

# The Effect of Water Flow on the Bacterial Diversity of Lancer Park



William Kish and Adonel Grubb



Department of Biological and Environmental Sciences, BIOL 250, Longwood University, Farmville, VA

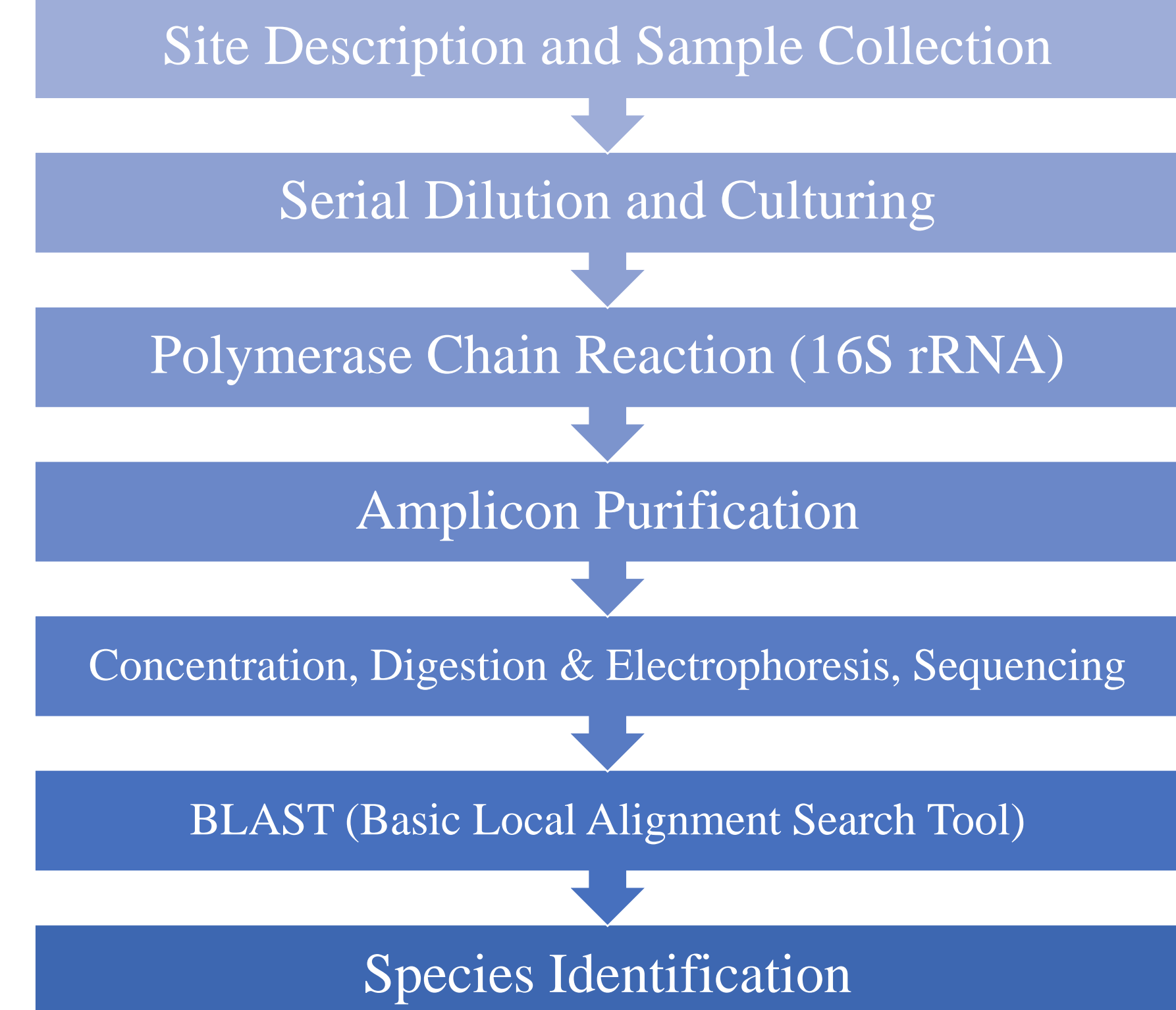
## Background

- A study in Spain concluded that bacterial distribution was linked to fast and slow moving water conditions (Berrendero et al. 2006).
- In 2013, a study done in Hawaii concluded that cell abundance decreases from low to high flow river conditions due to large communities being flushed away (Weigner et al. 2013).
- This study was conducted in freshwater, and it's expected that there will be a high bacterial diversity compared to marine and intertidal wetlands (Wang et al. 2013).

## Specific Aim

- Research Question:** To compare the bacterial diversity of Buffalo Creek and Lancer Park's research pond freshwater systems (Fig.1)
- Hypothesis:** Cellular abundance and diversity will be higher in the stagnant Lancer Park research pond than in Buffalo Creek.
- Importance:** This research is important to understand the different types of bacteria and how diverse and abundant they can be in Lancer Park.

