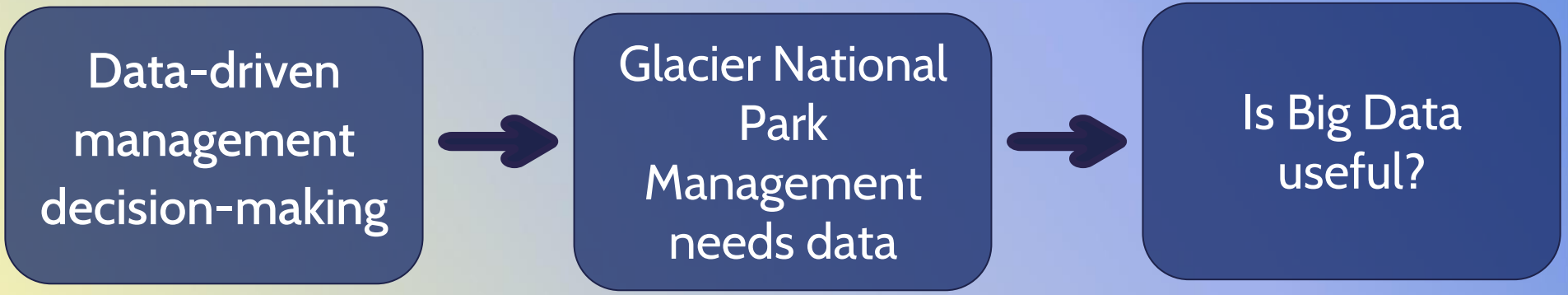
Evaluating the Usefulness of Big Data to Glacier National Park Management

Isabella Clowes, Owen McGinley, Ethan Shaw, Aidan Syrgak

PROJECT PURPOSE



Goal: Evaluate the usefulness of big data to Park management

Big Data refers to data sets that are too big to be dealt with by traditional data processing apps (Excel, Google Sheets, etc).

3 V's : higher ***volume***, faster ***velocity***, wider ***variety***

ZARTICO: A BIG DATA PROVIDER

ZARTICO

Visitor Location Data

1.6 billion devices tracked daily

Credit Card Spend Data

From 3,000+ financial institutions

Event Data

40+ million events from 300+ providers

(e.g. TicketMaster, SeatGeek, etc.)

LIST OF QUESTIONS TO TEST BIG DATA

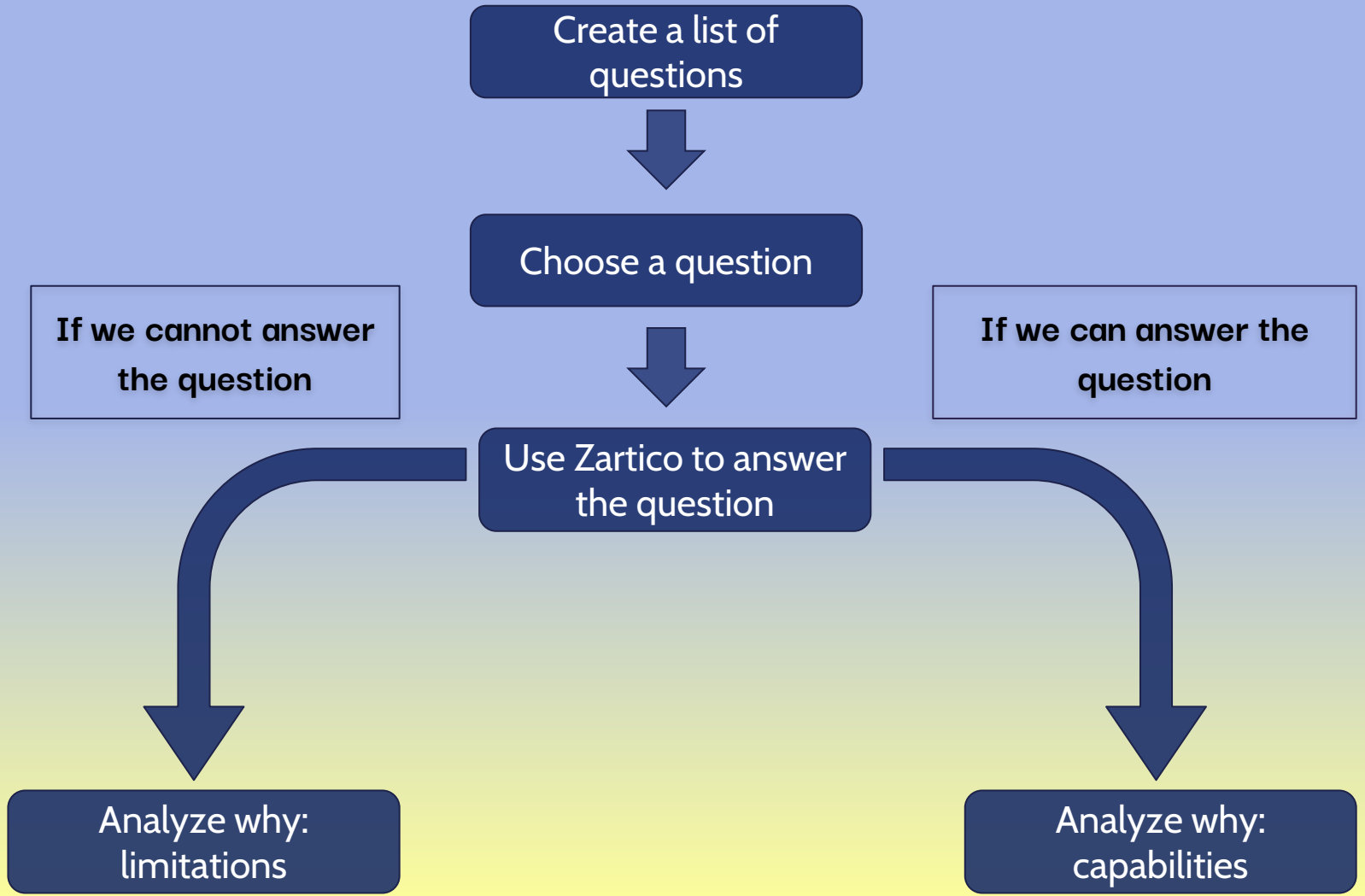
Demographic: Where are the visitors coming from? (local, out-of-state, Canada, etc.)

