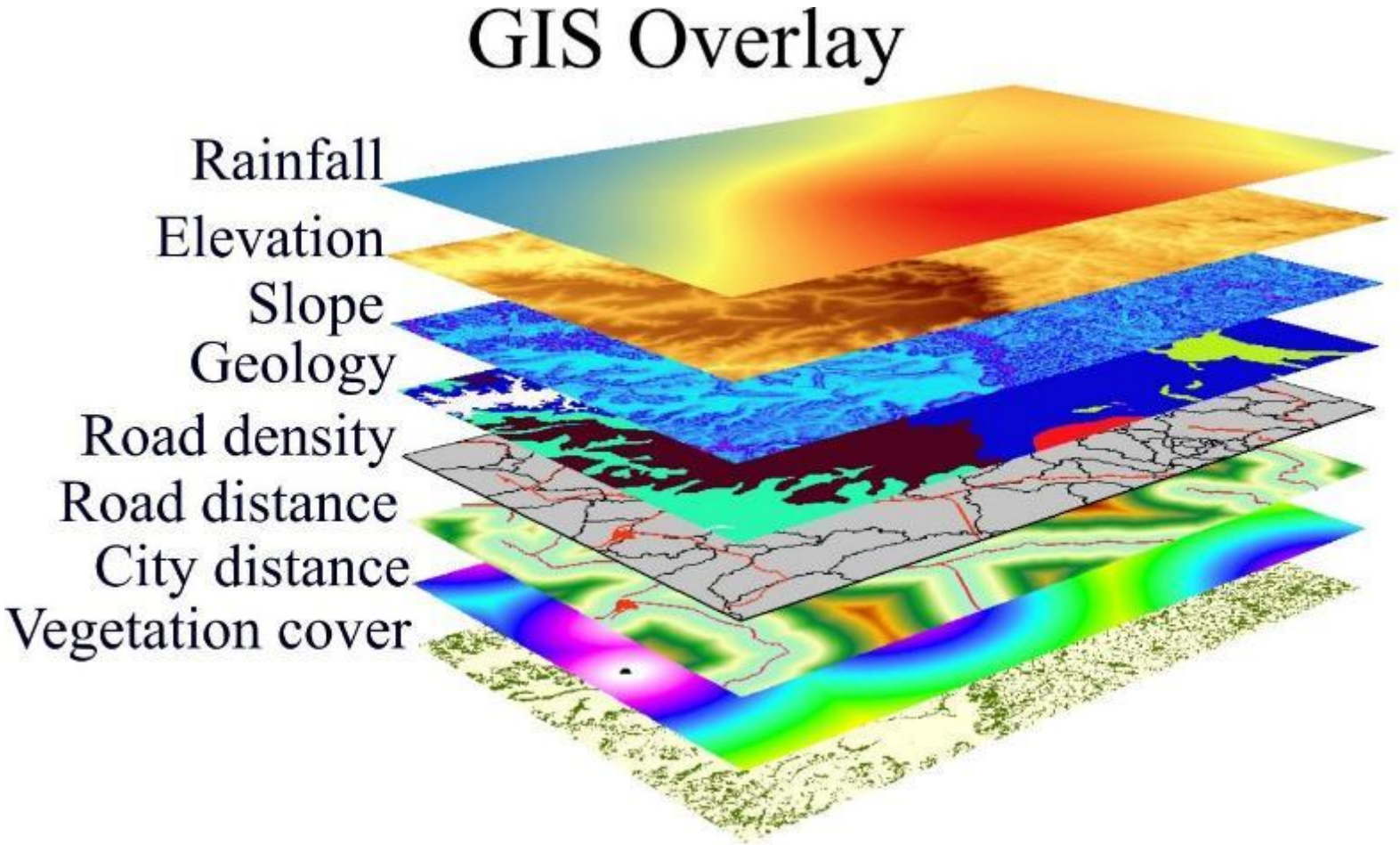
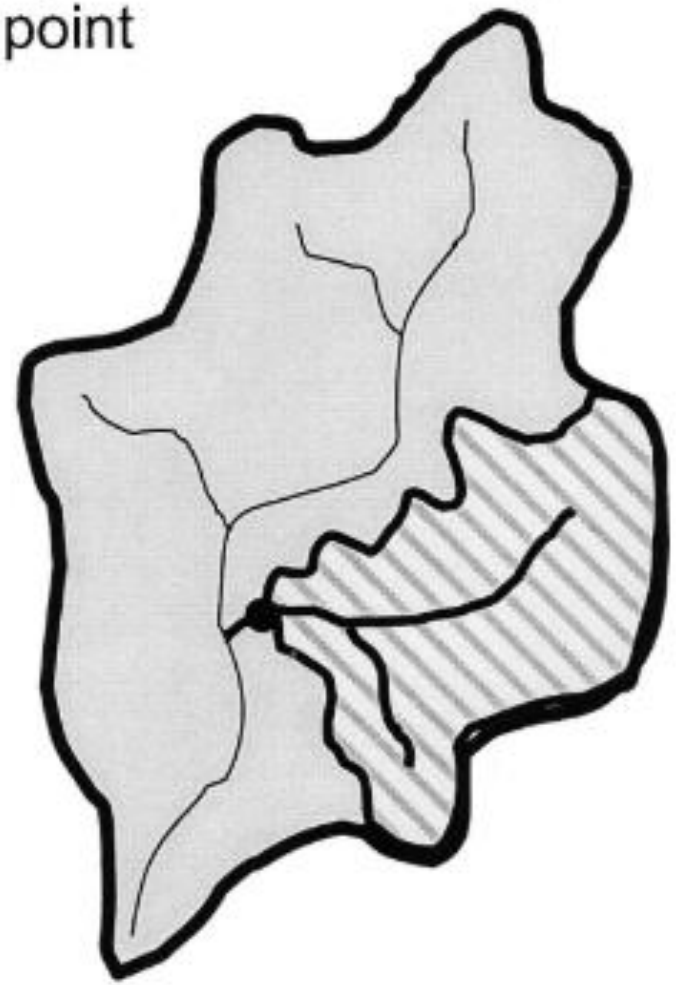


Sub-basin

entire drainage area upstream from sample point



Catchment scale

Geodynamic factors
- Geology
- Climate
- Relief

Land use and cover
- Natural cover
- Pasture
- Agriculture
- Urban areas
- Population density
- Roads

Site scale

Site habitat
- Channel morphology
- Substrate size
- Water flow
- Riparian cover and canopy
- Fish cover
- Human presence
- Water physical and chemical

Aquatic biota
- Richness
- Abundance
- Diversity
- Integrity

Landscape Ecol
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RESEARCH ARTICLE

The relative influence of catchment and site variables on fish and macroinvertebrate richness in cerrado biome streams

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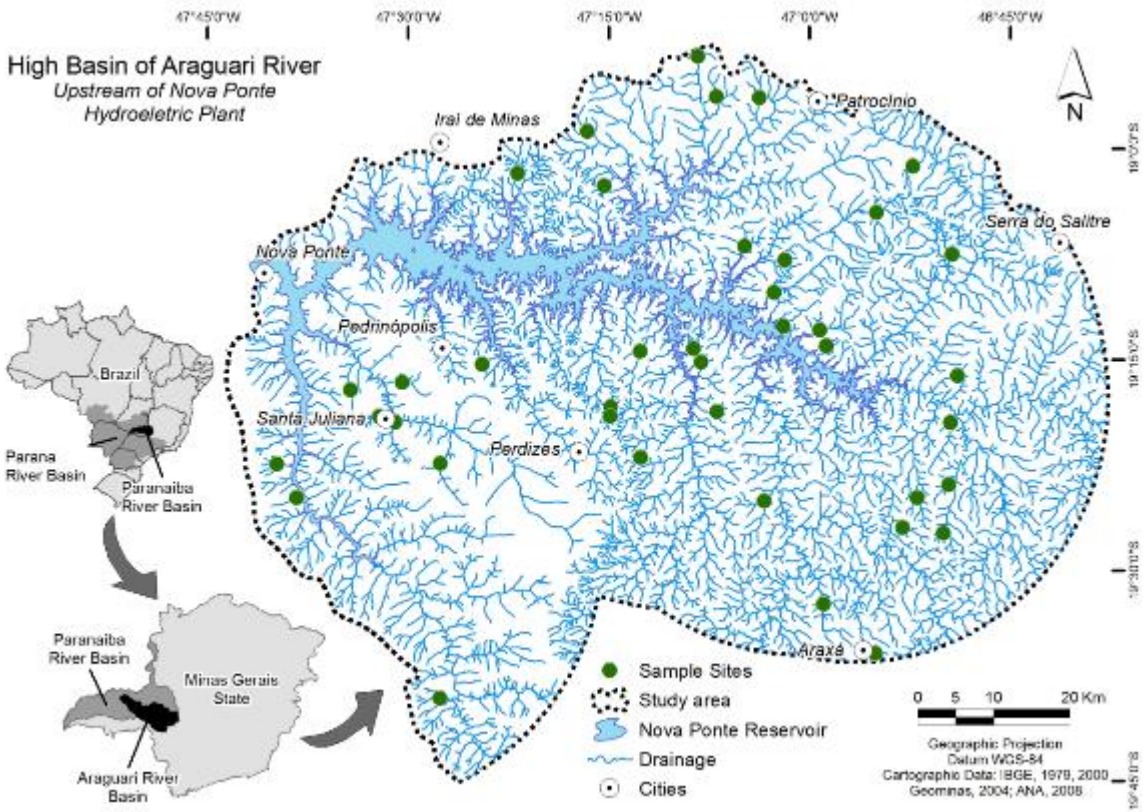
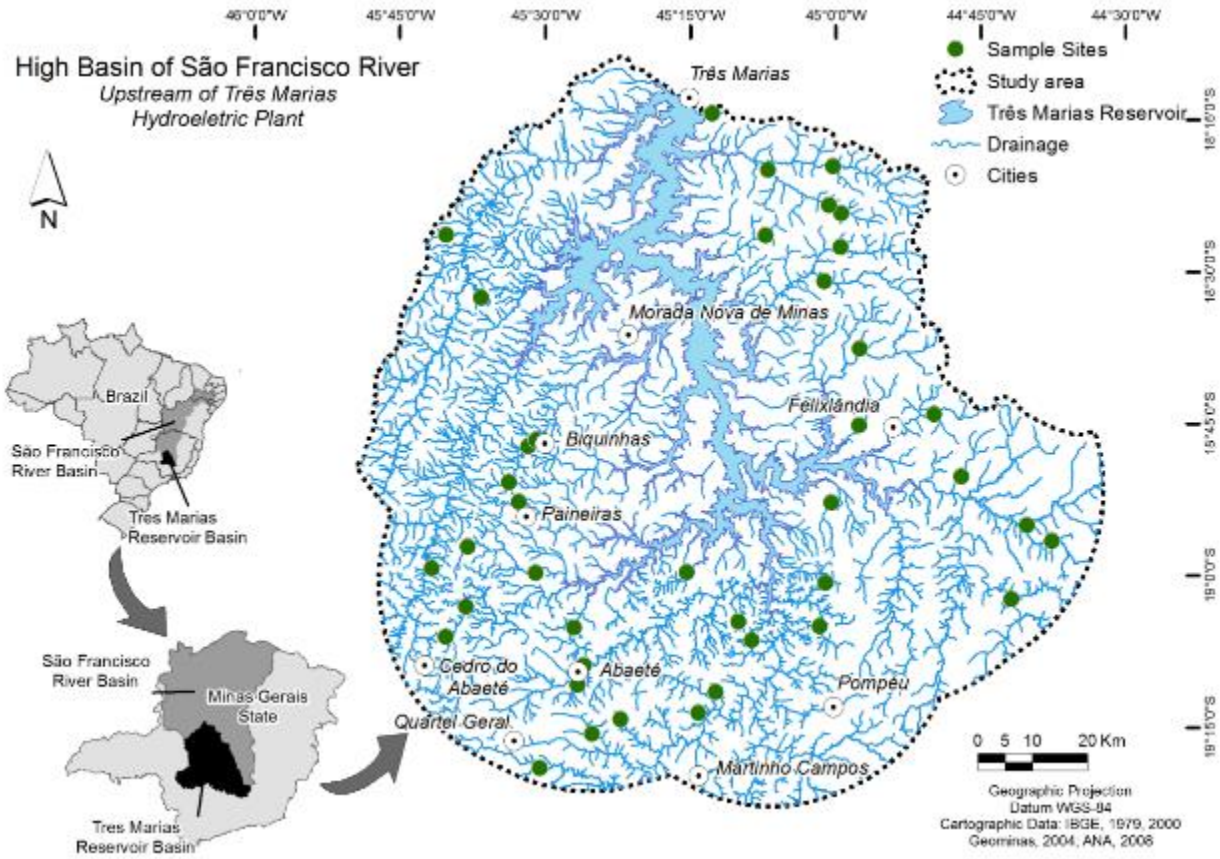
High Araguari and High São Francisco River Basin, Brazilian Cerrado Biome



