"The Mistery of NO_3 in La Venta River"

By: Natasha Ramos, Natalia Rodríguez
& Prof. Rose M. Trinidad
Juan Ponce de León HS
Florida, Puerto Rico

Funding provided by NSF Grant OIA -1556770

Background

La Venta River Site A

La Venta River Site B

Funding provided by NSF Grant OIA -1556770

Tilapia fish pond

Funding provided by NSF Grant OIA -1556770

Original Problem

- How much the injection of waters from the fish pond affects the nitrate levels in the stream?

Hypothesis

- Nitrate levels in the stream will increase by the injection of waste waters from the fish pond in the site B.

Funding provided by NSF Grant OIA -1556770

Official Problem

- How does the nitrate level decrease in such a short length between sites?

Hypothesis

- By the injection of waters from the pond, nitrate levels will be diluted in site B instead of increase.

Funding provided by NSF Grant OIA -1556770

Methodology

Physical chemical parameters and macrobenthics sampling

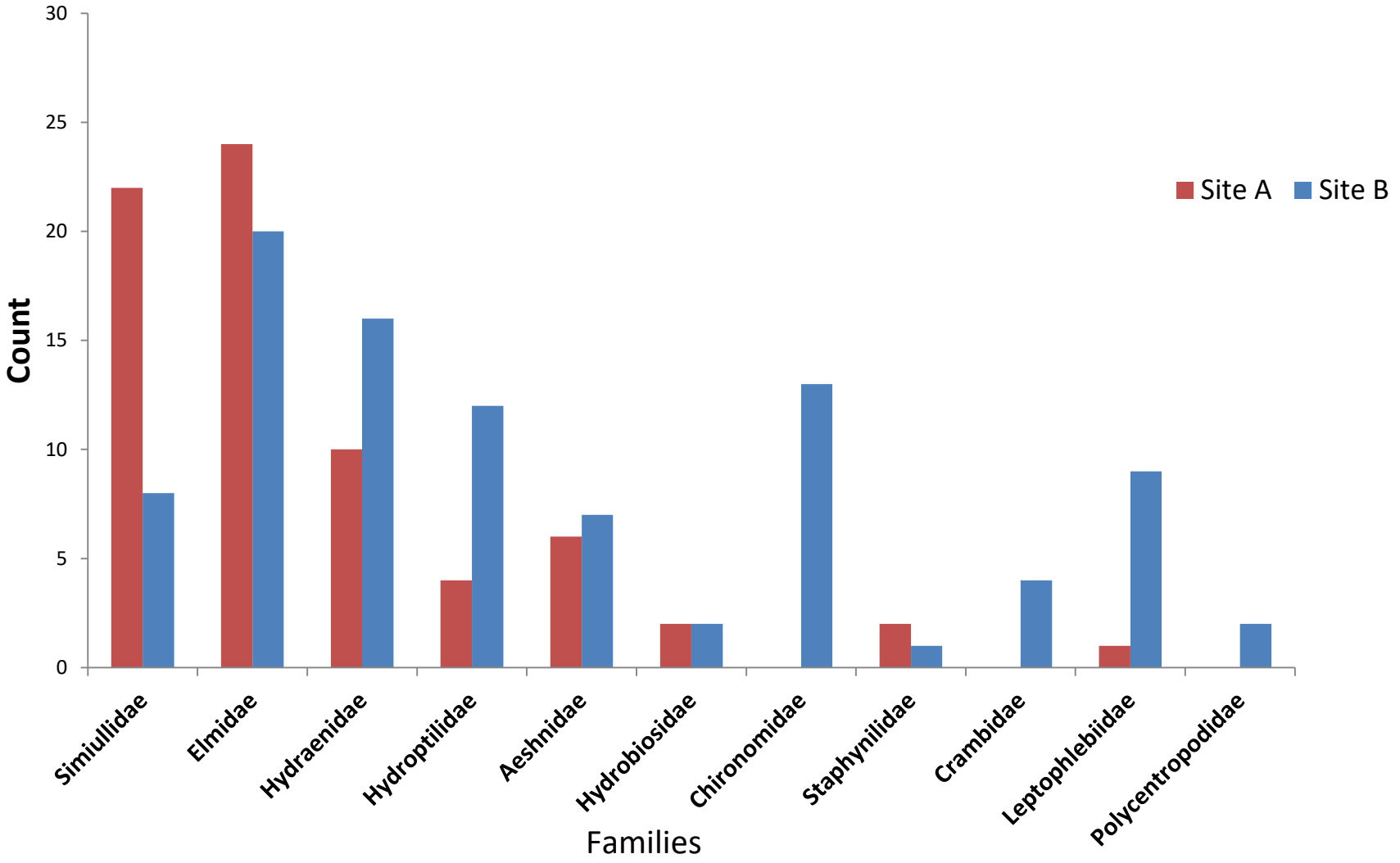
Chemical parameters sampling in cascade, pool, new stream and soil test in pond.