Visitor Statistics: How many days did visitors spend at GNP?

Reservation System Changes: Did implementation of the reservation system affect the number of locals visiting the Park?

Congestion: Are there large numbers of people that clump around at shuttle transfer spots?

Economic: Where did visitors stay during their trip? (hotels, etc.)


Create a list of questions
Choose a question
If we cannot answer the question
If we can answer the question
Use Zartico to answer the question
Analyze why: limitations
Analyze why: capabilities

CRITERIA FOR USEFULNESS

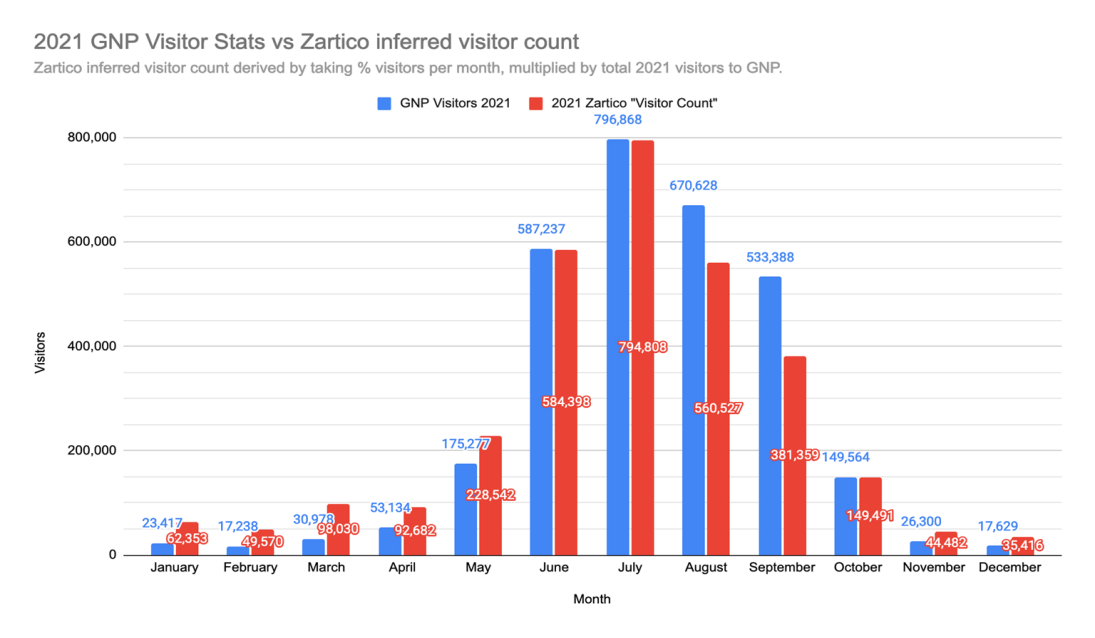
Credibility	Labor-Intensiveness	Relevance
• Validity of data • Time period for which data is available • Volume of data	• Cost • Time • Expertise	• Granularity • Presence of necessary data • Coverage of relevant location

CREDIBILITY

Validity of Data

Some data points invalid from the start

Accurate during summer months, less accurate in winter months



CREDIBILITY

Validity of Data

Some data points invalid from the start

Accurate during summer months, less accurate in winter months

Historical Availability

Only two good years of data: 2019 and 2021

Historical comparisons inaccurate - but hard to judge if it's an anomaly or not

Volume of Data

Big data in the park isn't that big

Other big data providers (Streetlight) have sample size issues

LABOR-INTENSIVENESS

- Confusing dashboard
- Difficult to find information
- Graphs not understandable

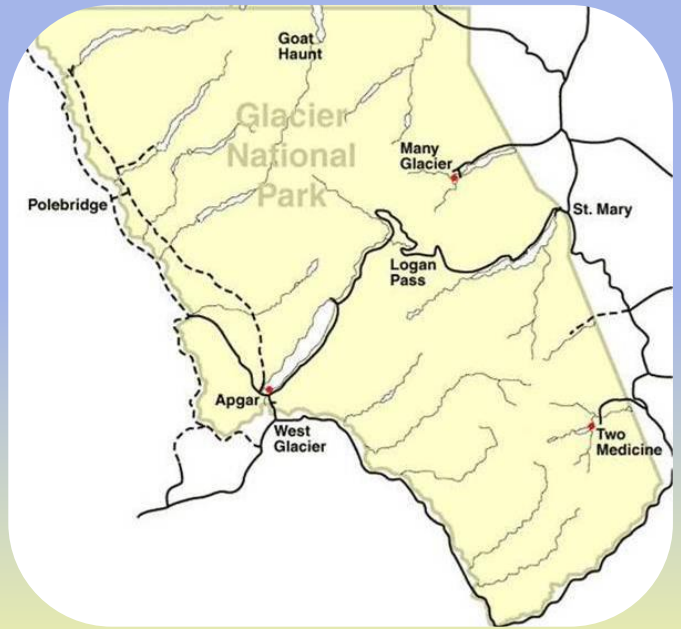
RELEVANCE

Presence of necessary data

Neighborhood (POI)
City (POI)
State (POI)
Trip Type
Visitor % In State
Visitor % Out State
Visitor % Resident
Facebook Post
Facebook Ad
Credit Card Summary
ACS Demographics
Location % of Total Devices