80 Sites selected by GRTS Design

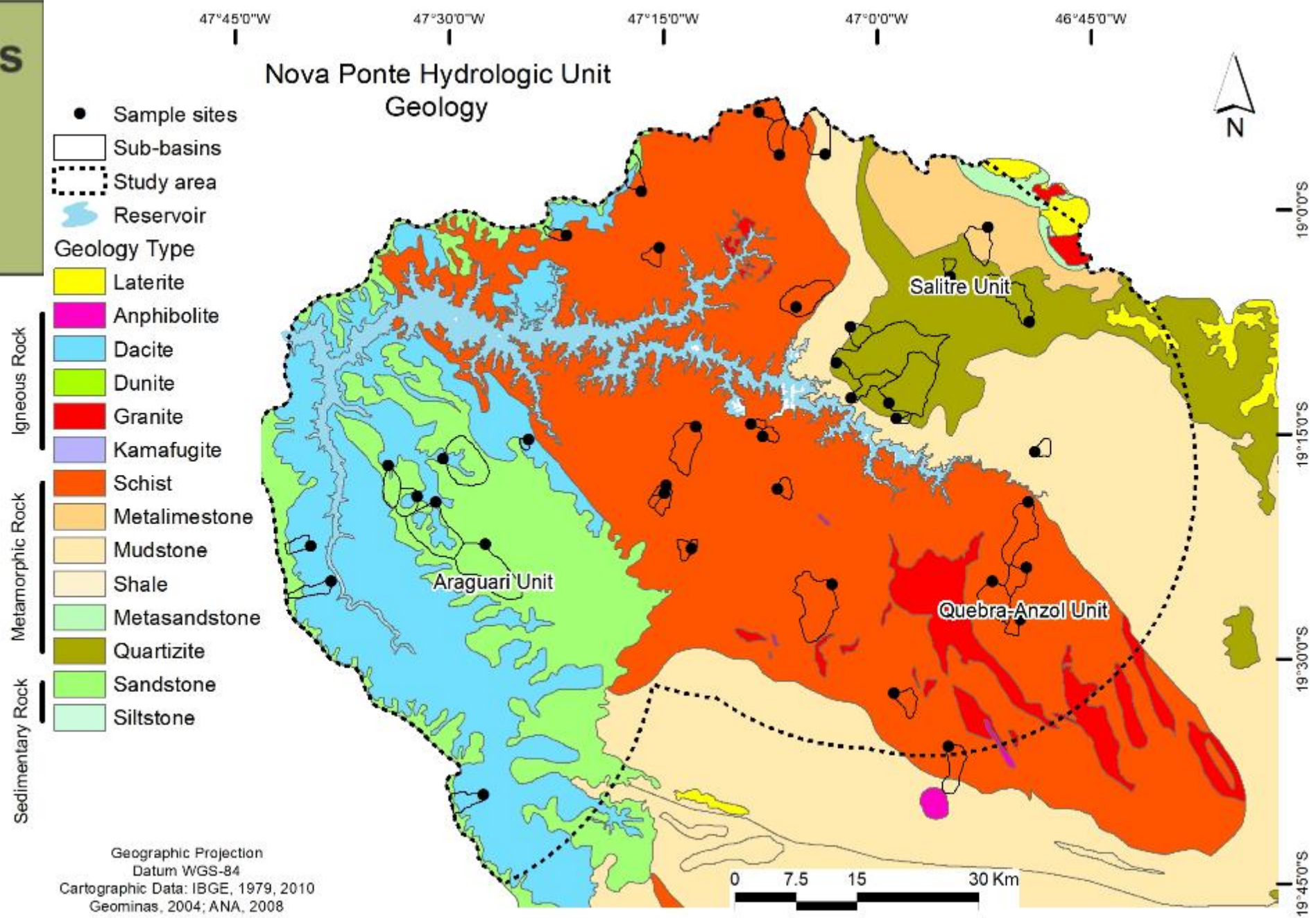
40 sites in eatch one



Geodynamic factors

- Geology
- Climate
- Relief

Geologic maps

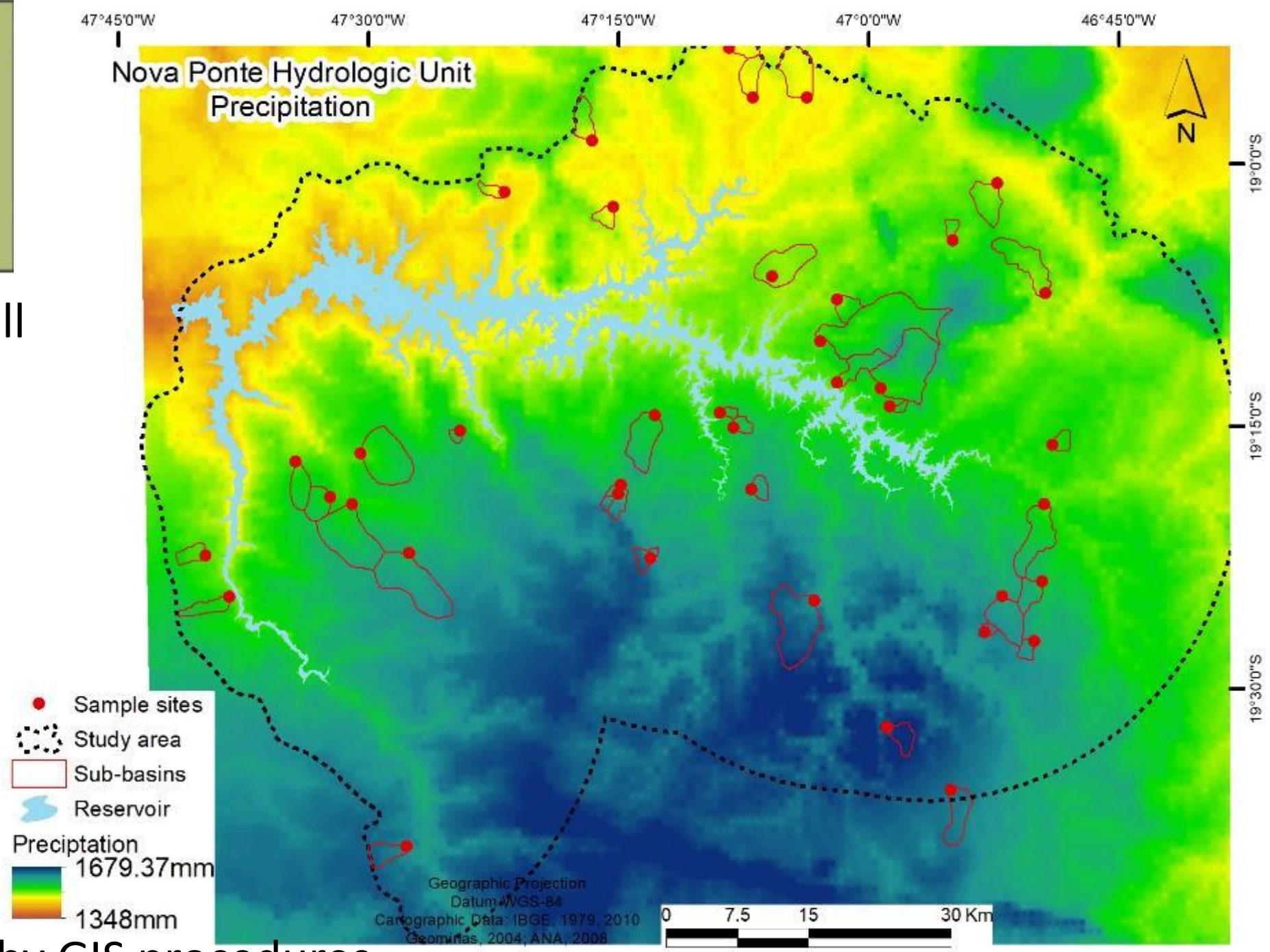


We extracted features by GIS procedures

Geodynamic factors

- Geology
- Climate
- Relief

Interpolated rainfall stations



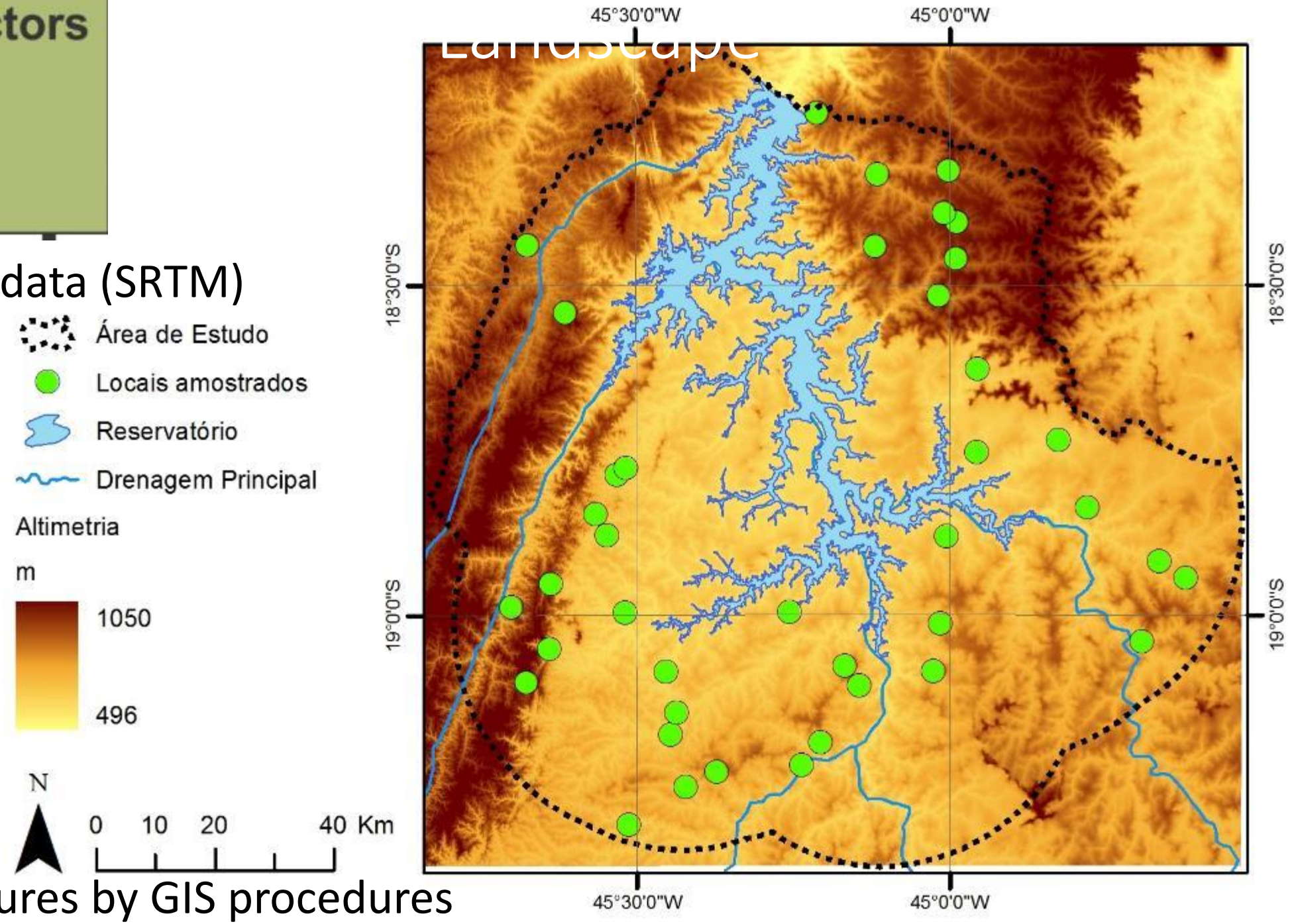
We extracted features by GIS procedures

Geodynamic factors

- Geology
- Climate
- Relief

Landscape

Digital model data (SRTM)



