2023 Park District Visitation Results & LoRaWAN Overview

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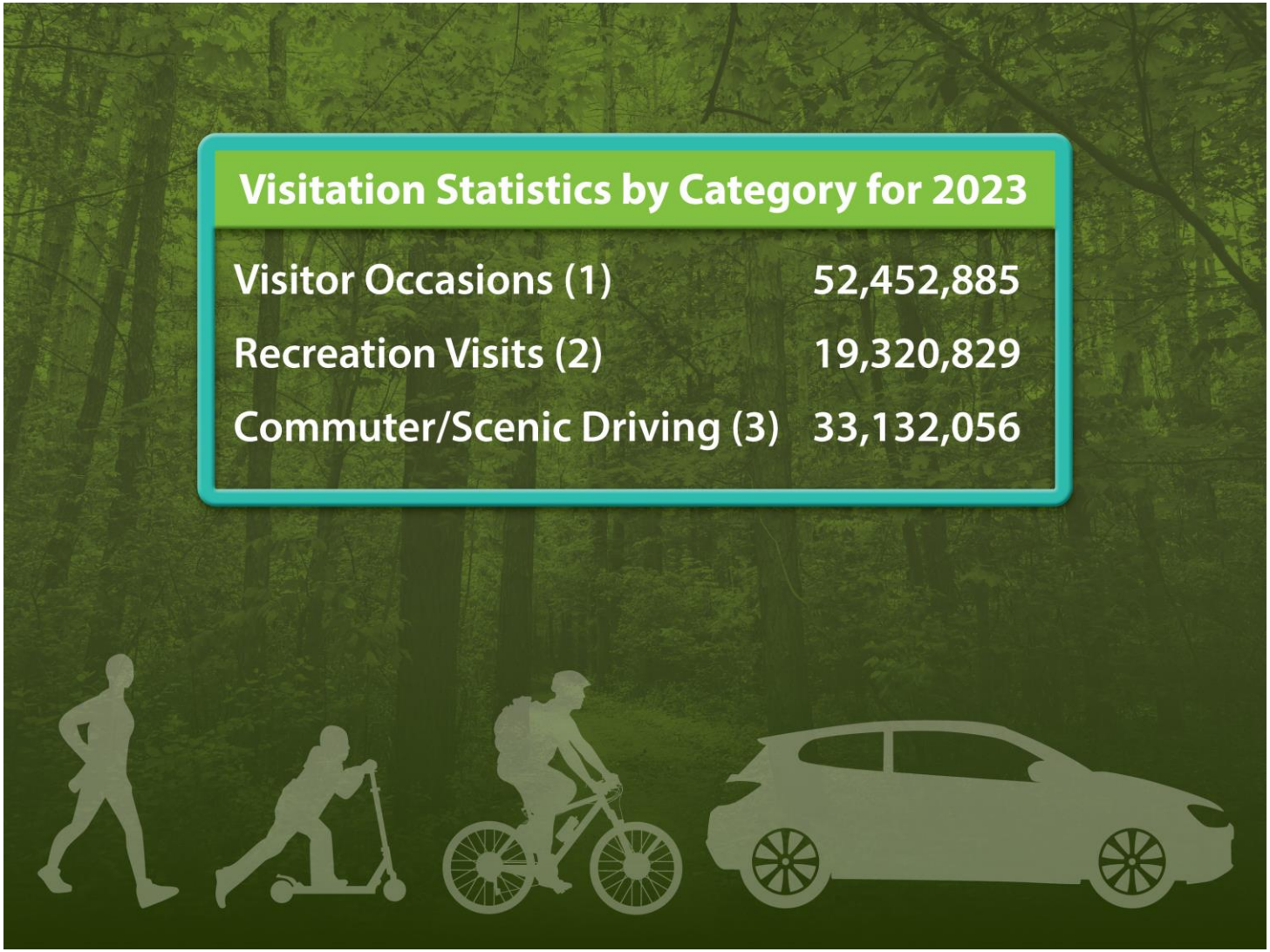
February 2024

*definitions located in appendix

2023 Visitation Overview



Summary of Visitor Occasions and Recreation Visits

Visitor Occasions increased by 10,442 and **Recreation Visits increased** by 273,486

The graph below represents millions

- *In order to increase the overall accuracy of the annual visitation estimate, a selection of reservations have been reviewed in-depth each year (including persons per car multipliers and parking lot weights).*