Granularity

Coverage of relevant location



Ex. Data from Zartico

WHERE BIG DATA IS USEFUL

- General visitor location and movement
- Visitor home location
- Traffic congestion
- Tool to compare against current park data (IRMA, traffic counters)

LIMITATIONS OF BIG DATA

- Big data just a sample, captures ~2% of visitors
- Lack of precise visitor tracking
- Spending data irrelevant
- Demographic data not granular enough
- New technology: Big data may not yet be worth the investment

Big Data Recommendations

QUESTIONS FOR BIG DATA PROVIDERS

Credibility:

Does the data span enough previous years to identify yearly trends?

To what extent can the data be collected offline?

Labor-intensiveness:

To what extent will implementing big data reduce current data collection efforts?

How much would big data cost?

Relevance:

To what extent is the data relevant to park management?

To what extent does the data cover the Park?

THANK YOU TO:

Pete Webster

Phil Wilson

Kat Barrs

Zartico & Glacier Country Tourism

Dr. Traver & Dr. Tuler

THANK YOU!

ANY QUESTIONS?

QUESTIONS THE PARK WANTED US TO ANSWER

Categorized questions by highest to lowest priority

High Priority	Medium Priority	Low Priority
• Where are visitors coming from? • How long are visitors spending in the park? • Did implementation of the reservation system affect locals coming to the park? • How has the reservation system shifted visitation timing?	• What is the demographic breakdown of visitors? • How long are visitors spending at specific attractions in the park? • How did the reservation system change spending at businesses in the communities surrounding GNP?	• Where did visitors stay during their trip? • What times do people go to certain attractions? • Which businesses did visitors frequent after exiting the park?

Questioning Credibility

- Are there sufficient points within the data that could be compared with the IRMA Visitor Statistics?
- Does the data tool span enough previous years?
- To what extent can the tool collect data when devices are offline, given the limited connectivity in the park?
- To what extent does the data contain a bias against certain groups of people? (e.g. cell phone provider, app usage)

Questioning Labor-intensiveness

- Will implementing this big data save labor compared to our current data collection and analysis?

- To what extent does the big data tool have an ability to produce visuals (graphs, charts, maps)?

- Is there a position in the park that would already have the skill sets to work with the data?

- To what extent is the big data tool intuitive to use? Will it require a lot of training and/or need constant customer support?

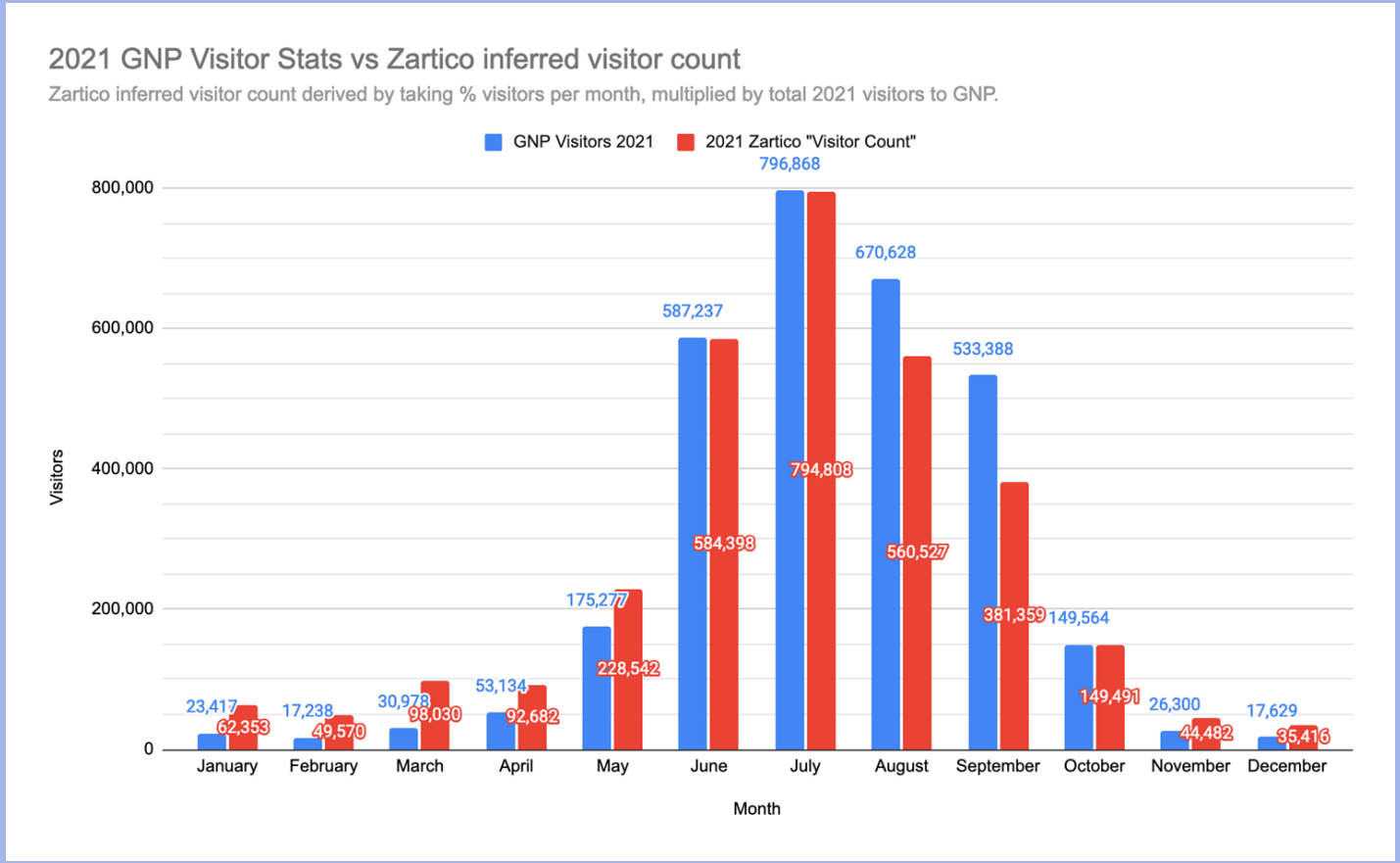
- How much would access to the data cost?