We extracted features by GIS procedures

High Resolution Image

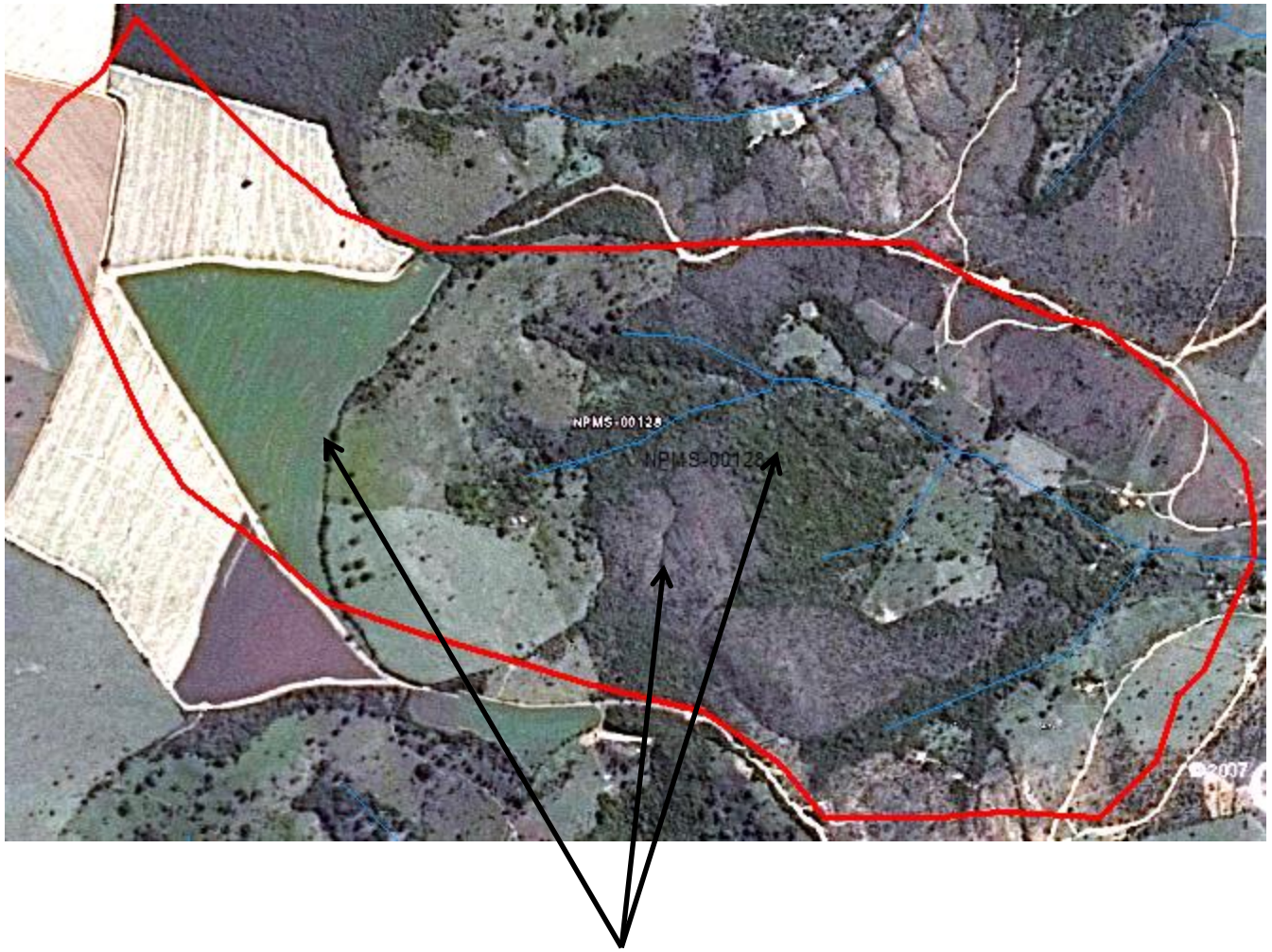
It is harder to distinguish the targets only using the colors

Shape (+)

Texture (+)

High resolution images help identify the shape and texture of targets more precisely

High Resolution Image



High Resolution Image

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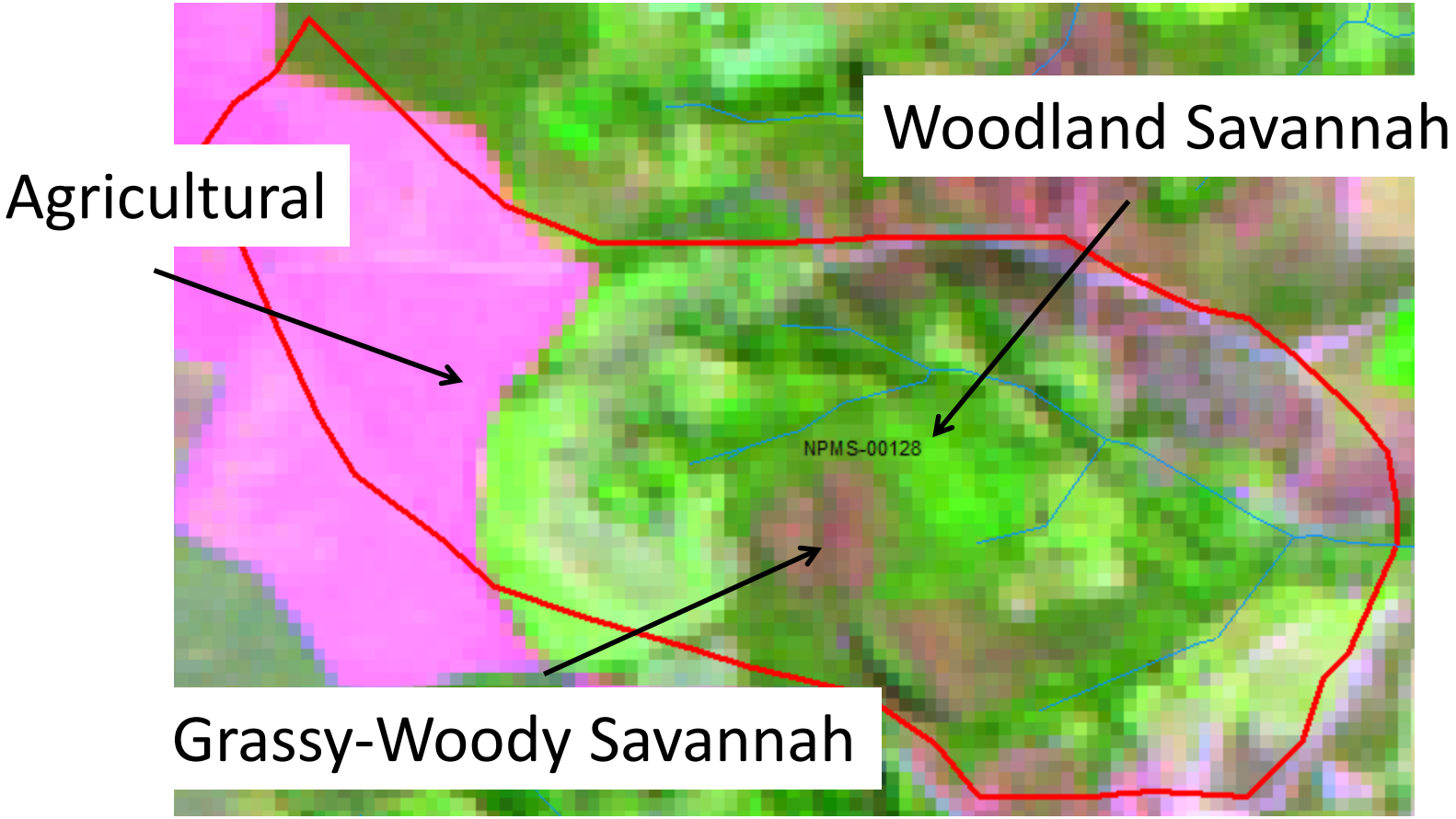
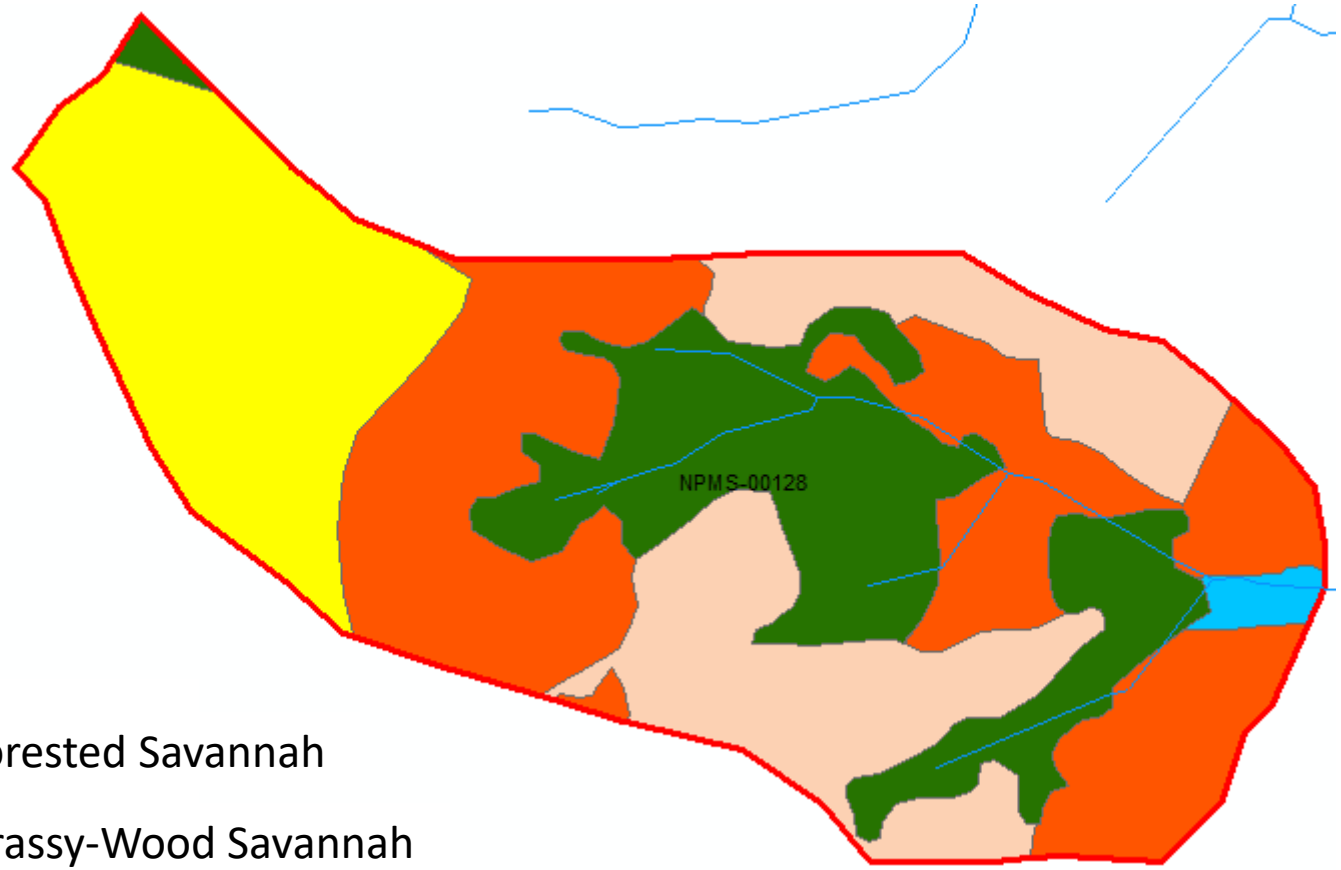
Landsat Images



