Appendix A: Summer 2017 YCC Crew Data Collection Calendar

◄ Mai **June 2017** Juli ►

Sun	Mon	Tue	Wed	Thu	Fri	Sat
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19 PM – Norris	20 AM – Old Faithful PM - Midway	21 AM – Norris PM - Artist Point	22 AM – Midway PM – Old Faithful	23 AM – Artist Point	24
25	26 PM – Midway	27 All Day Norris	28 All Day Old Faithful	29 All Day Artist Point	30 AM – Midway	

July 2017

◄ Juni | August ►

Sun	Mon	Tue	Wed	Thu	Fri	Sat
						1
2	3 PM – Artist Point	4 Day Off	5 All Day Midway	6 All Day Norris	7 AM – Old Faithful	8
9	10	11	12 Supplemental Collection: Norris	13	14	15
16	17 Supplemental Collection: Old Faithful	18	19 Supplemental Collection: Artist Point	20 Supplemental Collection:: Fairy Falls Midway	21	22
23	24 PM – Fairy Falls	25 All Day Old Faithful	26 All Day Norris	27 All Day Midway	28 AM – Fairy Falls	29
30	31 PM – Old Faithful					

◄ Juli

August 2017

September ►

Sun	Mon	Tue	Wed	Thu	Fri	Sat
		1 All Day Fairy Falls	2 All Day Midway	3 All Day Norris	4 AM – Old Faithful	5
6	7 PM – Norris	8 All Day Midway	9 All Day Fairy Falls	10 All Day Old Faithful	11 AM – Norris	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

Appendix B: Location of PAOT Counts at Each Focal Attraction Site

Artist Point:

PAOT Site (areas within orange boundary) 1: "Artist Point" – Entire viewing area between setback bench and the stairs to the viewing platform.

PAOT Site (areas within orange boundary) 2: "Viewing Platform" – Entire area at the top of the stairs that is enclosed by rock wall.

Fairy Falls:

PAOT Site (areas within pink boundary) 1: Viewing platform (not shown in image due to new trail and old imagery). Count all individuals within railing of viewing platform at end of trail.

Midway Geyser Basin:

PAOT Site (areas within pink boundary) 1: “Grand Prismatic” – Between, and including, the two “pullouts” on the boardwalk for viewing Grand Prismatic Geyser

Norris Geyser Basin

PAOT Site (areas within orange boundary) 1: “Stairs” – On the sloped area of the trail until it flattens out before becoming boardwalk.

PAOT Site (areas within orange boundary) 2: “Boardwalk East” – section of boardwalk, including the “pullouts” on the East side of the boardwalk.

Old Faithful

PAOT Site (areas within orange boundary) 1: “L Bridge” – The entire “L” shape in the boardwalk.

PAOT Site (areas within orange boundary) 2: “Beehive Geyser” – the “L” near Beehive Geyser from the curve in the boardwalk until the end of the fencing.

Appendix C: GPS-based Tracking Download & Cleaning Procedures

YELL YCC Crew GPS Download Procedure:

USE THE LATEST VERSION OF DNR GPS FOR DATA DOWNLOADS:

Available here: https://www.dnr.state.mn.us/mis/gis/DNRGPS/DNRGPS.html

1. Open DNR GPS program
2. Plug GPS unit into computer via USB cord – it should turn on automatically
3. Ensure it says "Projection: UTM Zone 12N" at the bottom of the window. If not, click "File", "Set Projection" ensure the Datum says "WSG 84" and find "UTM Zone 12N".
4. Wait for the program to locate the GPS (the little bubble next to the projection will turn green).
5. If the computer does not find the GPS automatically, click "GPS" then "Find GPS".
6. Once the GPS has been found, click "Track" then "Download" à A new dialog box should pop-up showing you the tracks that are saved on the GPS unit.
7. Select the first saved track that was saved by the research crew.
8. Click the "Tracks" tab and examine the track. Ensure the filename, lat long, xproj, yproj, time, and ltime all look correct.
9. Now we will save the data as an ArcMap shapefile:
    a. Select "File" then "Save To" then "ArcMap" then "File"
    b. Ensure the file type is "ESRI Shapefile 2D"
    c. Enter a file name that is "dd_month_yy_gpsnumber_tracknumber"
    d. When it asks Save to Shape/GPS Type – click **"Point"** then click "Ok"
10. Repeat steps 6 through 9 for all saved tracks on the GPS unit.
11. Open ArcMap and examine the files from that GPS unit to make sure everything looks good
12. Close DNR GPS
13. Disconnect GPS
14. Clear GPS
15. Repeat with next GPS unit.

<u>YELL YCC Crew GPS Tracking Data Cleaning:</u>

YCC crews are handing Garmin eTrex GPS units out to random visitors at four different locations in Yellowstone: Artists Point, Norris Geyser Basin, Midway Geyser Basin, and Old Faithful.

The visitors carry the GPS unit with them during their hike and then return the unit to the YCC crews at the trailhead or in dropboxes at the trailhead or in the visitor center at Norris and Old Faithful. While hiking, the GPS units collect a data point of the visitor's location every 10 seconds.

This protocol can result in error and extra data points being collected (points collected in the drop boxes, points collected at the trailhead while the YCC crews waited for visitors to hand the GPS units to, random positional error, etc.). We are only interested in analyzing the points that represent visitor behavior when they are hiking or stopping or walking at the sites of interest. To clean the GPS tracks the following procedure is used.

Step 1: Make a copy of all the **eTrex GPS tracks** and place in a folder called "Cleaned_GPS_Tracks". These will be the GPS tracks that are worked with for cleaning so that we always have a back-up of the raw data. You may also see GPS tracks from SAC GPS units (these are used for a different type of data collection and do not need to cleaned).