Questioning Relevance

- To what extent does the big data tool have data directly inside Glacier National Park?
- To what extent are the datasets relevant to park management's informational needs?
- Does the big data tool show data by time of day?
- How long would we have access to the data for?

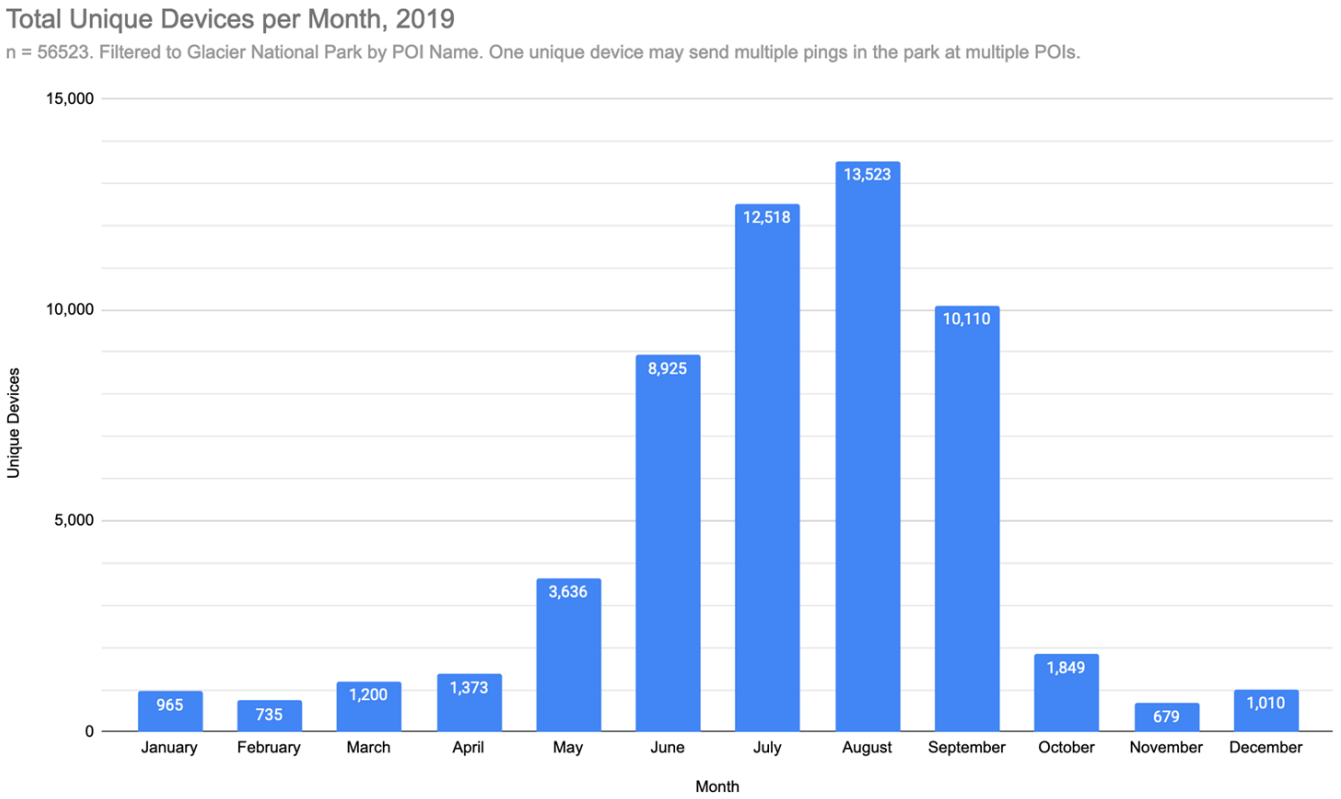
CREDIBILITY ANALYSIS

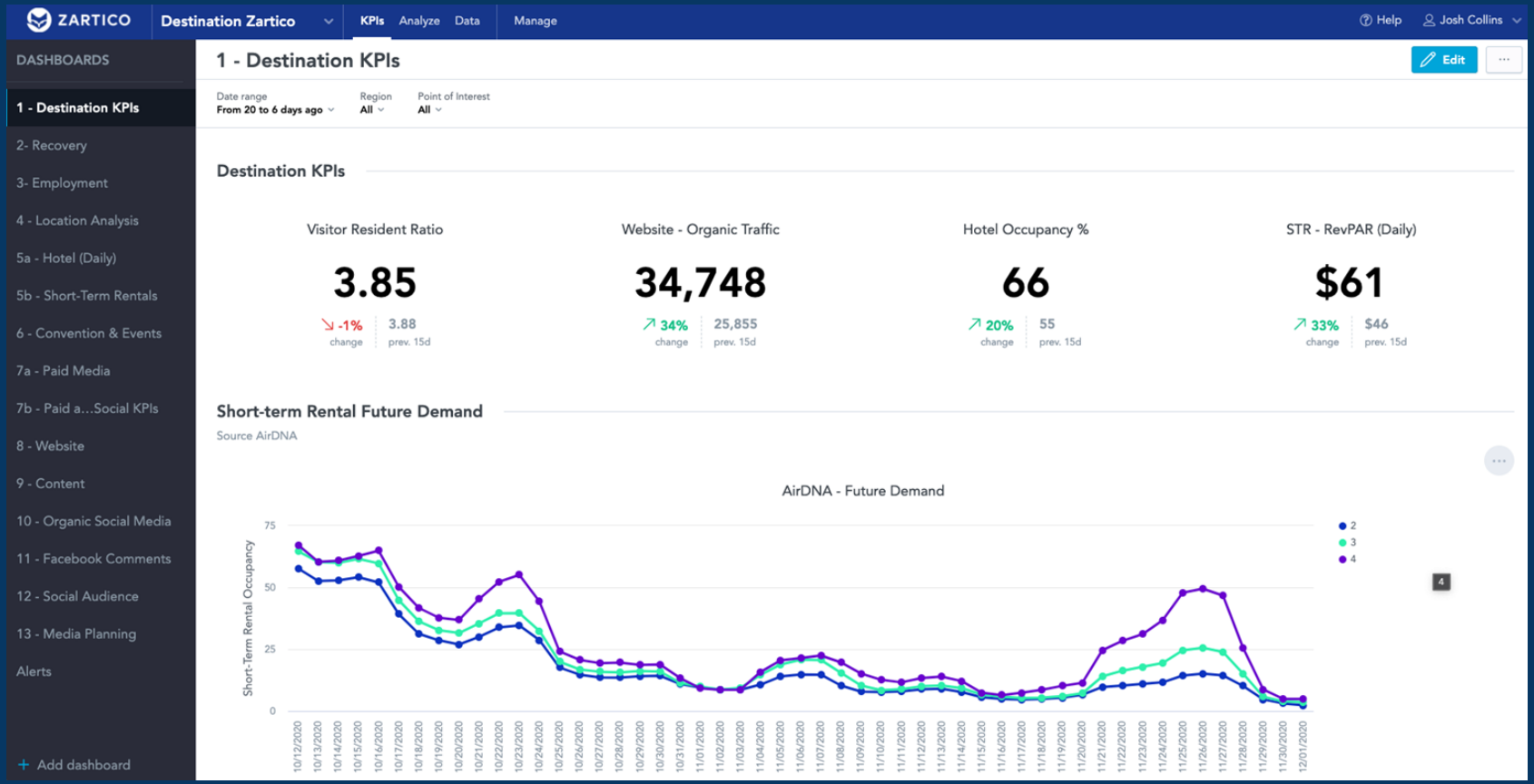
Evaluate Zartico's data accuracy against park IRMA visitation data