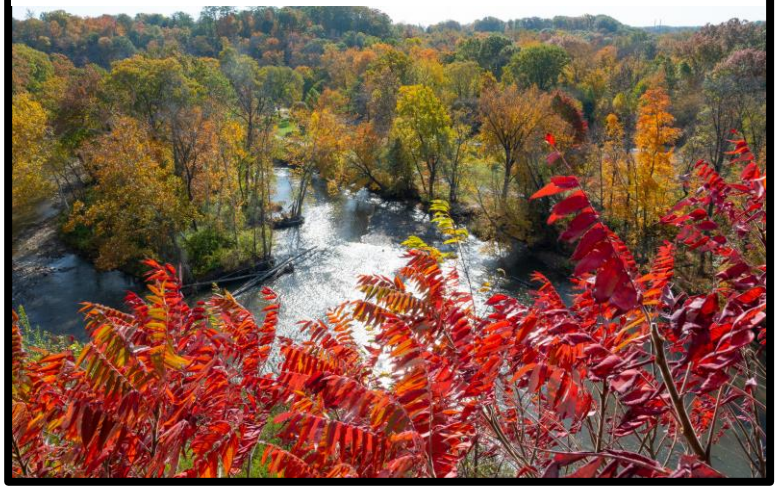
2023 Temporary Construction Projects

Hinckley

- Dam rehabilitation

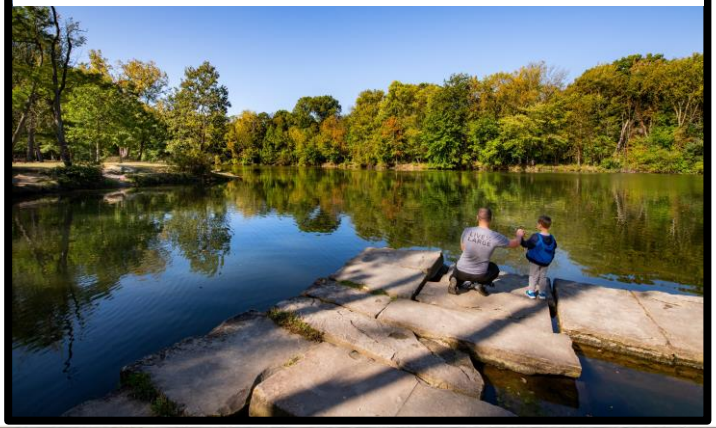
Rocky River

- Mastick Road closures due to APT construction



Mill Stream Run

- Wallace Lake Beach construction

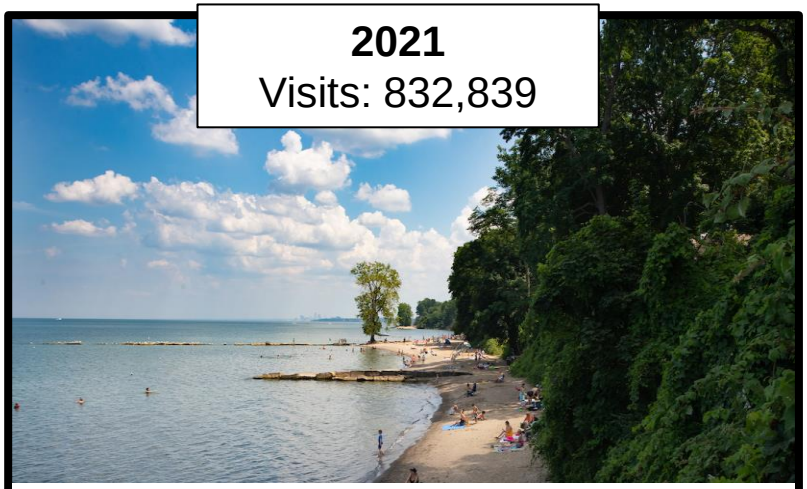


Impact of Park Improvements – Huntington Reservation

2020
Visits: 925,555

- Sunset Picnic Plaza & The Noshery Construction Begins

2021
Visits: 832,839



- Sunset Picnic Plaza & The Noshery Construction, Cont.

2022
Visits: 893,274

- Sunset Picnic Plaza & The Noshery Opening

2023
Visits: 1,007,071

- Karen's Way Place Space Opening

Record Attendance +13%

Increases in 2023

Brecksville +4%

- White Oak Trail Loop Opening
- Sleepy Hollow & Seneca Golf Course Attendance Increases
  - Sleepy Hollow Up 37% YOY
  - Seneca Up 23% YOY

West Creek +7%

- Watershed Stewardship Center Attendance Increase
  - Up 45% YOY

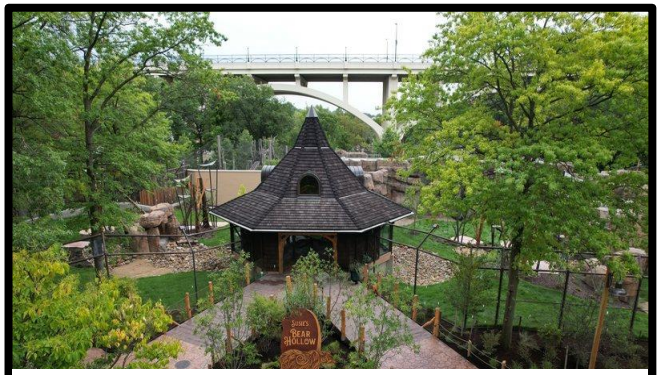
Bedford +6%

- Shawnee Hills Golf Course Attendance Increase
  - Up 26% YOY

Merwin's Wharf +36%

- Seasonal Promotions, Weekly Specials, Special Events (Summer Concert Series)