Data analysis

Funding provided by NSF Grant OIA -1556770

Results

Funding provided by NSF Grant OIA -1556770

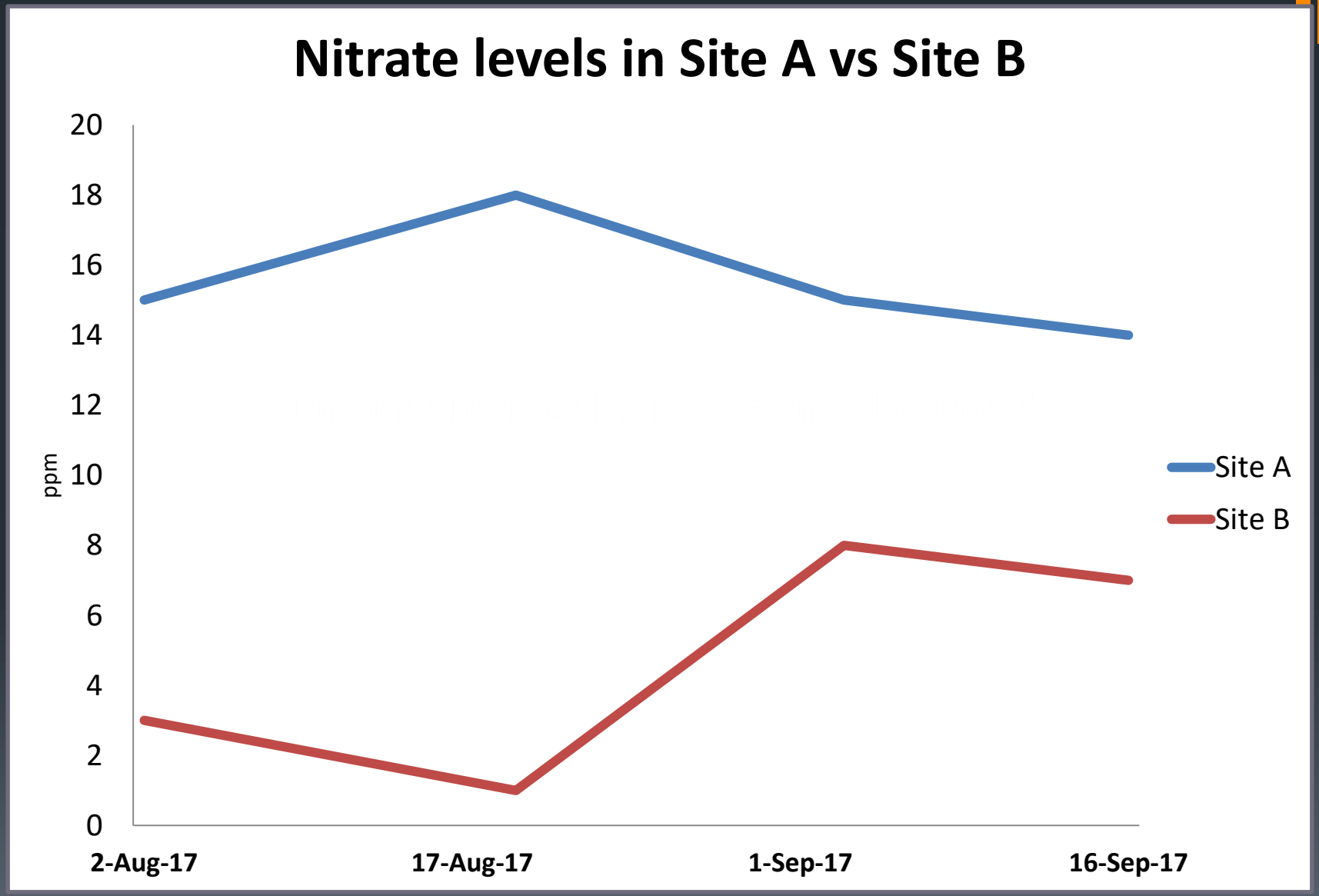


Physical Chemical Parameters

Parameters (average)	Site A	Site B
pH (ppm)	7.49	7.74
Nitrate (ppm)	**12**	**5.7**
Dissolve Oxygen (ppm)	7.71	8.85
TDS (ppm)	112.6	108.2
Ammonio (ppm)	0.42	0.3
Phosphate (ppm)	0.24	0.28
Canopy %	45.8	3
Water Temperature ºC	24.08	25.4
Salinity (ppm)	78.23	75.09
Conductivity (µS)	158.85	154.25
Discharge m^3/s	0.149	0.277

Funding provided by NSF Grant OIA -1556770

Nitrate Results before H. María