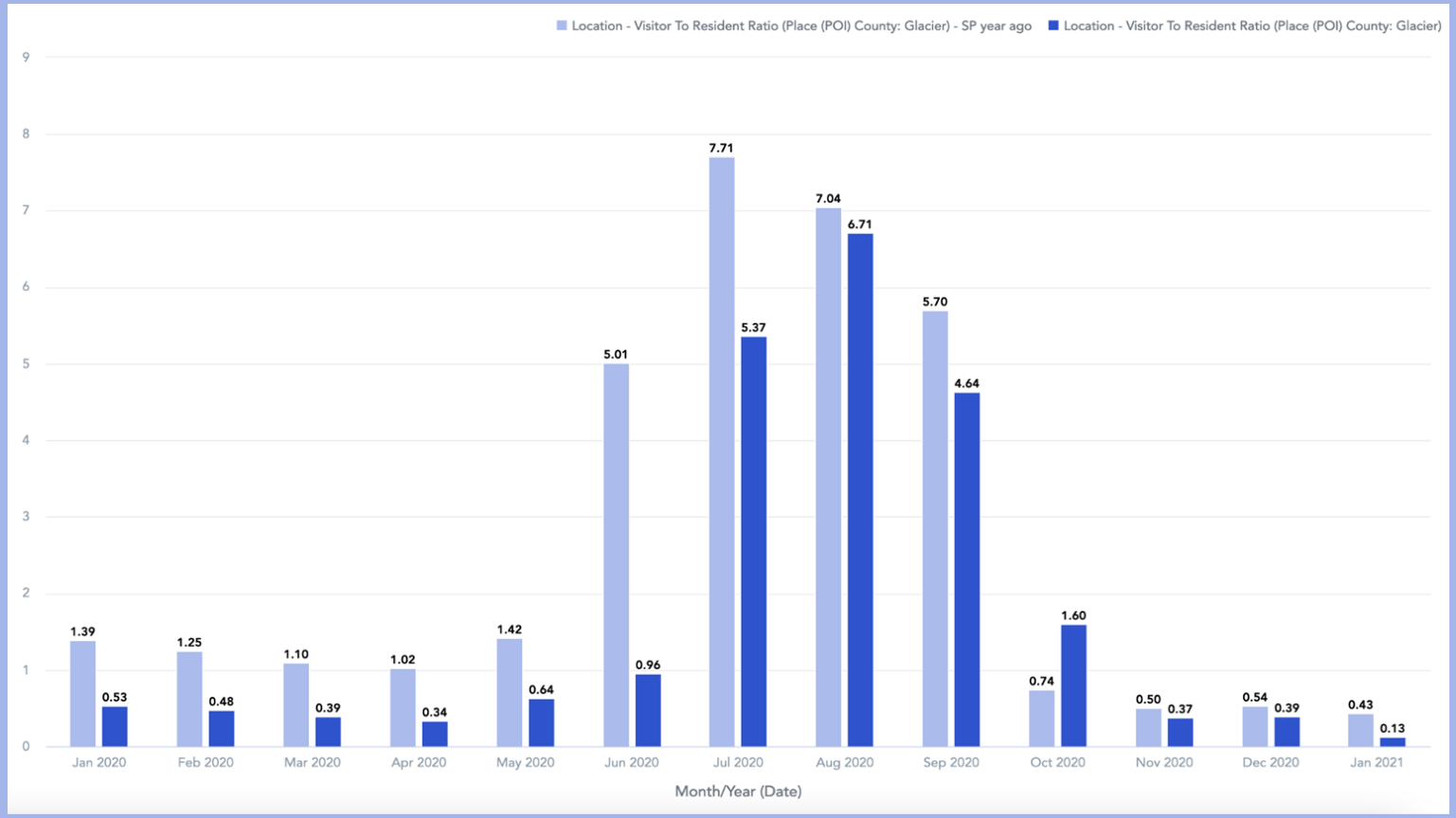


CREDIBILITY ANALYSIS