Zoo +4%



- Susie's Bear Hollow Opening
- Asian Lantern Festival & Wild Winter Lights Attendance

Outdoor Experience +14%

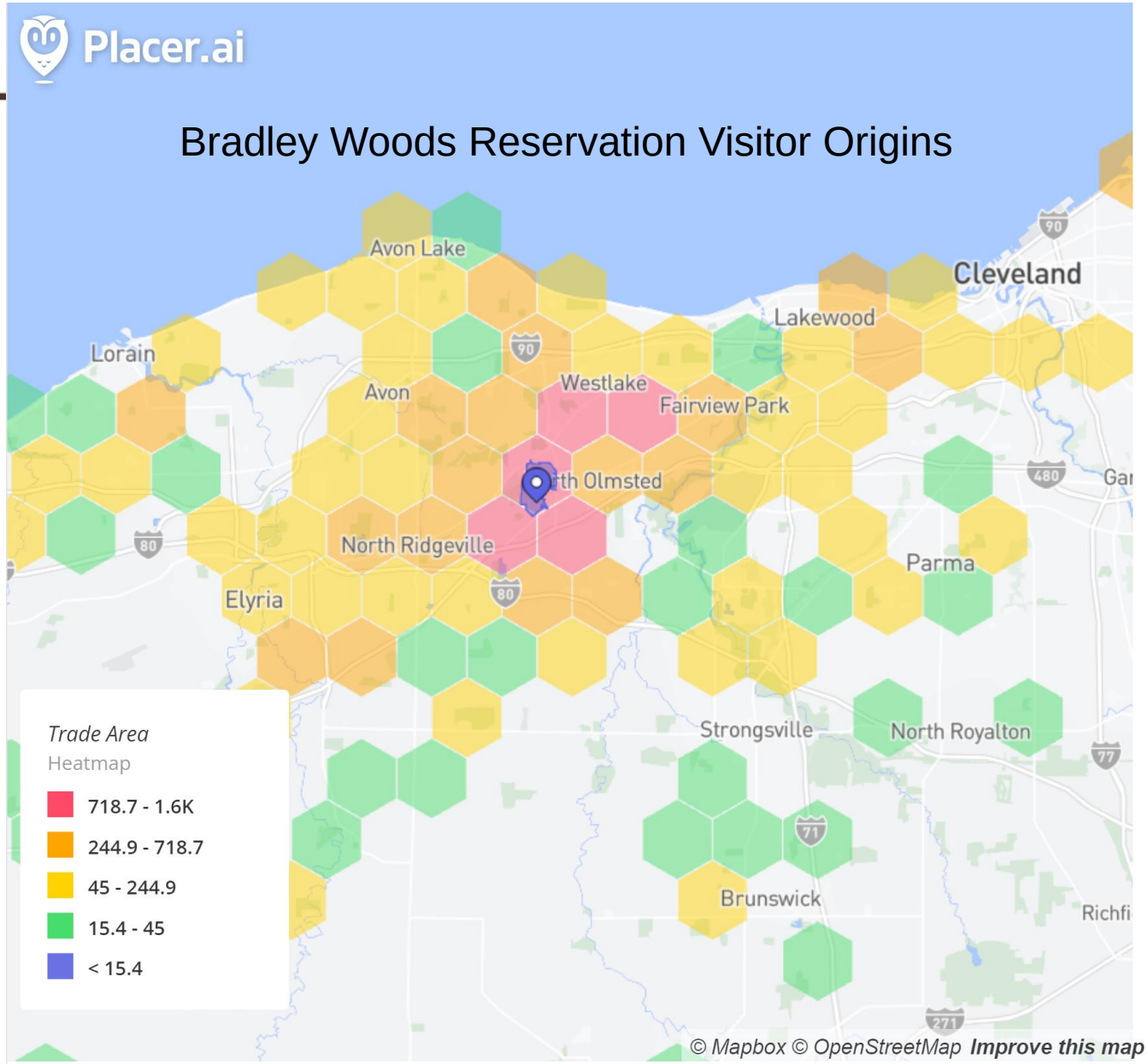
- Nature Center Attendance Increases
- Program Attendance Increases

Research & ITS Partnership – Emerging Technologies

Placer.ai

Placer.ai

- Placer.ai is a location analytics platform that collects geolocation data from mobile devices that are enabled to share data in an anonymized manner.
- This chart represents where visitors are estimated to be coming from when visiting Bradley Woods Reservation.