Landsat images include infrared detection which compensates the limitations of high resolution images

Land Use and Cover Class



Forested Savannah

Grassy-Wood Savannah

Wetland

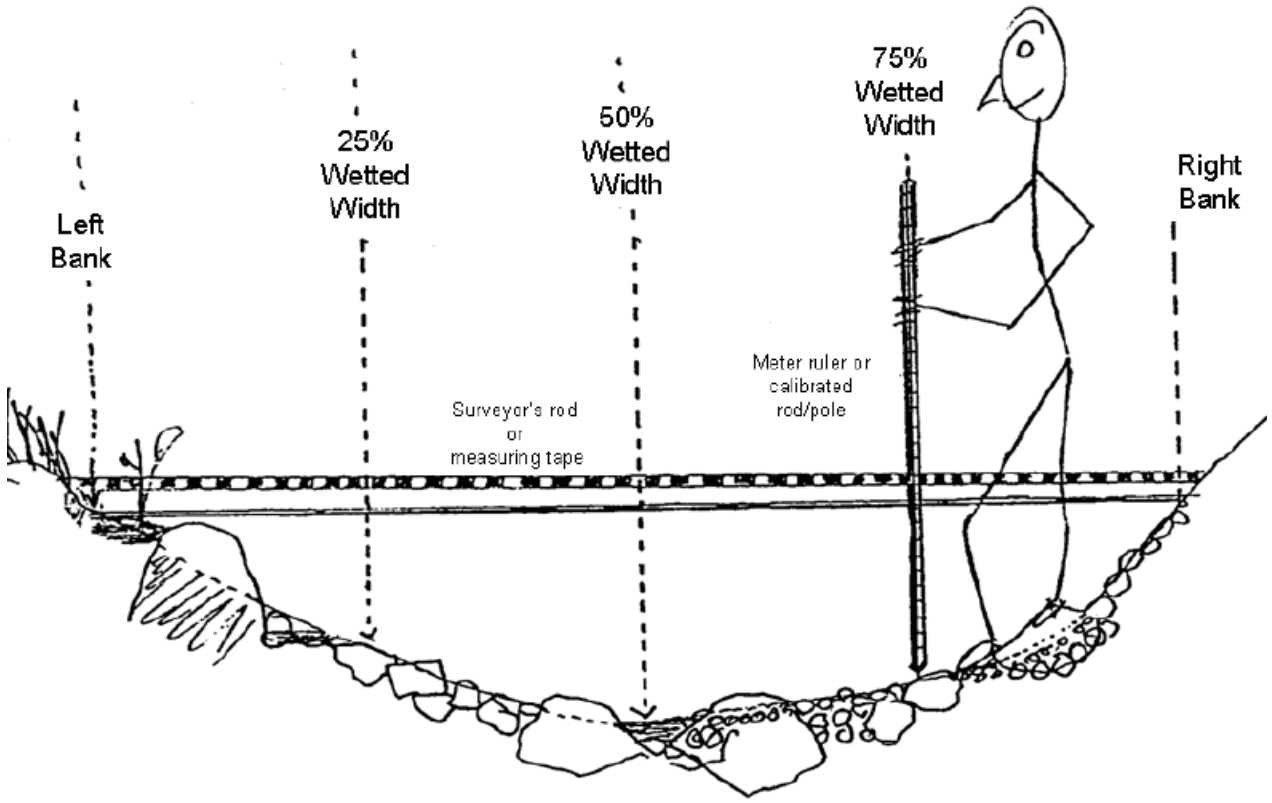
Pasture

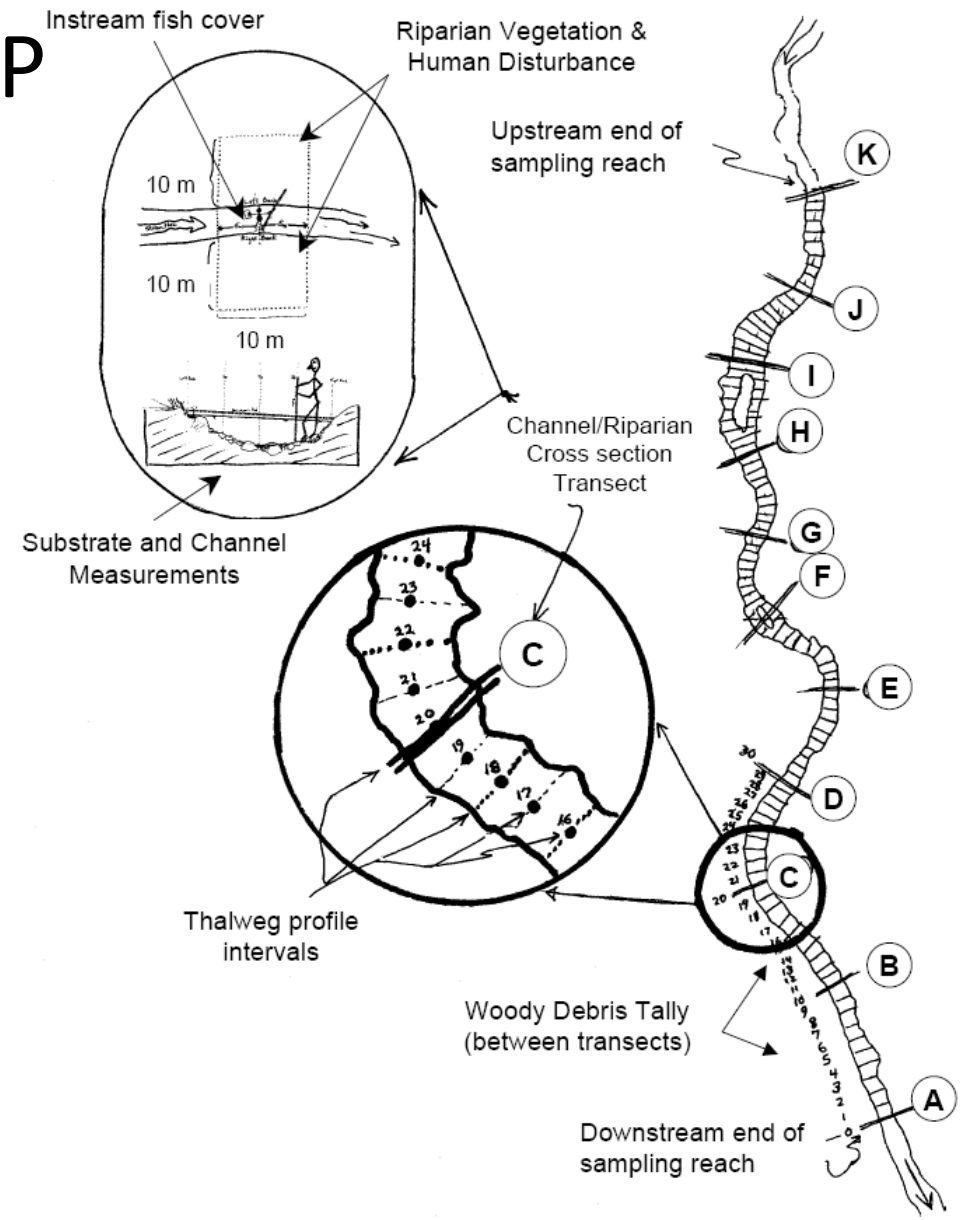
Agriculture

The result is very precisely