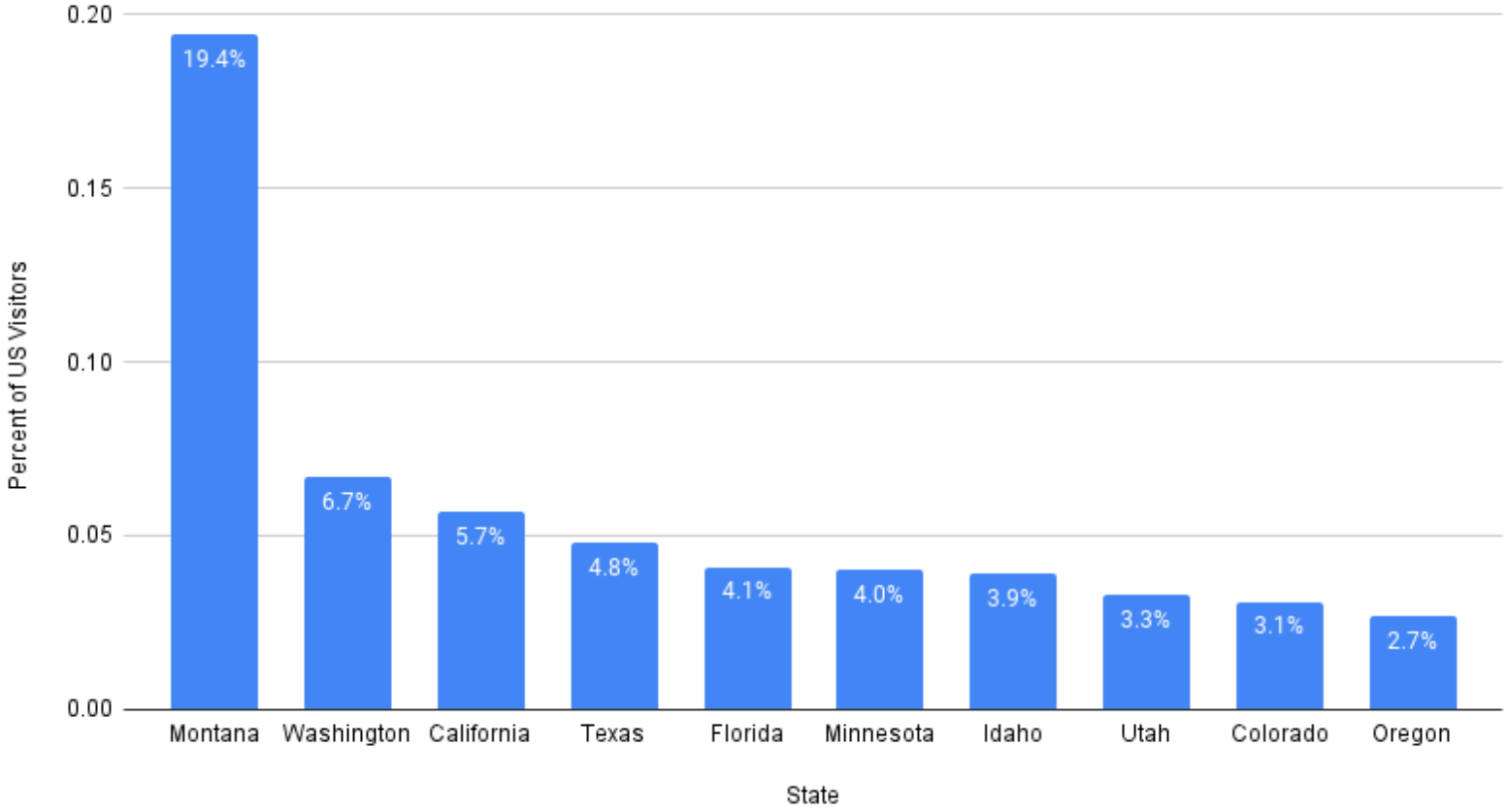
Think critically before making decisions based on big data