## Methodology



## Results

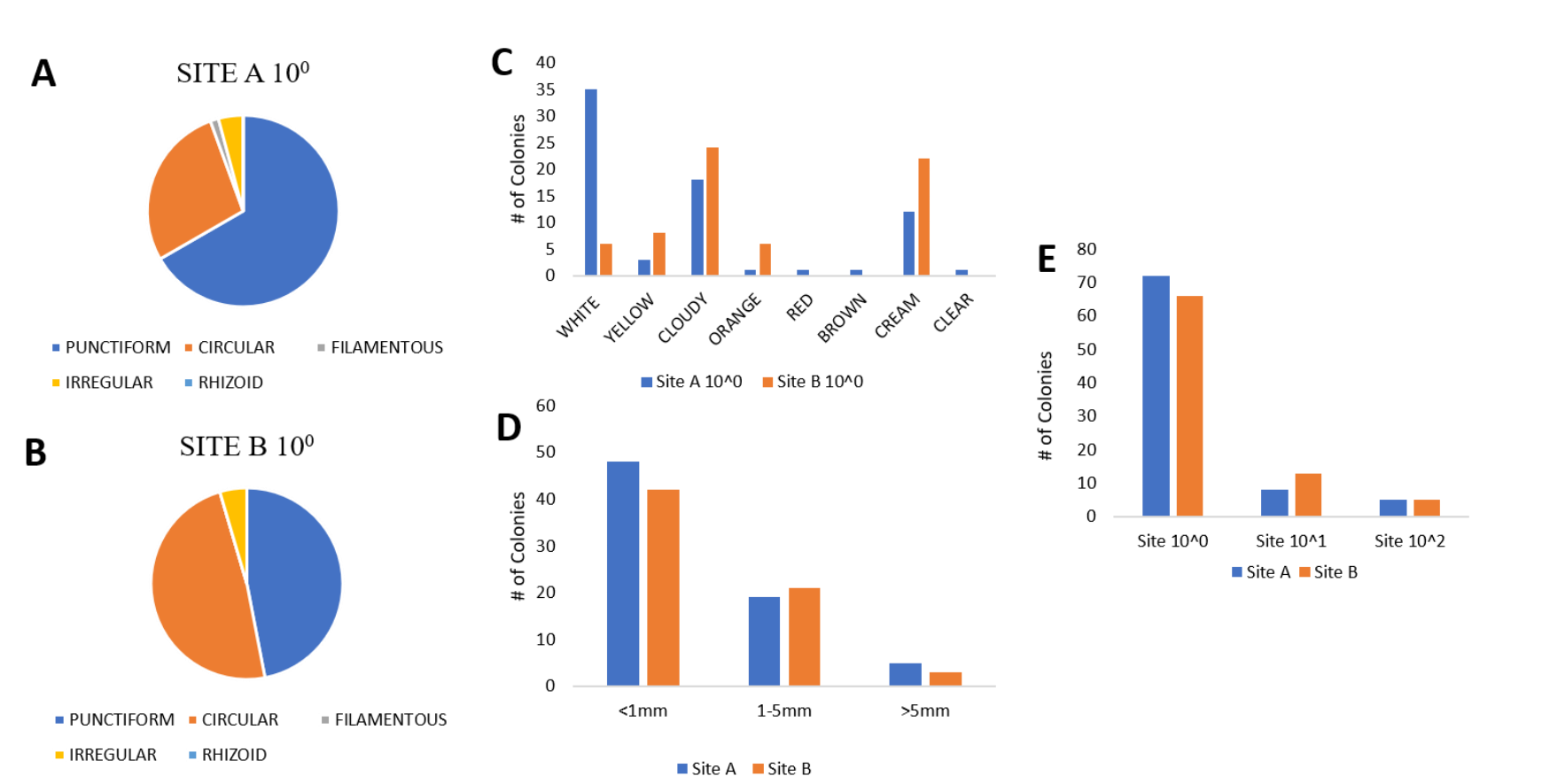