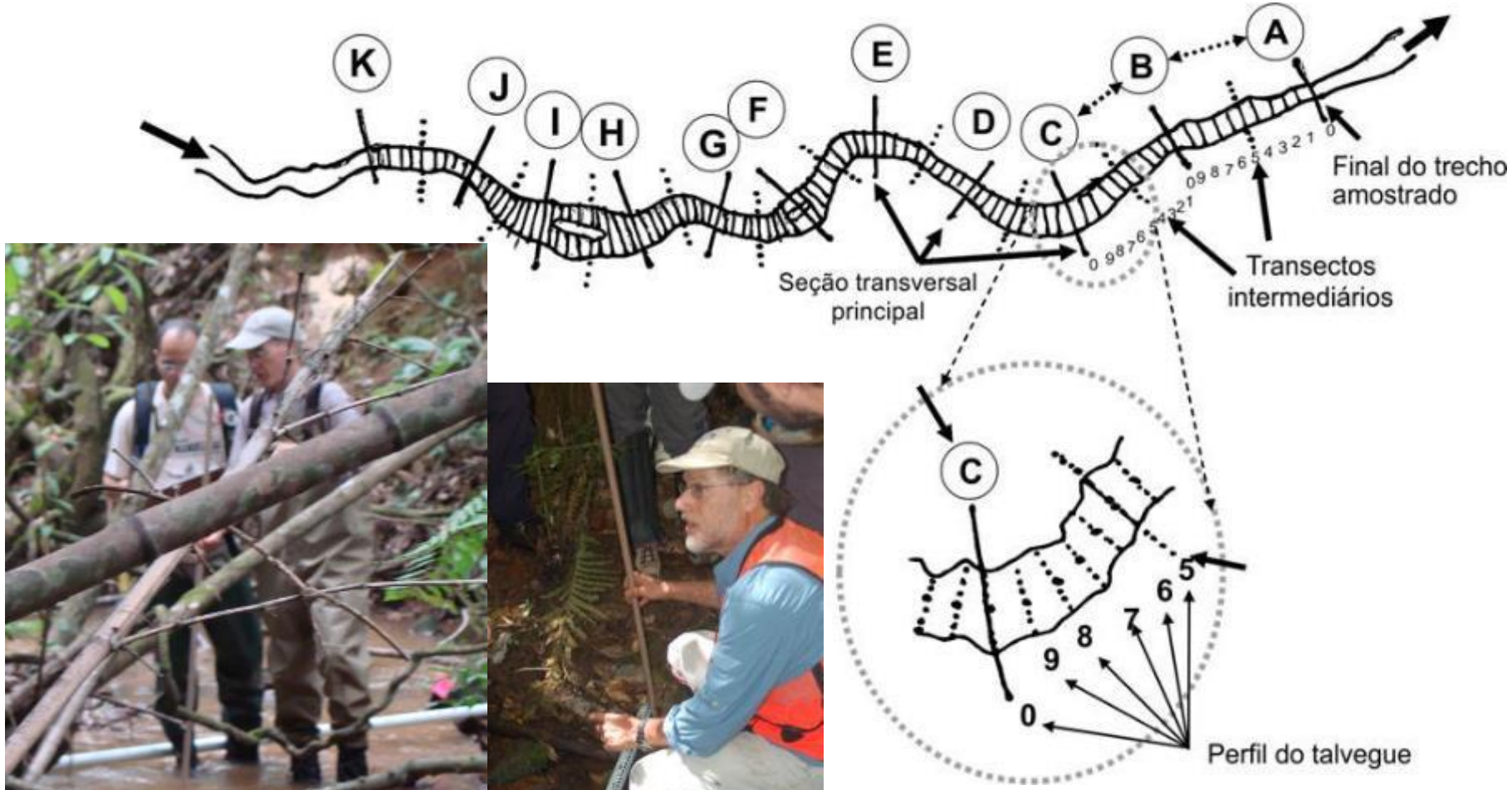
Physical Habitat Assessment

- Our methodology is based on EMAP Stream Assessment





Physical Habitat Assessment



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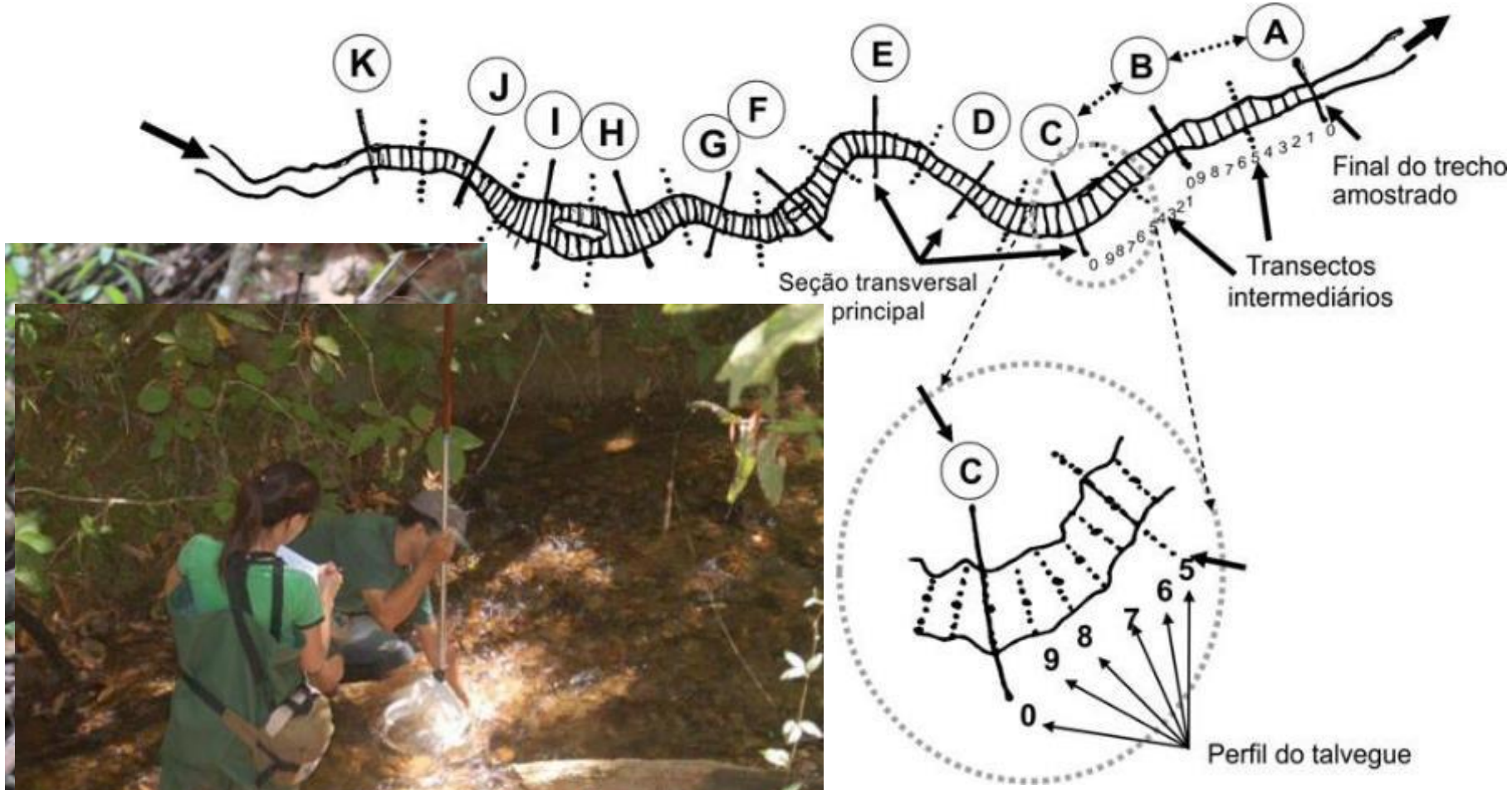

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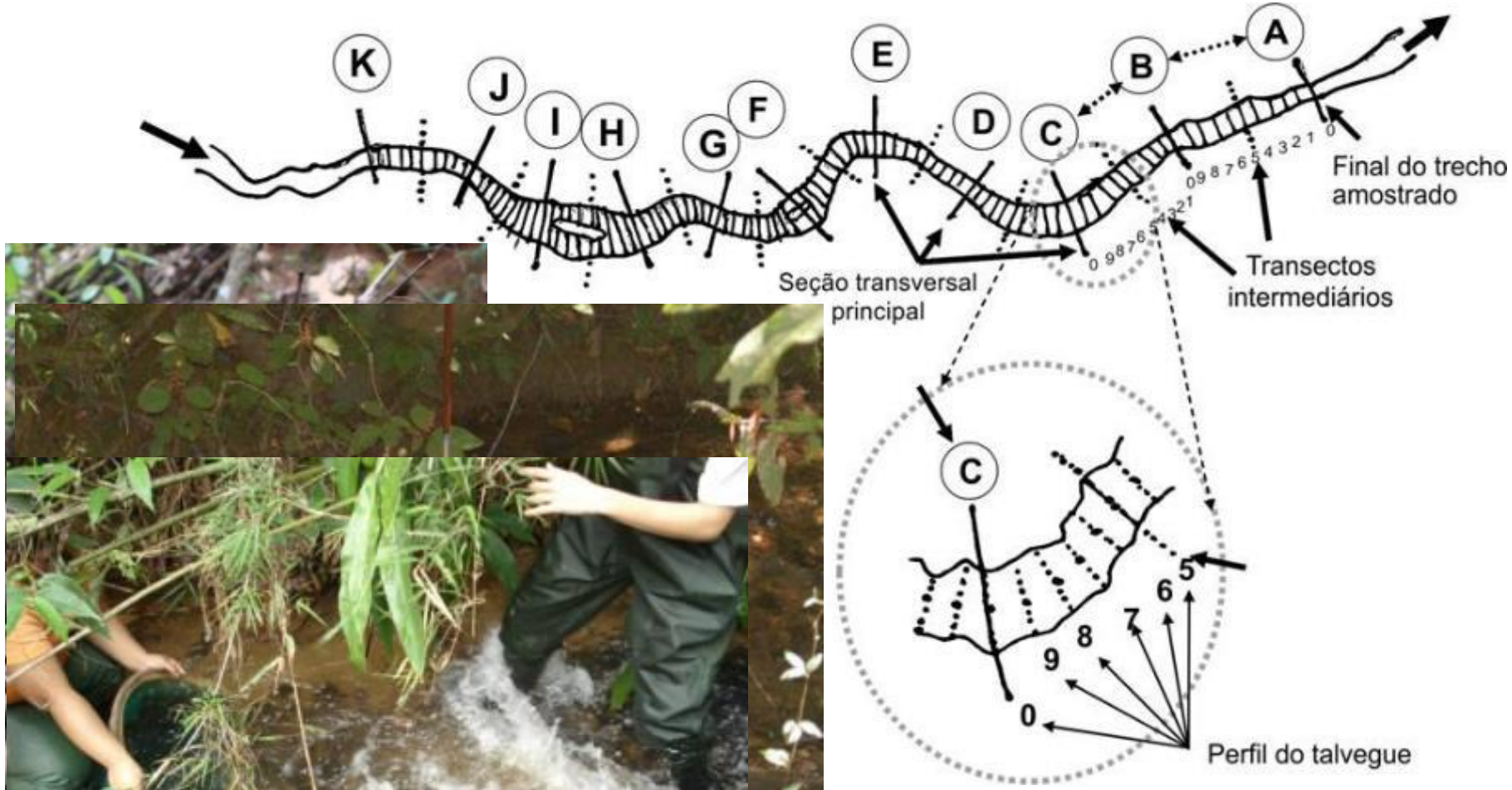

