



*Anything* **Unknown**  
to **Nature**  
is a **Health Risk**

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# Outline

## S

- **Soil**
- vegetables
- pesticides
- birth defects
- cancer

## A

- **Air**
- SO<sub>2</sub>, NO<sub>2</sub>
- respiratory, lung, heart problems

## W

- **Water**
- rivers are sewer lines
- vectors (dengue, virus, bacteria....)



*Soil*



Chemical  
Control  
to  
Biological  
Control



*Air*



Elevated  
Sulfur  
Dioxide

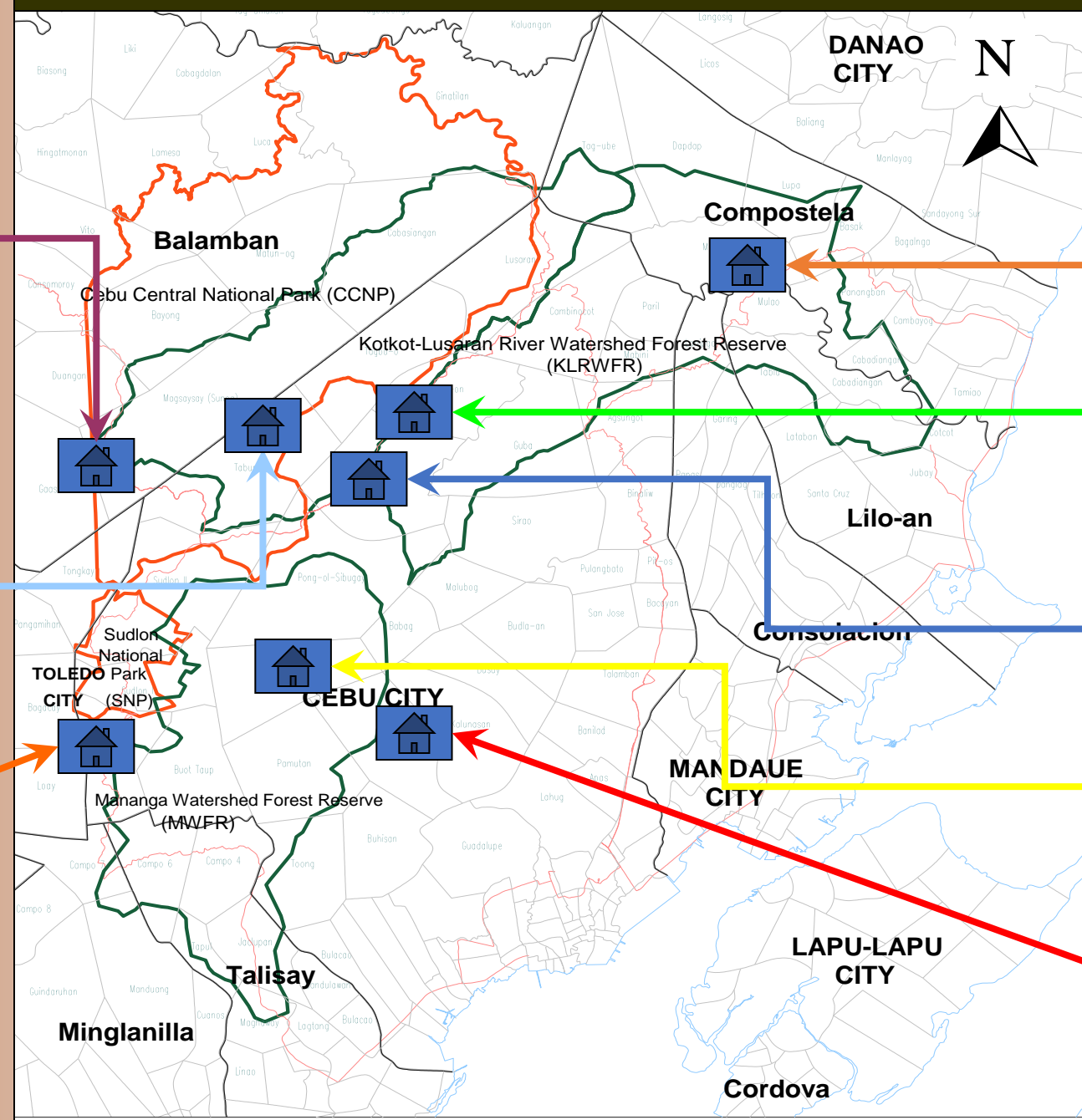
199 7 18

*Air*

**Site # 6  
Ga-as**

**Site # 5  
Tabunan**

**Site # 4  
Sudlon**



**Site # 8  
Mulao**

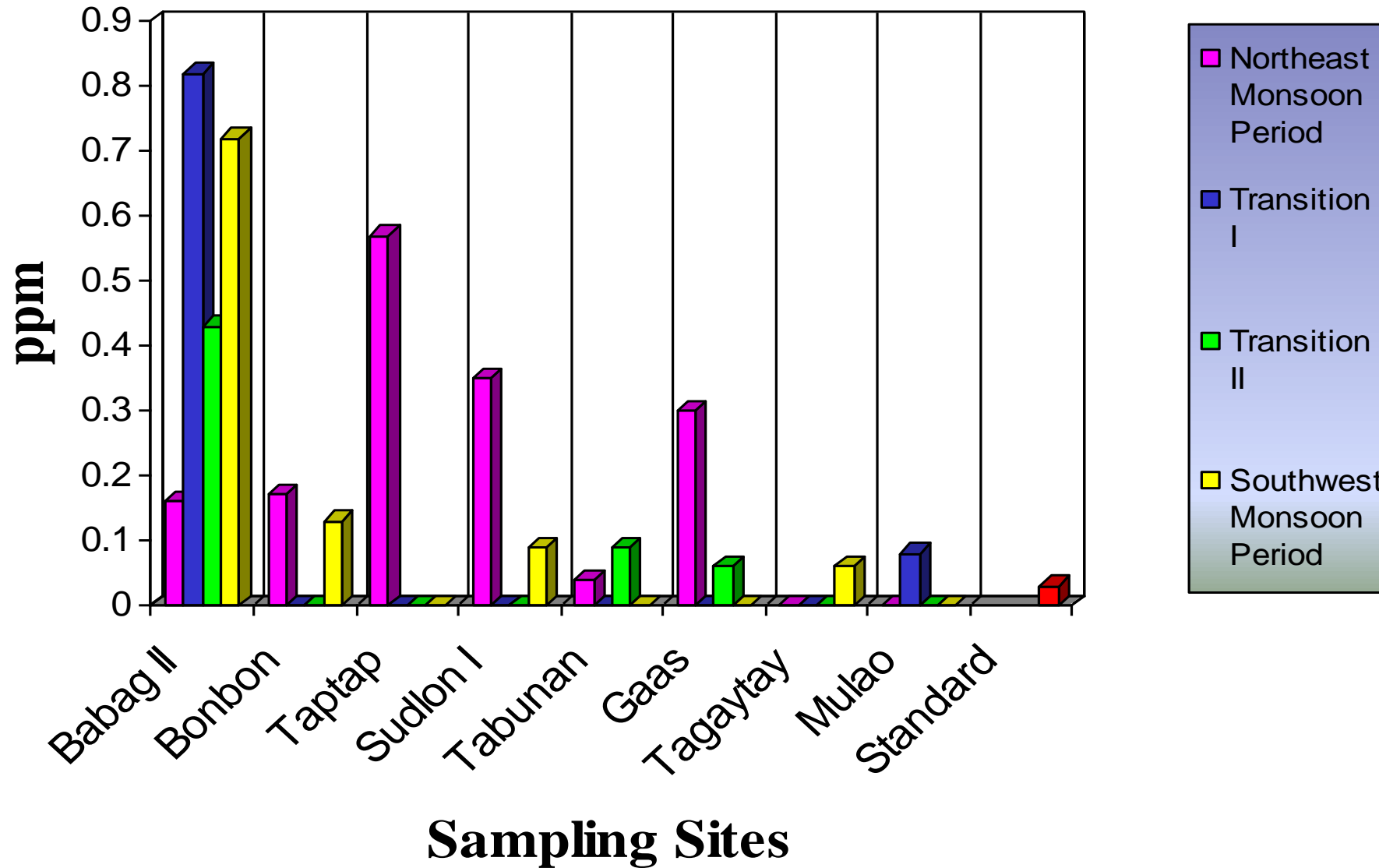
**Site # 7  
Tagaytay**

**Site # 3  
Taptap**

**Site # 2  
Bonbon**

**Site # 1  
Babag II**

*Air*



**Figure 1. 24-Hour Average of SO<sub>2</sub> for the Four Wind Patterns (October 1998-September 1999)**



*Water*



**Stop  
making  
our  
Rivers  
as  
Sewer  
Lines!**



# National Issues at Present

- National Sewerage and Septage Management Program affecting water quality and public health
- Absence of Large Wastewater Treatment Facilities (WTFs) for domestic wastes, neglect of housing
- Highly Polluted Rivers and Coastal Environments
- Highly Contaminated Seafoods



# Proposed Plan of Action

- National Sewerage and Septage Management Program (NSSMP) 2012 – 2020 for HUCs
- Build, Operate, Transfer (BOT) of Large Wastewater Treatment Facilities (IWRM, Israel)
- Bioremediation/Phytoremediation (ChAnELS)  
Umbrella Plant and Guppy Fish

# References

- J.M. Castañares, Technical Report, Socio and Economic Profiling of Four Protected Areas in Cebu Province, Air Quality, 2001  
Commissioned Research by DENR-7  
Five Research Groups of the University of San Carlos  
ChAnELS, WRC, BRG, OPS, GIS



# References

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- R.C. Cañete, L.M.G. Villegas and J.M. Castañares. Seasonal Bioaccumulation of Copper in Guppy, *Poecilia reticulata*(Peters) with Characterization of the Hydrophobic Fraction of its Octanol-Water Emulsion. KIMIKA 25 (1) 22-37, 2014.
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<https://www.gssrr.org/index.php/JournalOfBasicAndApplied/issue/archive>



# *Passion is the Best Driving Force in Research and Action*

*jmcastanares 2021*

*Danke*