Funding provided by NSF Grant OIA -1556770

Water pond and soil nitrate test

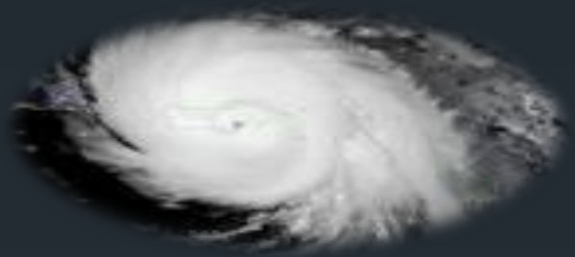
- **Pond**
  - 9 PPM
- **40 m**
  - 15 PPM
- **Soil**
  - Site A - Surplus
  - Pond - Surplus
  - Site B - Defficient

Funding provided by NSF Grant OIA -1556770

Physical Chemical parameters factors that can decrease the nitrate levels in Site B

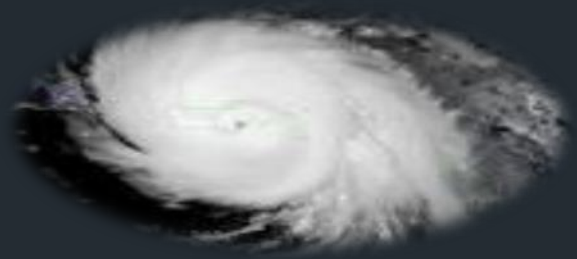
- Water from the pond diluted the NO_3 – Pipes sometimes are broken and no water was injected in the river. N☹
- Algae is sequestring NO_3- Sediment is abundant and avoid algae growth. N☹