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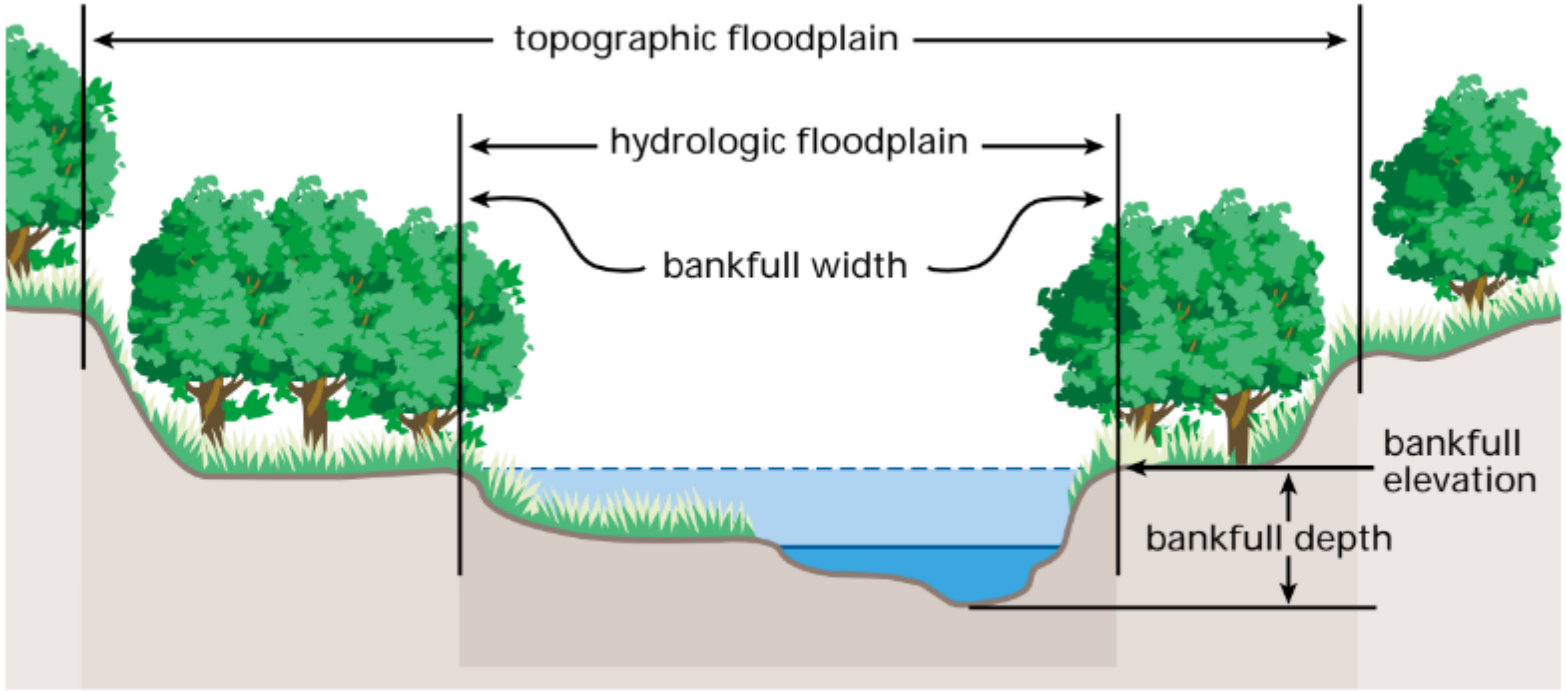
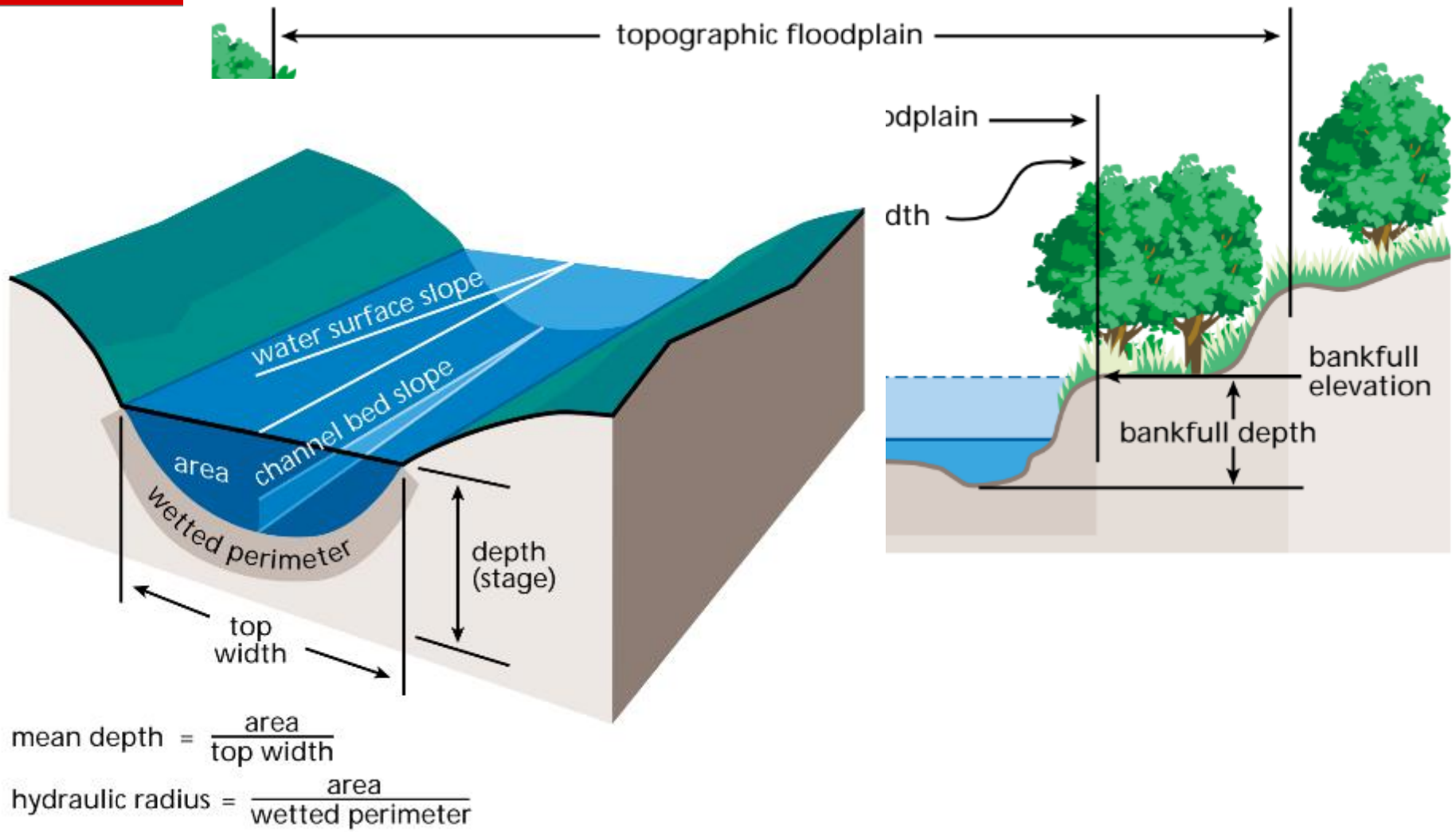