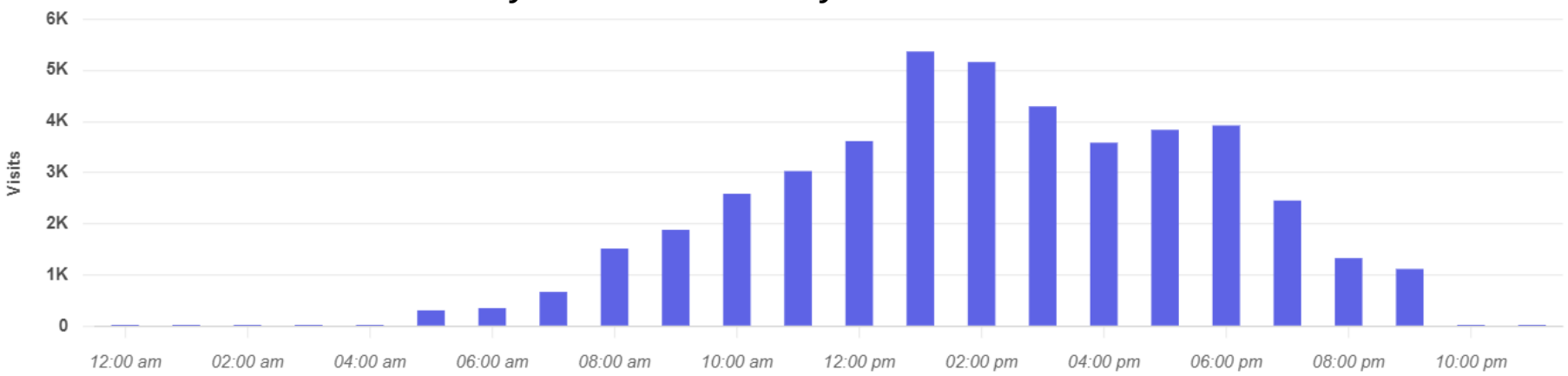


Bradley Woods Reservation | | Aug 1st, 2023 - Jan 31st, 2024
Data provided by Placer Labs Inc. (www.placer.ai)