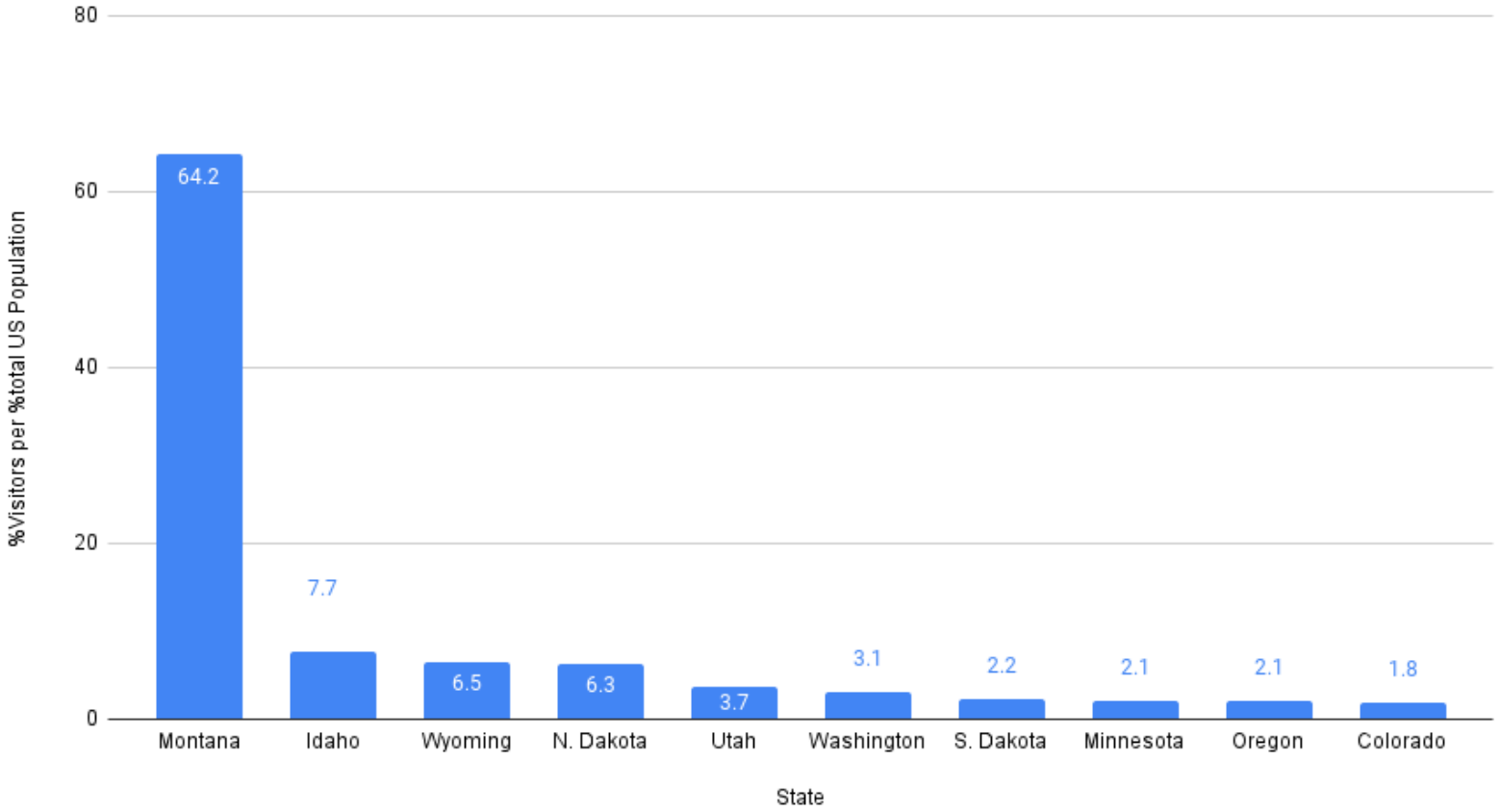

ZARTICO
Destination Zartico
KPIs
Analyze
Data
Manage
Help
Josh Collins
DASHBOARDS
1 - Destination KPIs
2- Recovery
3- Employment
4 - Location Analysis
5a - Hotel (Daily)
5b - Short-Term Rentals
6 - Convention & Events
7a - Paid Media
7b - Paid a...Social KPIs
8 - Website
9 - Content
10 - Organic Social Media
11 - Facebook Comments
12 - Social Audience
13 - Media Planning
Alerts
+ Add dashboard
1 - Destination KPIs
Edit
Date range
From 20 to 6 days ago
Region
All
Point of Interest
All
Destination KPIs
Visitor Resident Ratio
3.85
-1%
change
3.88
prev. 15d
Website - Organic Traffic
34,748
34%
change
25,855
prev. 15d
Hotel Occupancy %
66
20%
change
55
prev. 15d
STR - RevPAR (Daily)
$61
33%
change
$46
prev. 15d
Short-term Rental Future Demand
Source AirDNA
AirDNA - Future Demand
Short-Term Rental Occupancy
75
50
25
0
2
3
4
4
10/12/2020
10/13/2020
10/14/2020
10/15/2020
10/16/2020
10/17/2020
10/18/2020
10/19/2020
10/20/2020
10/21/2020
10/22/2020
10/23/2020
10/24/2020
10/25/2020
10/26/2020
10/27/2020
10/28/2020
10/29/2020
10/30/2020
10/31/2020
11/01/2020
11/02/2020
11/03/2020
11/04/2020
11/05/2020
11/06/2020
11/07/2020
11/08/2020
11/09/2020
11/10/2020
11/11/2020
11/12/2020
11/13/2020
11/14/2020
11/15/2020
11/16/2020
11/17/2020
11/18/2020
11/19/2020
11/20/2020
11/21/2020
11/22/2020
11/23/2020
11/24/2020
11/25/2020
11/26/2020
11/27/2020
11/28/2020
11/29/2020
11/30/2020
12/01/2020