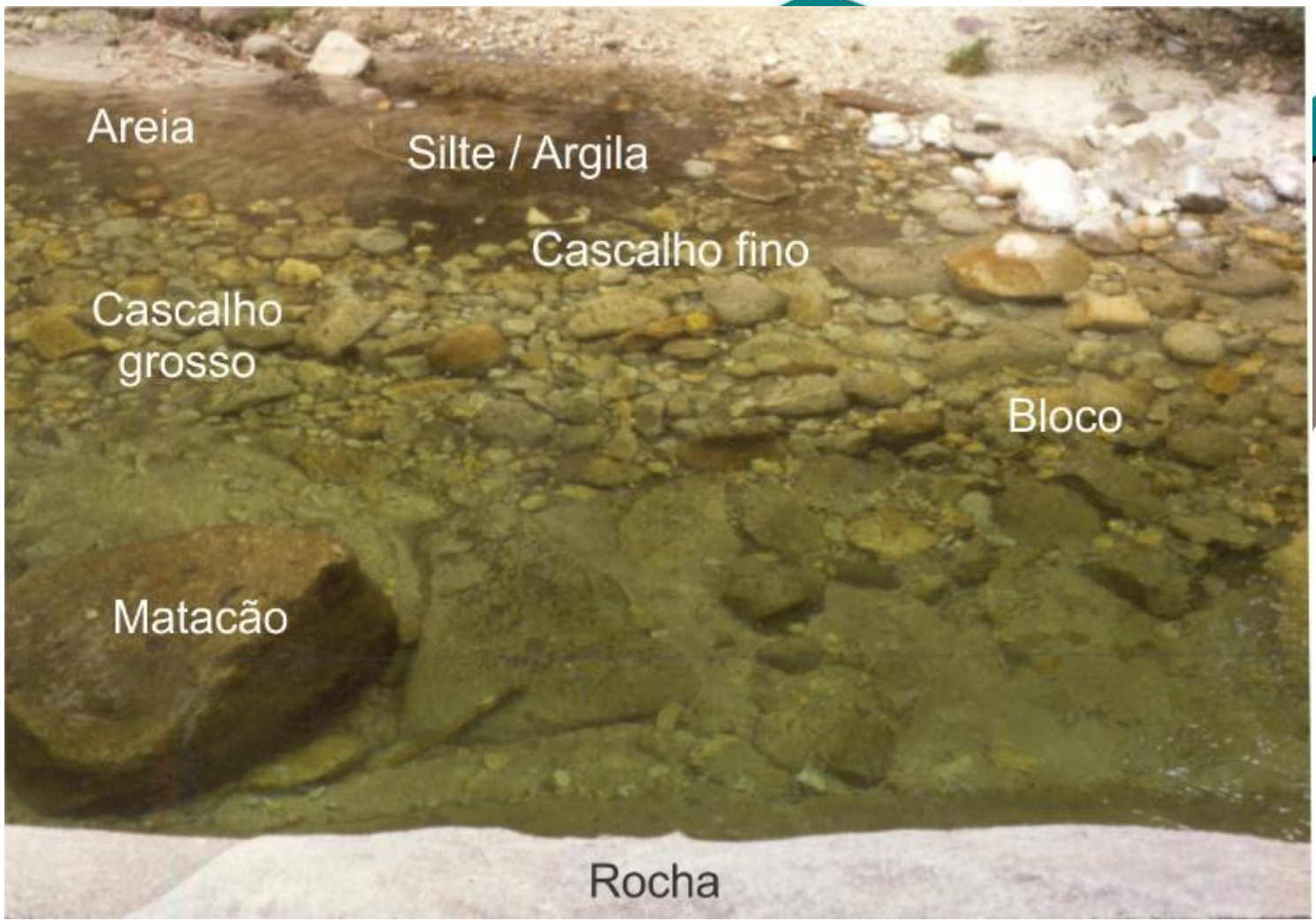
Physical Habitat Assessment

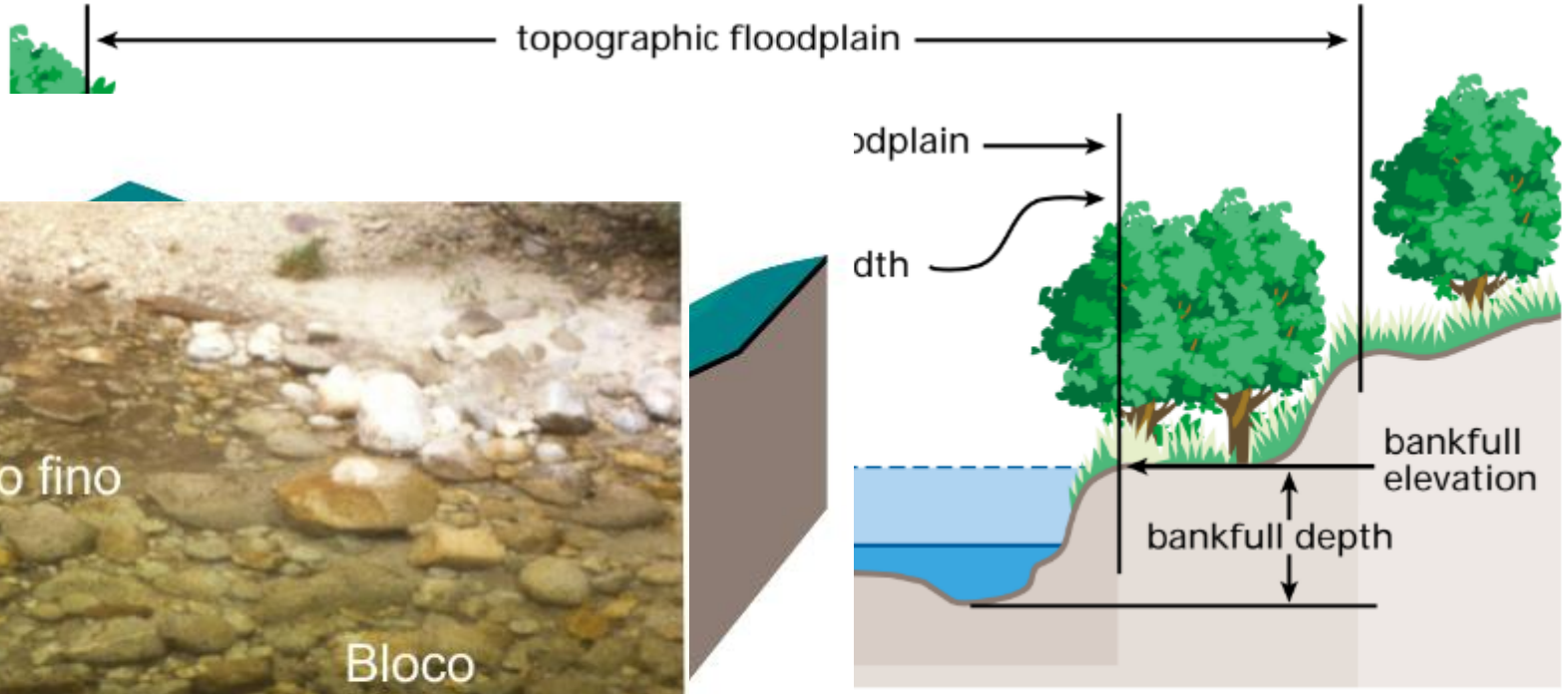


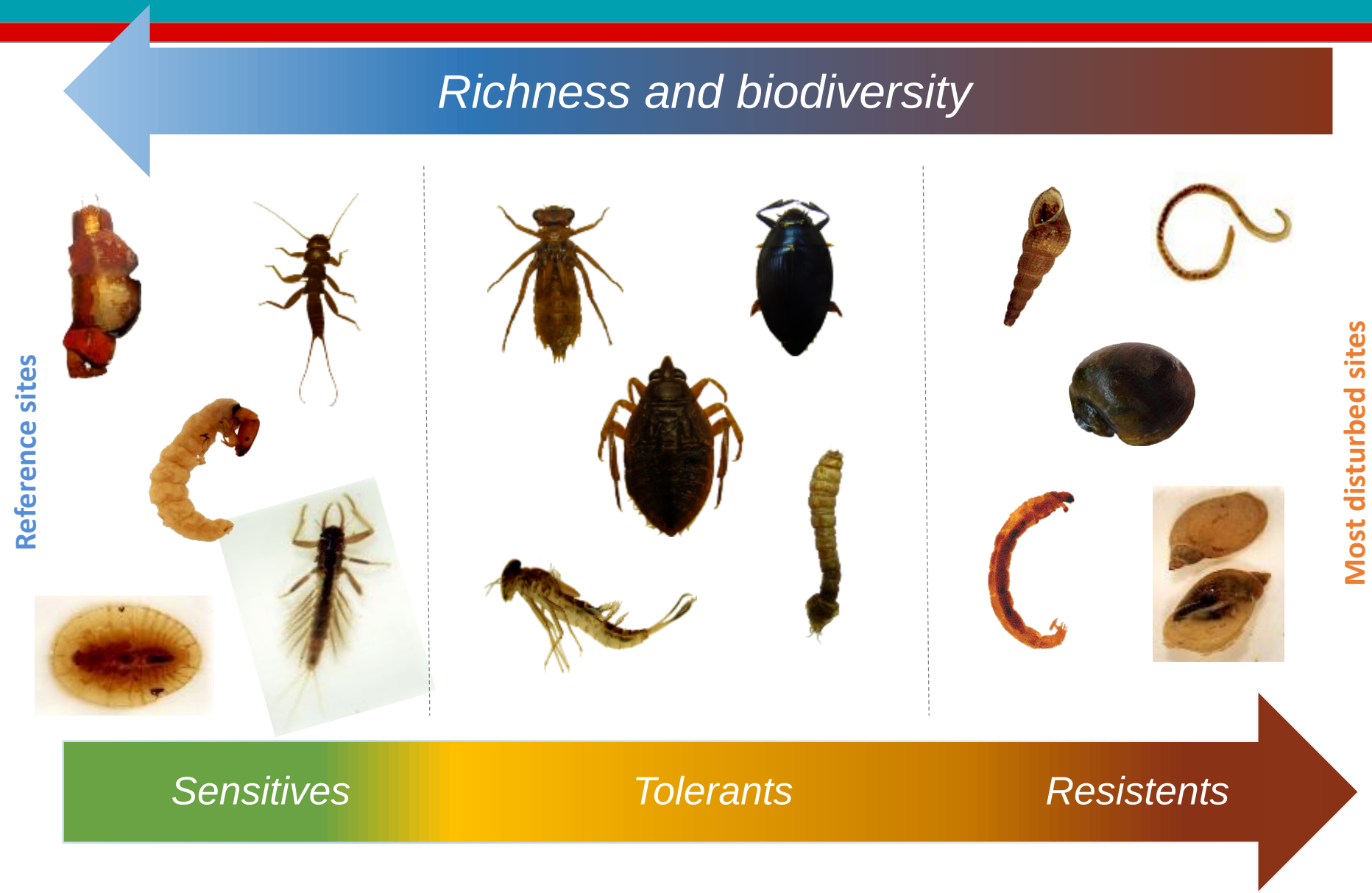
$$\text{mean depth} = \frac{\text{area}}{\text{top width}}$$