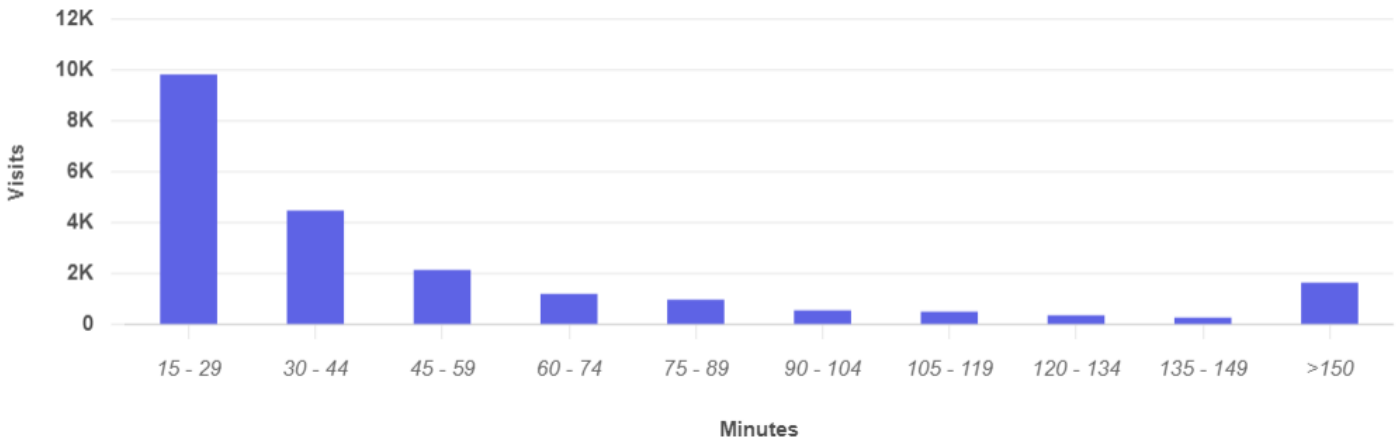
Placer.ai

Bradley Woods Reservation
4538 Bradley Rd, Westlake, OH 44145

Hourly Visits to Bradley Woods Reservation



Visitor Length of Stay at Bradley Woods Reservation



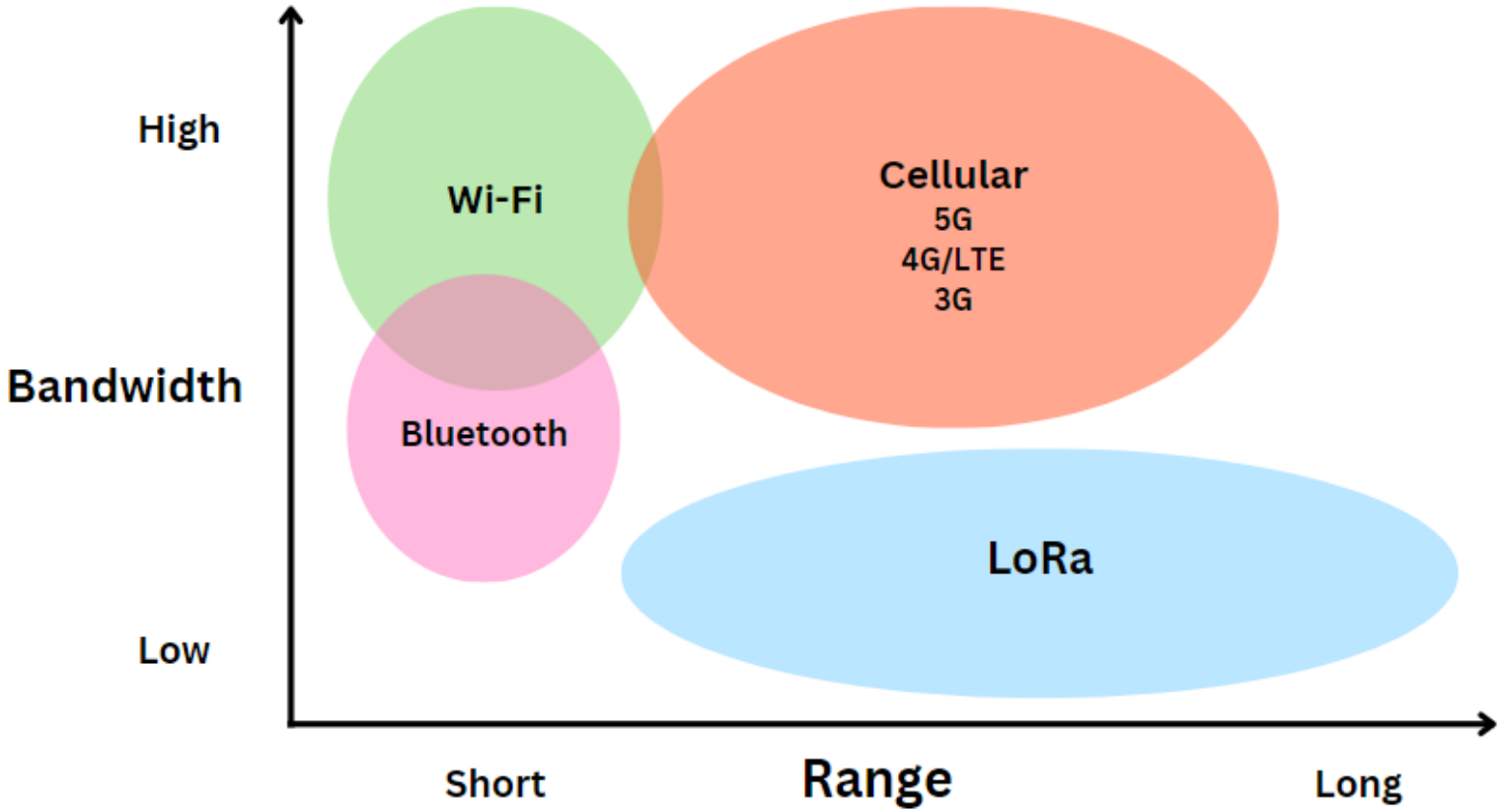
Average Stay	57 min
Median Stay	34 min

What is LoRaWAN?