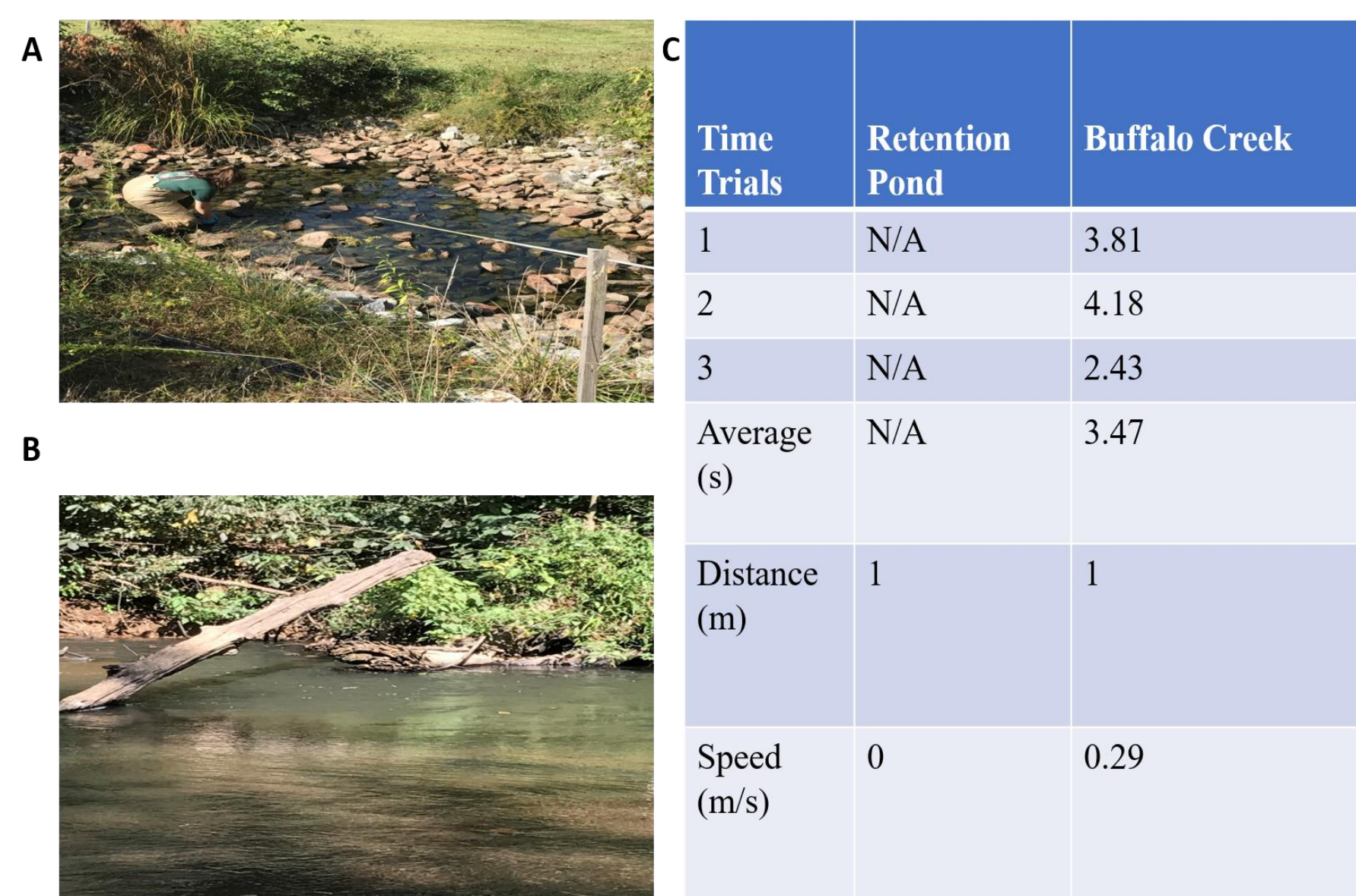