$$\text{hydraulic radius} = \frac{\text{area}}{\text{wetted perimeter}}$$

Physical Habitat Assessment







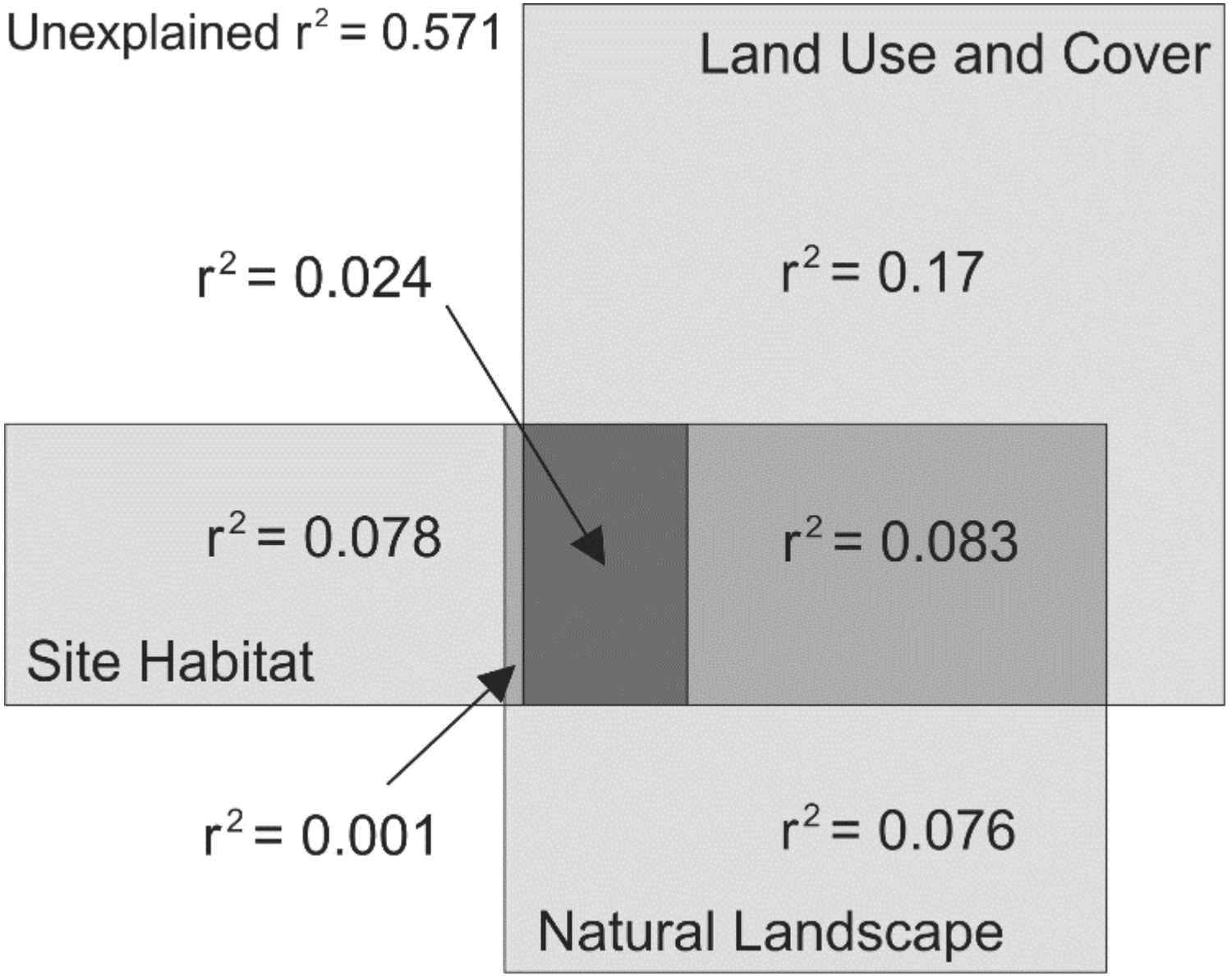
Ligeiro et al. (2014) – livro IBI-CEMIG

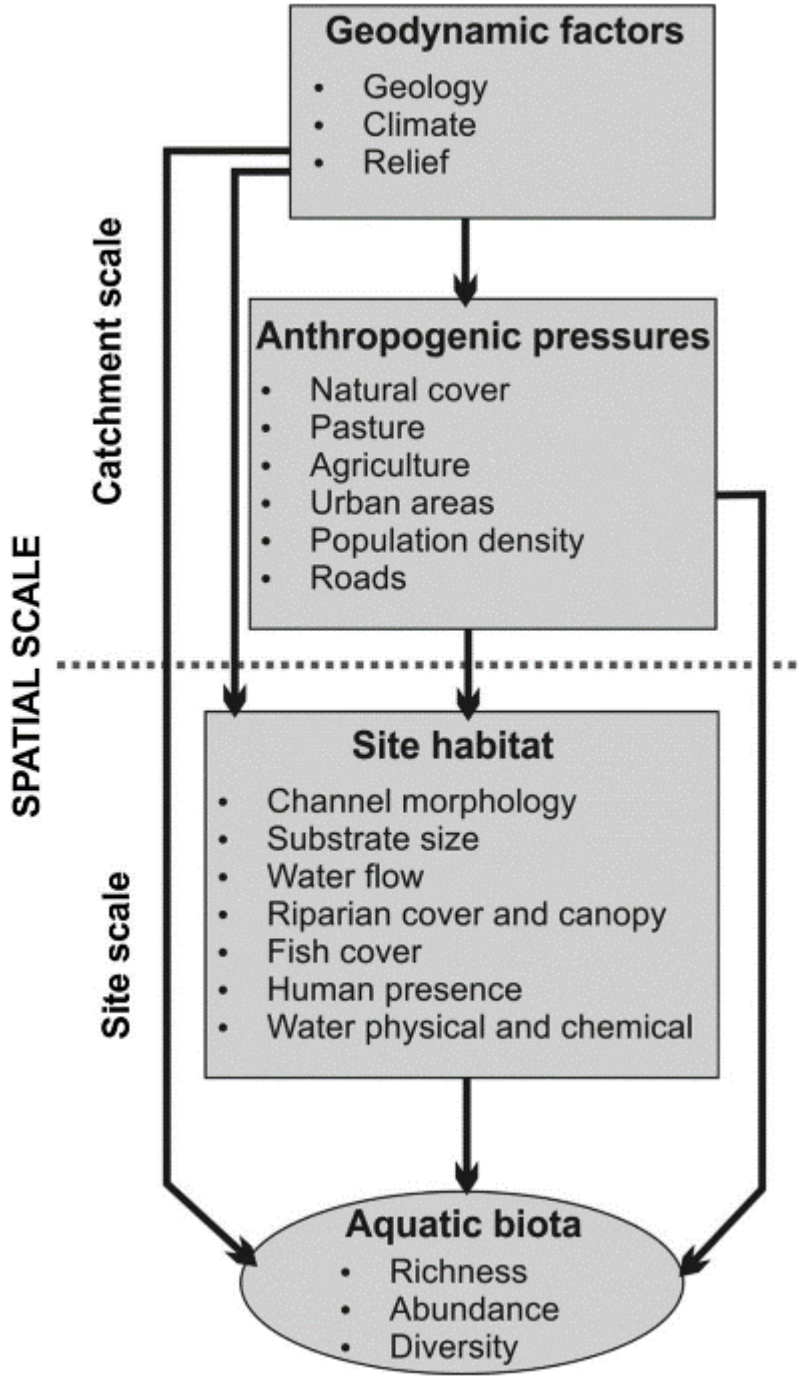
- Objective: We evaluated how three classes of environmental variables (landscape, land/cover, and site habitat), influence fish and macroinvertebrate assemblage richness in the Brazilian Savanna biome
- We extracted basin-scale variables through GIS procedures
- Site habitat and biota were assessed by field work

Statistical Methods

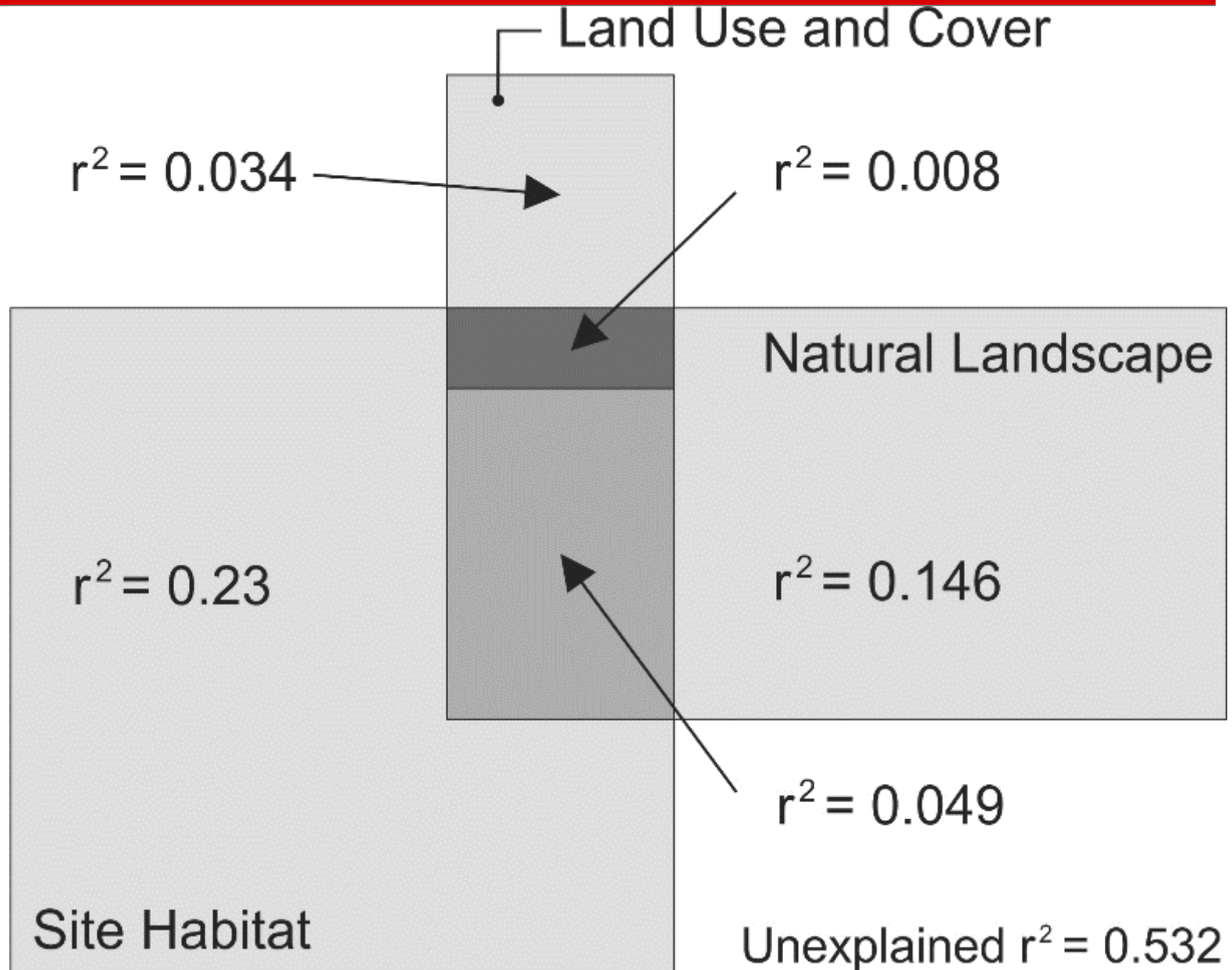
- Pearson correlation to identify the best candidate predictors
- Multiple regression with geographical data and physical habitat separately and Assemblages Richness
- Multiple regression with all data and Assemblages Richnessmetodologia

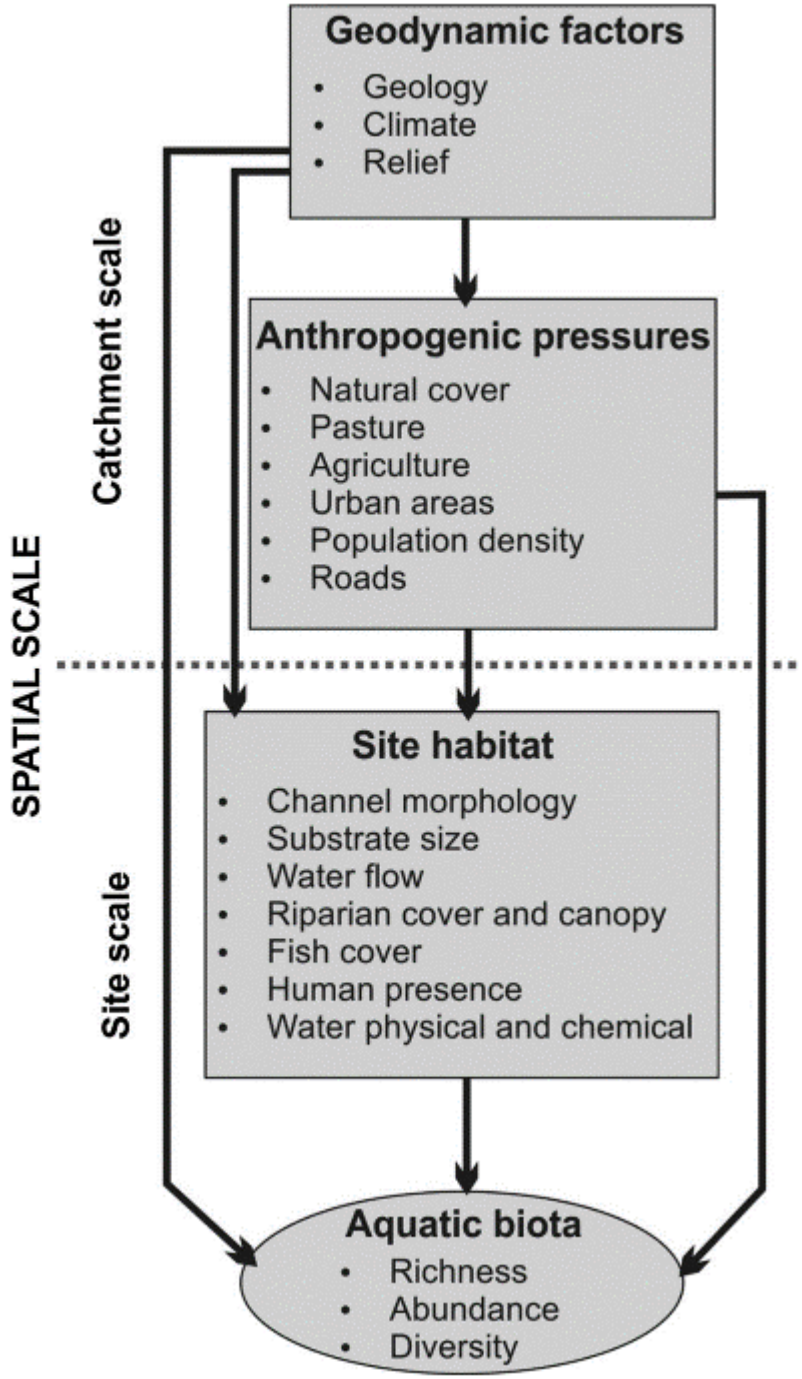
Richness: bentic macroinvertebrate





Richness: Fish





Conclusions

- Anthropic Activities in have been influenced by Landscape and both can explain site habitat
- Co-variance effect
- Land use and cover variables explained more variability in macroinvertebrate taxa richness than in fish species richness; the last ones are more related to site habitat
- All three classes of environmental variables studied were useful for explaining assemblage richness in Brazilian Savanna headwater streams.