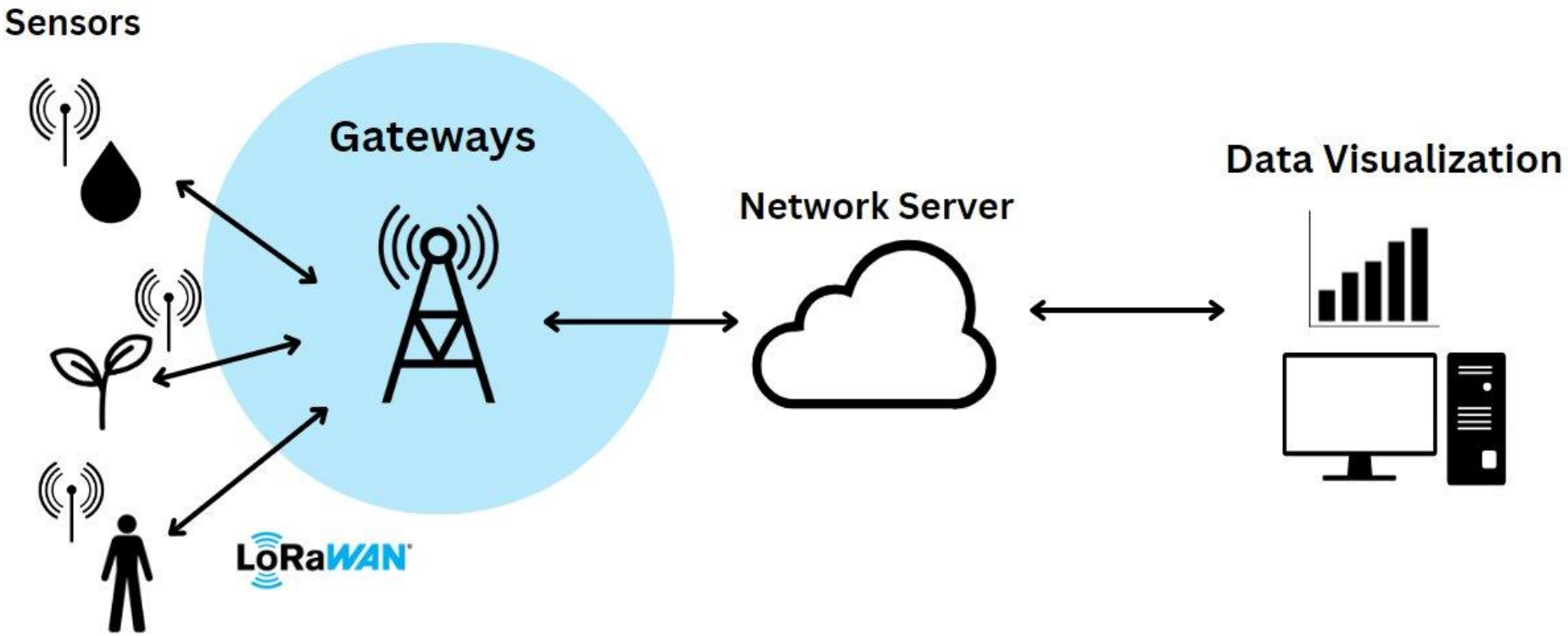
Long Range WAN (Wide Area Network)

- Uses LoRa radio modulation to enable wireless communication from end devices (sensors) to gateways

How Does LoRaWAN Compare?