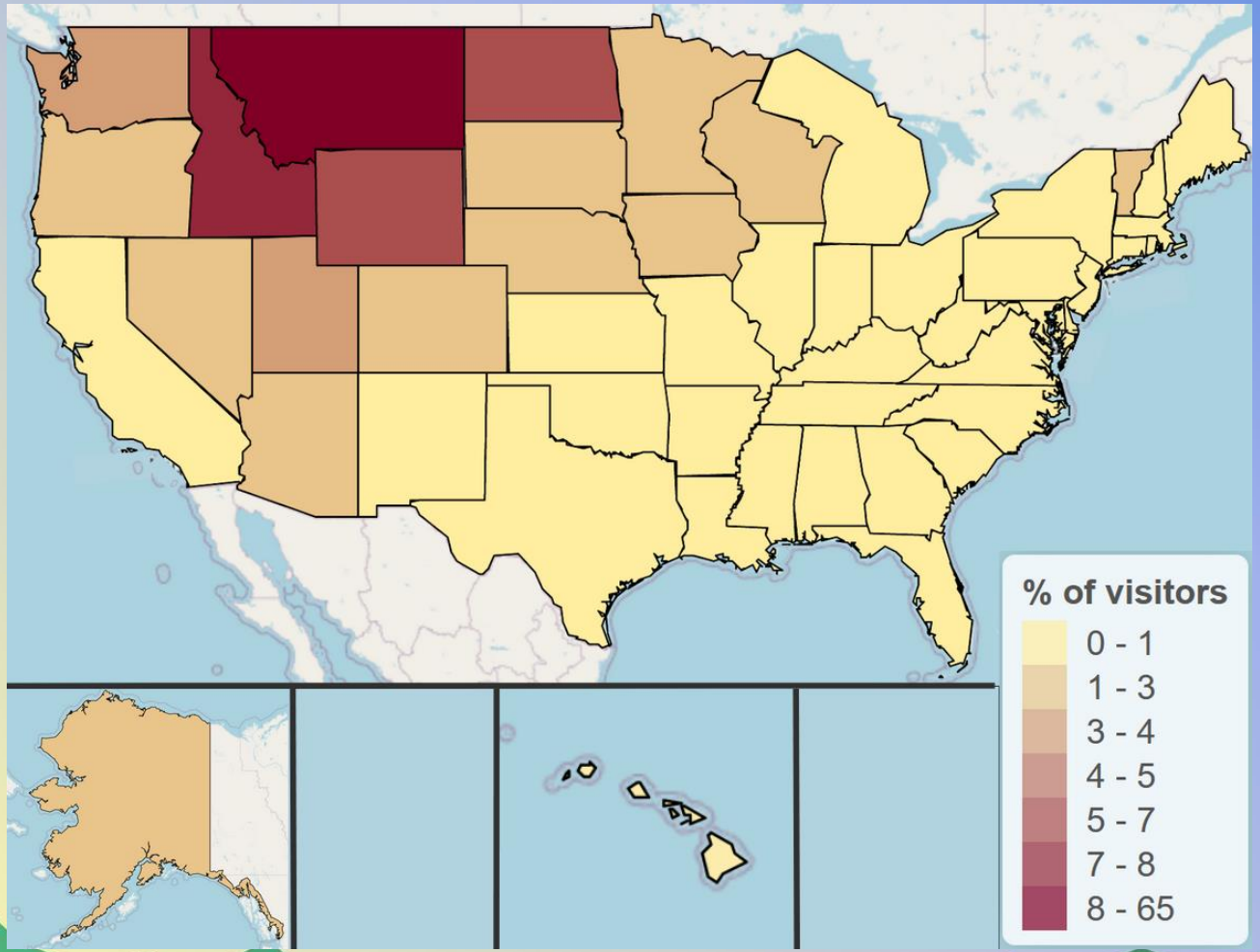

Location - Visitor To Resident Ratio (Place (POI) County: Glacier) - SP year ago
Location - Visitor To Resident Ratio (Place (POI) County: Glacier)
9
8
7
6
5
4
3
2
1
0
1.39
0.53
1.25
0.48
1.10
0.39
1.02
0.34
1.42
0.64
5.01
0.96
7.71
5.37
7.04
6.71
5.70
4.64
0.74
1.60
0.50
0.37
0.54
0.39
0.43
0.13
Jan 2020
Feb 2020
Mar 2020
Apr 2020
May 2020
Jun 2020
Jul 2020
Aug 2020
Sep 2020
Oct 2020
Nov 2020
Dec 2020
Jan 2021
Month/Year (Date)

States with the Highest Percentage of Visitors to GNP (2019)



% Visitors Normalized by State Population (2019)




% of visitors
0 - 1
1 - 3
3 - 4
4 - 5
5 - 7
7 - 8
8 - 65