Figure 2. Colony Diversity and Abundance. (A) Site A colony forms. (B) Site B colony forms. (C) Colony colors between both sites (D) Colony diameter sizes between both sites. (E) Comparison of colony abundance

Species	Identity
<i>Pseudomonas sp. Strain DS-E06</i>	98%
<i>Pseudomonas punonensis strain XJPY7</i>	98%
<i>Pseudomonas sp. Strain rqb93</i>	98%
<i>Pseudomonas straminea strain P1</i>	98%
<i>Pseudomonas sp. 14K2</i>	98%

#	Ends	Coordinates	Length (bp)
1	(LeftEnd)-MspI	1-457	457
2	MspI-MspI	458-567	110
3	MspI-MspI	568-810	243
4	MspI-MspI	811-835	25
5	MspI-(RightEnd)	836-1041	206

Figure 5. NCBI BLAST Results and MSP1 fragments. (A) The top 5 genus species results with the highest identity percentage. (B) MSP1 fragment for *Pseudomonas sp. Strain DS-E06* (206 bp, 243 bp, 400 bp).

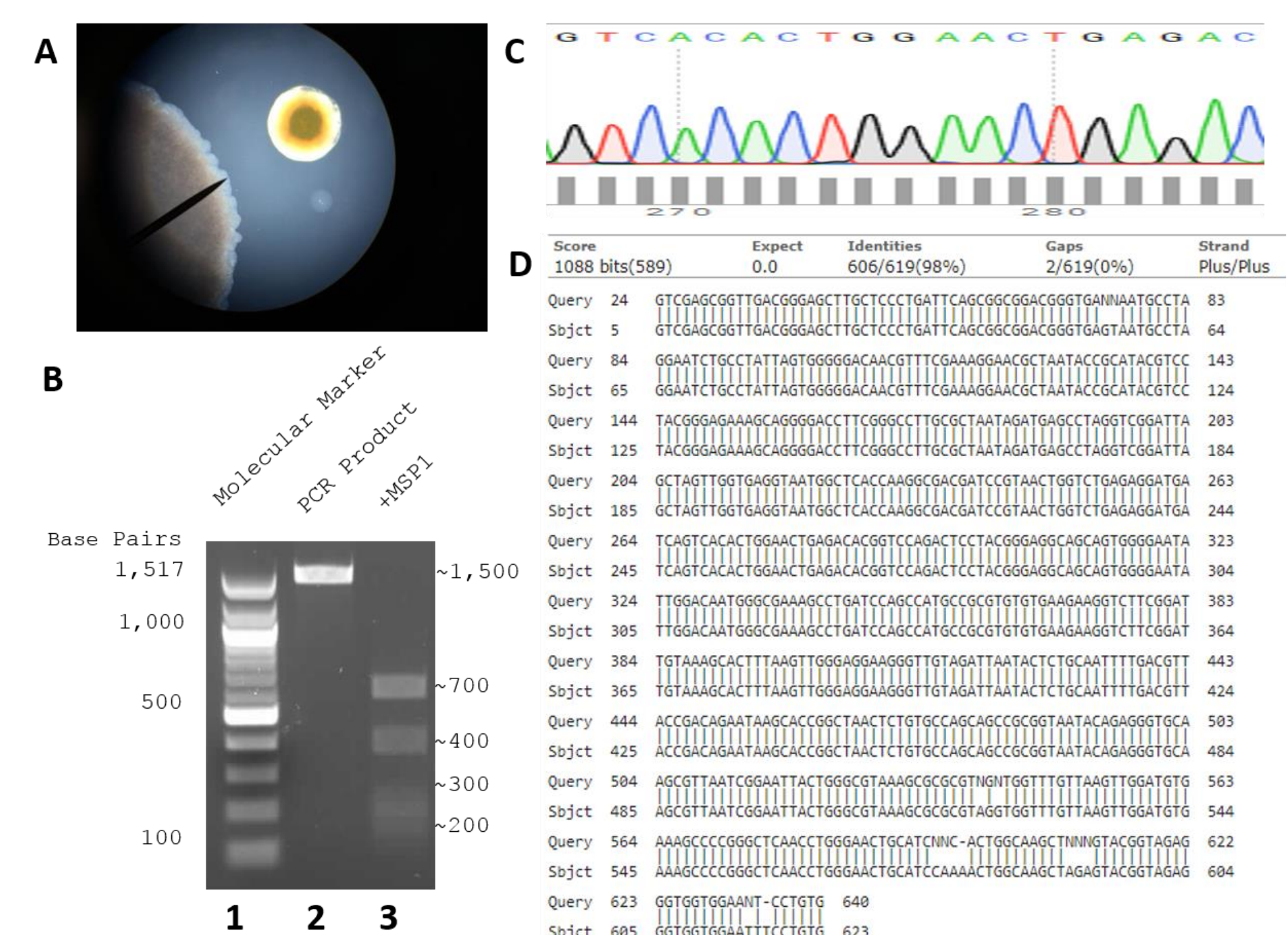


Figure 3. Possible identification of *Pseudomonas sp. Strain DS-E06* from retention pond. (A) Microscopic image of colony. (B) Gel electrophoresis of 16sRNA PCR product (Lane 1) New England Biolabs (NEB) molecular marker (Lane 2) PCR product (Lane 3) MspI digestion (CCGG). (C) Example high quality chromatogram used for BLAST sequencing. (D) Alignment between *Pseudomonas sp. Strain DS-E06* rRNA gene sequence and DNA sequence from colony.

	Concentration (ng/mL)	Absorbance	Absorbance	260/280
		260	280	
Site A	82.4	1.648	0.854	1.93
Site B	27.3	0.546	0.280	1.95

Table 1. Nanodrop. Comparison of sites DNA concentration and absorbance.

## Conclusions

- A correlation of water flow and bacterial diversity and abundance couldn't be determined due to lack of data.
- Lancer Park's retention pond colony was identified as genus: *Pseudomonas* with no certain species.
- Buffalo Creek sample could not be identified due to bad sequencing results.

## Future Direction

- More repetitions**
  - More colonies to sequence
- Location**
  - New stagnant pond
  - New part of Buffalo Creek
- Identification**
  - Better sequencing results
  - Fluorescence under UV (possibly help identify the exact species of bacteria)

## References

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- Wiegner TN, Mead LH, Molly SL. 2013. A comparison of water quality between low- and high-flow river conditions in a tropical estuary, hilo bay, hawaii. Estuaries & Coasts [Internet]. [14 Sept 2017];36(2):319-333. Available from: <http://doi.dx.org/10.1007/s12237-012-9576>