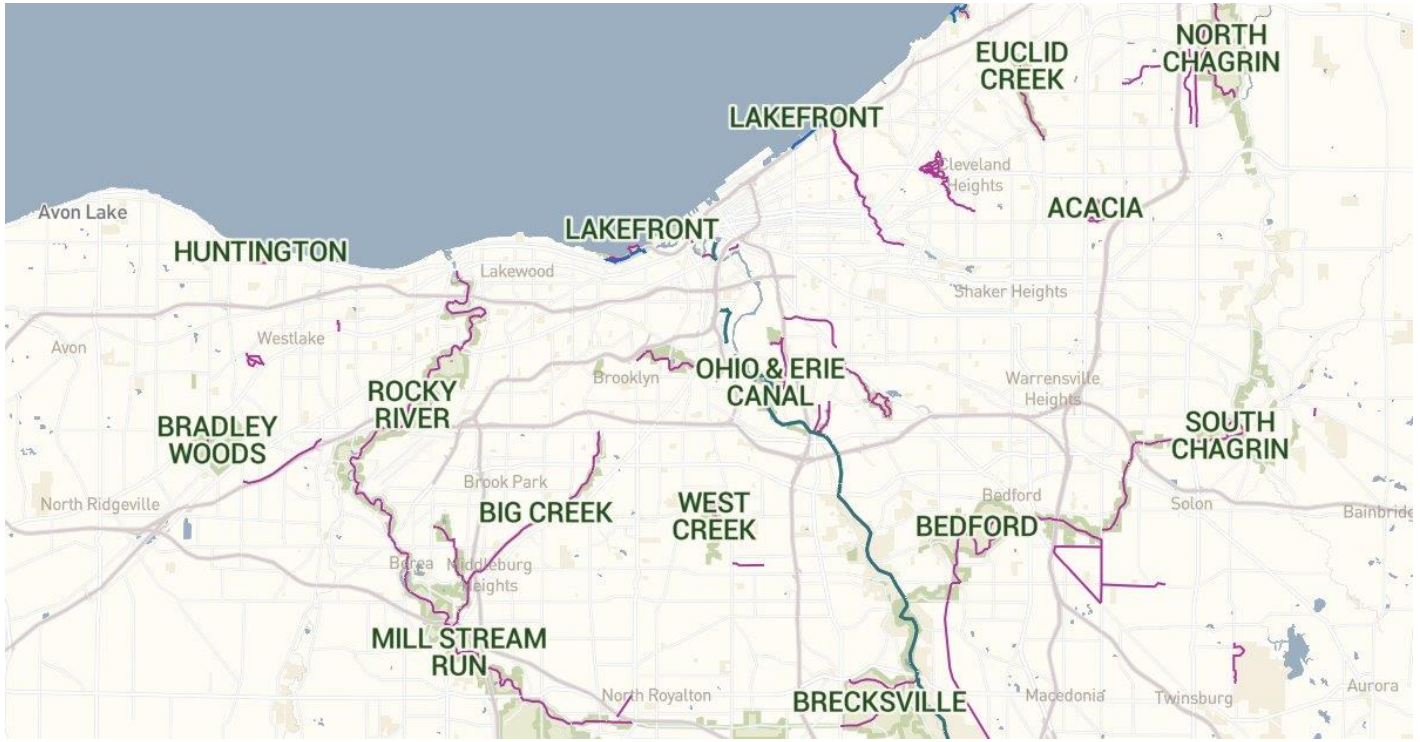


LoRaWAN System Architecture



Gateways

- **Enable sensors to transmit data to the user**
  - Factors that determine gateway signal range include
    - height of gateway
    - obstructions (physical buildings, trees, and terrain)



Advantages/Limitations of LoRaWAN

Advantages

- Network coverage has a very **wide range**
- Can purchase and place our own gateways to extend LoRa network throughout reservations
- Sensors are **less expensive** than most cellular alternatives and have an extremely long battery life
- A single gateway can support thousands of end devices (sensors)

Limitations

- Cannot send **photos or videos** (bandwidth too low)
- Not suitable for real-time data, as **information is sent infrequently**

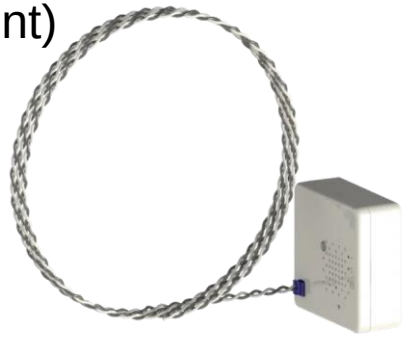
Use-Cases for Cleveland Metroparks

People Counting

- Visitor counts (door sensors, occupancy sensors, people counting sensors on trails, AI sensors)

Utility Sensing

- Water or gas leak detectors, water and gas flow meters, GPS (fleet management)



Environmental Sensing

- Air temperature and humidity sensors
- Sensors to measure water temperature and water level
- Air quality sensors, soil moisture sensors, weather stations

LoRaWAN Trail Monitoring Solutions

- **Infrared People Counter**
  - Utilizes 2 infrared beams and an IR transmitter and receiver to detect in and out counts
  - Can be utilized wherever LoRa signal is present

- **Distance Sensors**
  - Ultrasonic and microwave sensors measure distance between sensor and an object
  - Currently exploring possible configurations for people-counting

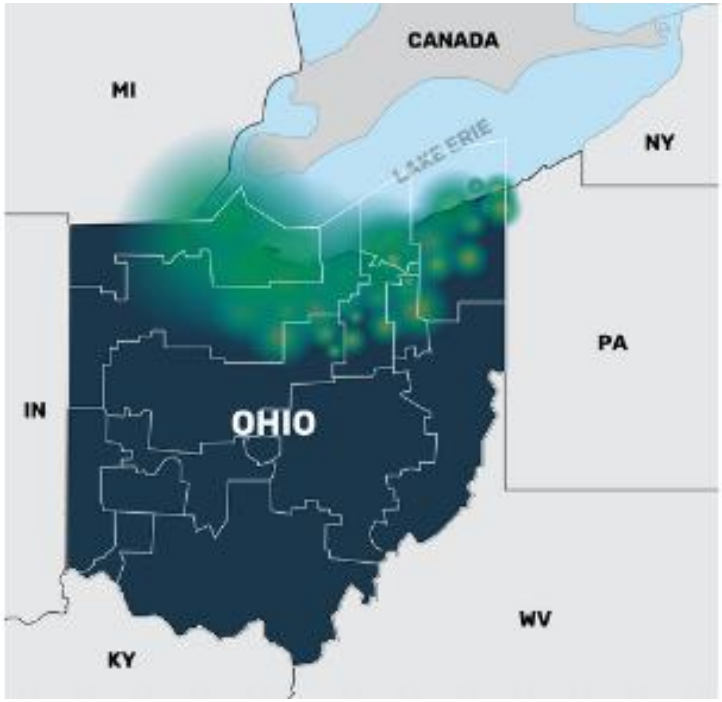
- Low cost of sensors can improve pedestrian counting scalability
- Also exploring the possibilities of using LoRaWAN for bridle trail monitoring