Hurricane María
Site A



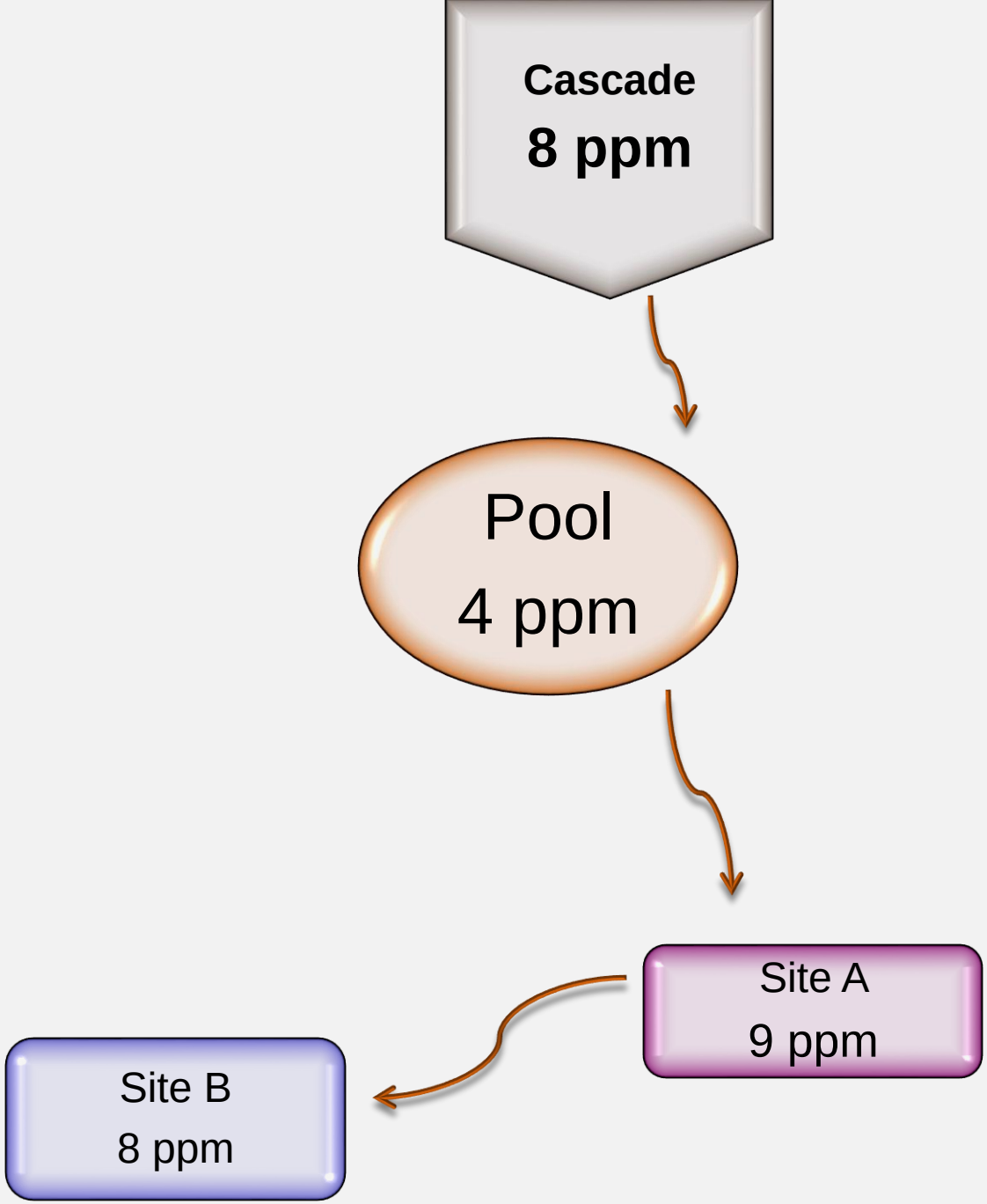
Funding provided by NSF Grant OIA -1556770