- ***Currently exploring the viability of LoRaWAN sensors by comparing their counts to those of the existing Eco-Counters***

Real-world Examples of LoRaWAN Integration

Smart Lake Erie Watershed (Cleveland Water Alliance)

- Using LoRaWAN to monitor Lake Erie (200+ sensors currently)



Clevelandwateralliance.org

LimnoTech and Freeboard

- Using LoRaWAN sensors to collect data regarding water conditions: contaminants, nutrients, wave-height, water temperature, etc.
- Buoys and weather stations fitted with LoRaWAN sensors

Freeboard.tech/technology

Appendix

2023 Visitation Overview

Three types of visitation are measured for Cleveland Metroparks.

(1) Visitor Occasions - The number of people *entering* Cleveland Metroparks reservations by vehicle, foot, or bicycle for any reason. This includes all of those who travel through the parks as well as those who visit the parks for recreational purposes.

(2) Recreation Visits - Only includes those who *park their vehicles or arrive by foot/bicycle/in-line skate, etc.* to use the parks.

(3) Commuter/Scenic Driving Visits represents the number of vehicles and visitors unaccounted for by Recreation Visits. It is estimated by taking the difference between Visitor Occasions and Recreation Visits.

Visitation Statistics by Category for 2023

Visitor Occasions (1)	**52,452,885**
Recreation Visits (2)	**19,320,829**
Commuter/Scenic Driving (3)	**33,132,056**

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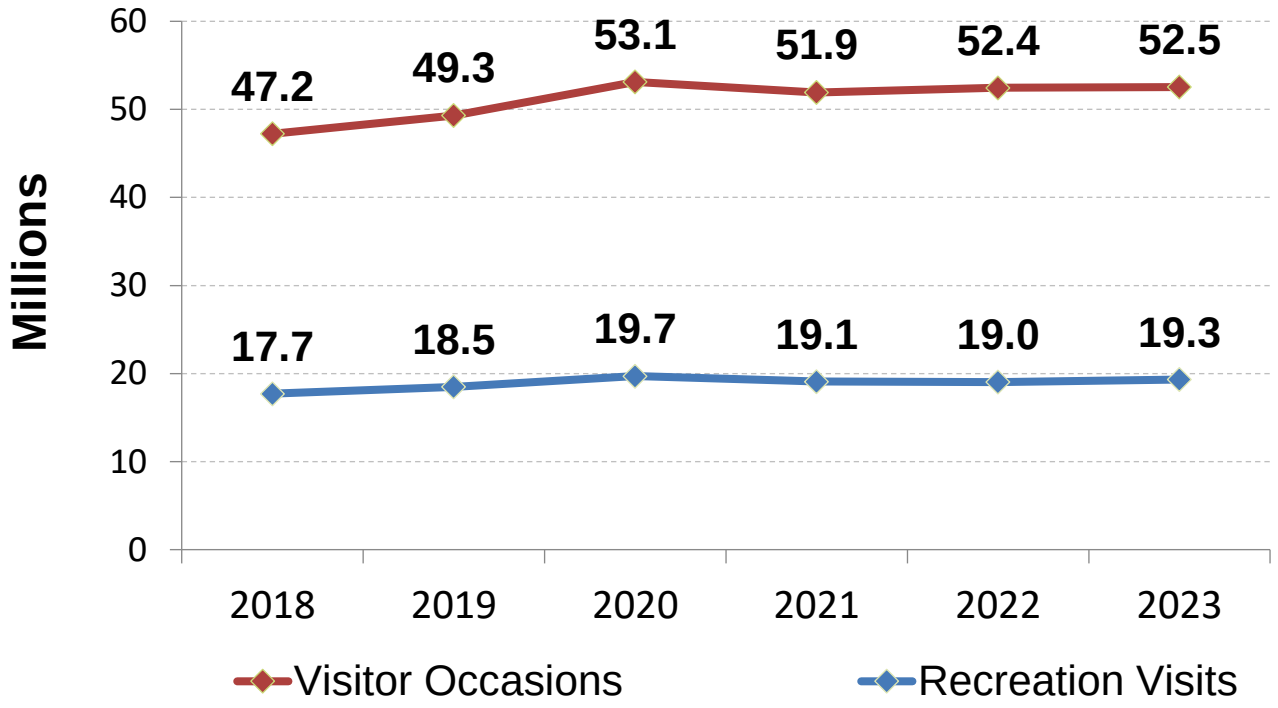

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