Hurricane María
Site B



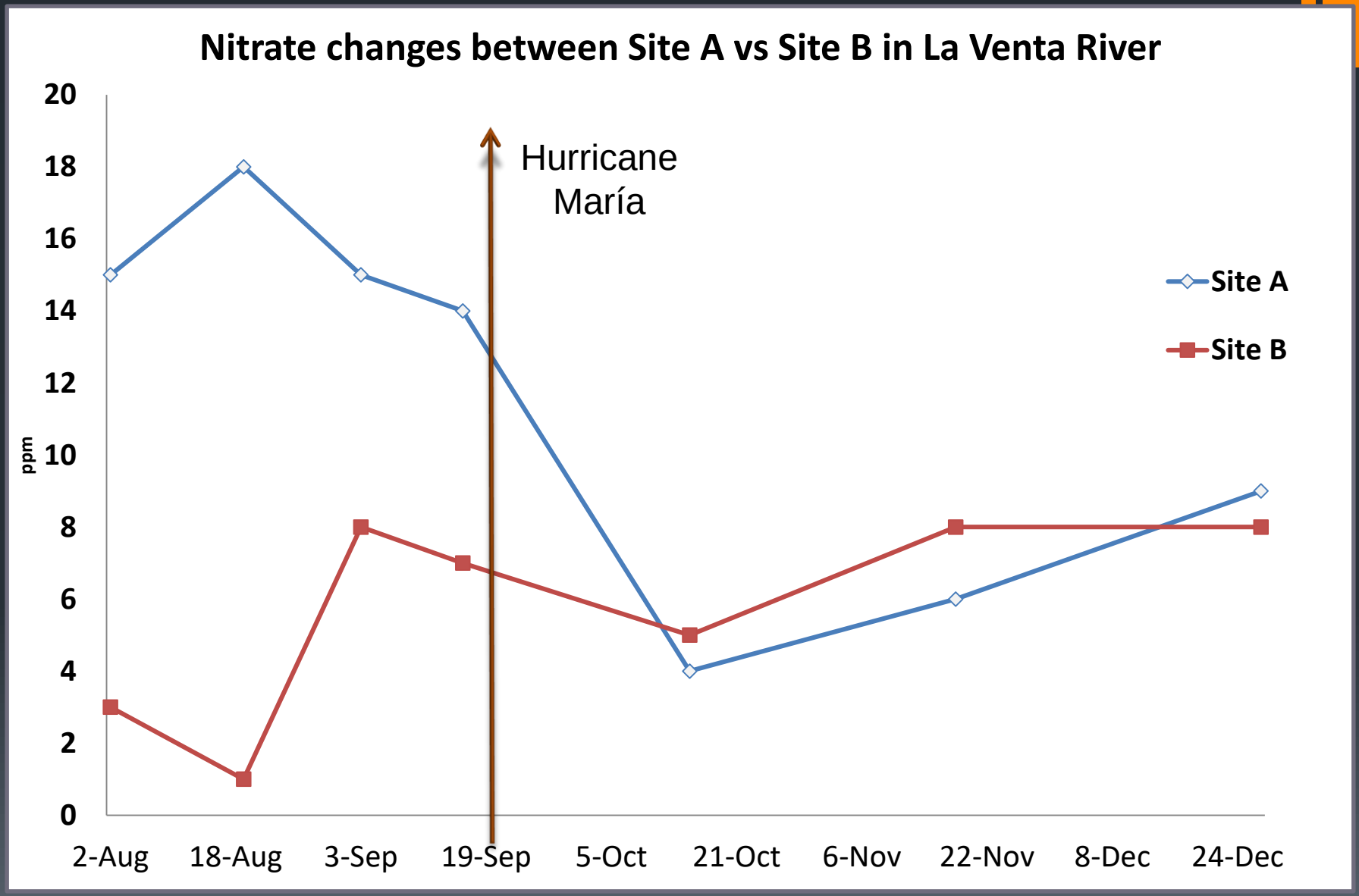
Funding provided by NSF Grant OIA -1556770

Nitrate Results



Funding provided by NSF Grant OIA -1556770

Nitrate Results



Funding provided by NSF Grant OIA -1556770

Conclusions

The hypothesis can’t be validated. The pond pipes sometimes were off and water injection to the Site B from the pond was not constant, neither the amount of water descending to the stream specifically by the time of Hurricane María. A high agricultural activity in upper lands near the site A was observed after the deforestation by hurricane. We conclude that it was the main factor affecting nitrate levels from Site A.

Funding provided by NSF Grant OIA -1556770

References

- Mengxue, X., Talhelm, A.& Pregitzer, K. (2017) Chronic nitrogen deposition influences the chemical dynamics of leaf litter and fine roots during decomposition. Soil Biology & Biochemistry, 112, pp. 24-34.
- RACC Reference Manual (2017-2018)
- Rivera, U., Jader, J.,Pinilla, G. & Camacho, L. (2013) Grupos tróficos de macroinvertebrados acuáticos en el humedal urbano andino de Colombia. Acta Biológica Colombiana, 18 (2), pp. 279-292.
- Smith, L., Voytek, M., Bohlek, J. & Harvey, J. (2006) Denitrification in nitrate rich streams: application of N2 and n-tracer methods in intact orders.Ecological applications 16 (6), pp. 2191-2207.

Funding provided by NSF Grant OIA -1556770

Acknowledgements

- Omar Pérez, PhD, University of PR
- Veronica Sosa-Gonzalez, PhD, CWDD
- Prof. Rose M. Trinidad, CIAM
- Prof. Elliot López, CIAM
- William McDowell, PhD, University of NH
- Noelia Báez, Coordinator Luq-LTER
- Mr. Jaime Vega, Land Owner

Funding provided by NSF Grant OIA -1556770

JPL PUERTO RICO TEAM

Thanks

Thanks

Funding provided by
NSF Grant OIA -1556770