Step 2: Create a word document where you will note what edits are made to each GPS track collected. Save this file and call it "YCC_GPS_Track_Cleaning_Log_17"

Step 3: Open the file called "YCC_17_Trails" - In there you will find shapefiles of all the trails where GPS tracking of visitors is occurring for the 2017 data collection period. *At Old Faithful, we GPS tracked visitors throughout the area but the only trail included as a shapefile is from the upper geyser basin – but any GPS points that appear to be from visitor's hiking on sidewalks and trails or visiting the Old Faithful will be considered measures of visitor behavior and should be kept. Adding a satellite imagery baselayer will be helpful for most of these sites as well to determine when visitors were on trails or sidewalks or what points are due to error.*

Step 4: Open each individual GPS track and include its name in the cleaning log and examine the track for errors.

Step 5: Use the "Select Features" function to select any points that you think are not representative of visitor behavior (points on roadways, in the parking lots, points obviously from the GPS unit being left in the dropbox, random stray points due to positional error).

You want to keep points where it appears a visitor was hiking, stopping at features, or walking on a path (due to GPS error, the points will not always line up perfectly with the trail or walking path and that's OK – we only want to delete points are sure are not from visitor movement).

Step 6: Use the "Delete Features" tool to delete the selected features***. NOTE: There is NO WAY to undo the "Delete Features" function, so be sure only the features you want to delete are selected. If no points are selected, the entire shapefile will be deleted!***

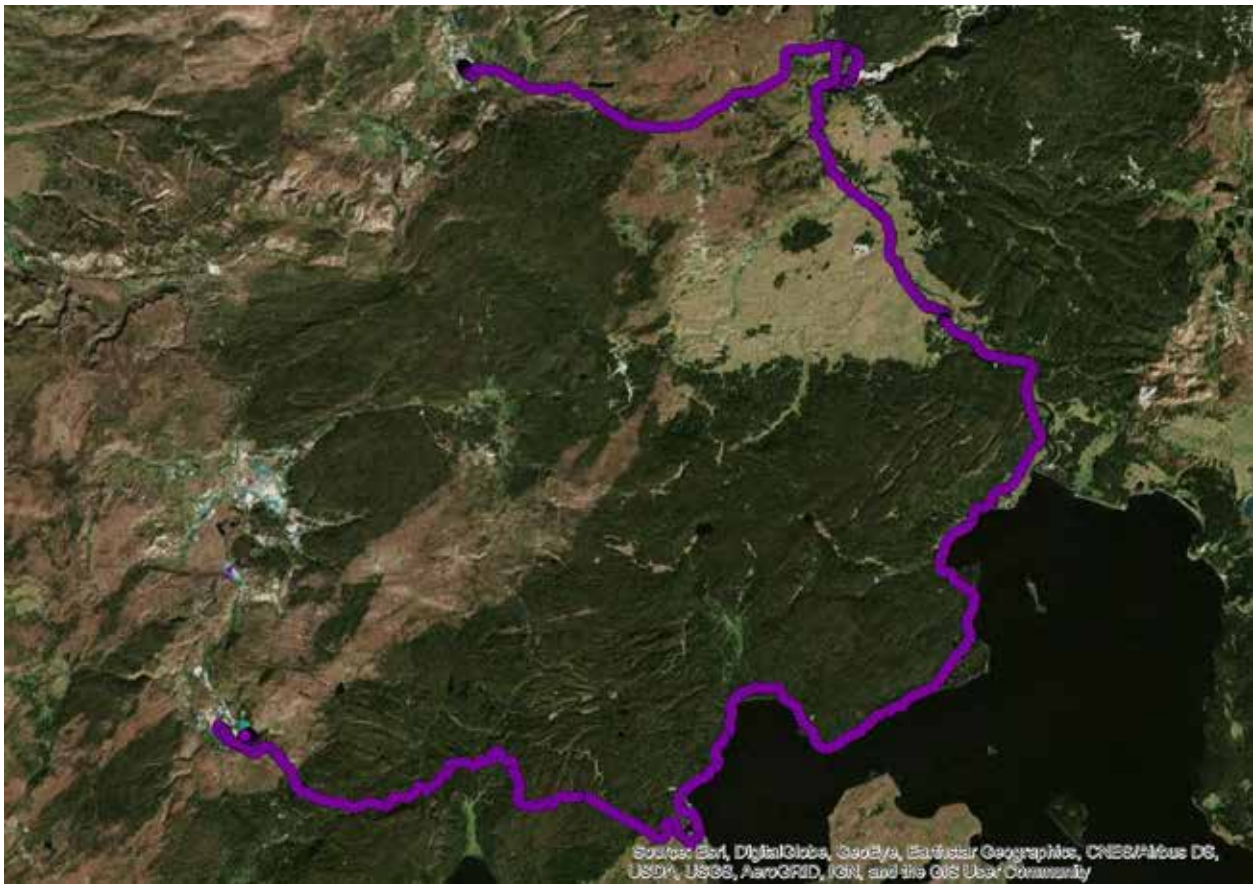
Possible Extra Step: If you find a single GPS tracking shapefile that has tracks from two different sites (ex: Norris and Old Faithful) or more than one visitor track in the same shapefile. Split the file so that each file only contains a *single* visitor track. You can do this using the "Select Features", "Create File from Selected Feature" and then export that selected feature. Once you are sure the track has been exported into its own file, you can use the "Delete Features" tool to remove the track from the original file.

Step 7: Document what you did for each track to clean it in the word document.

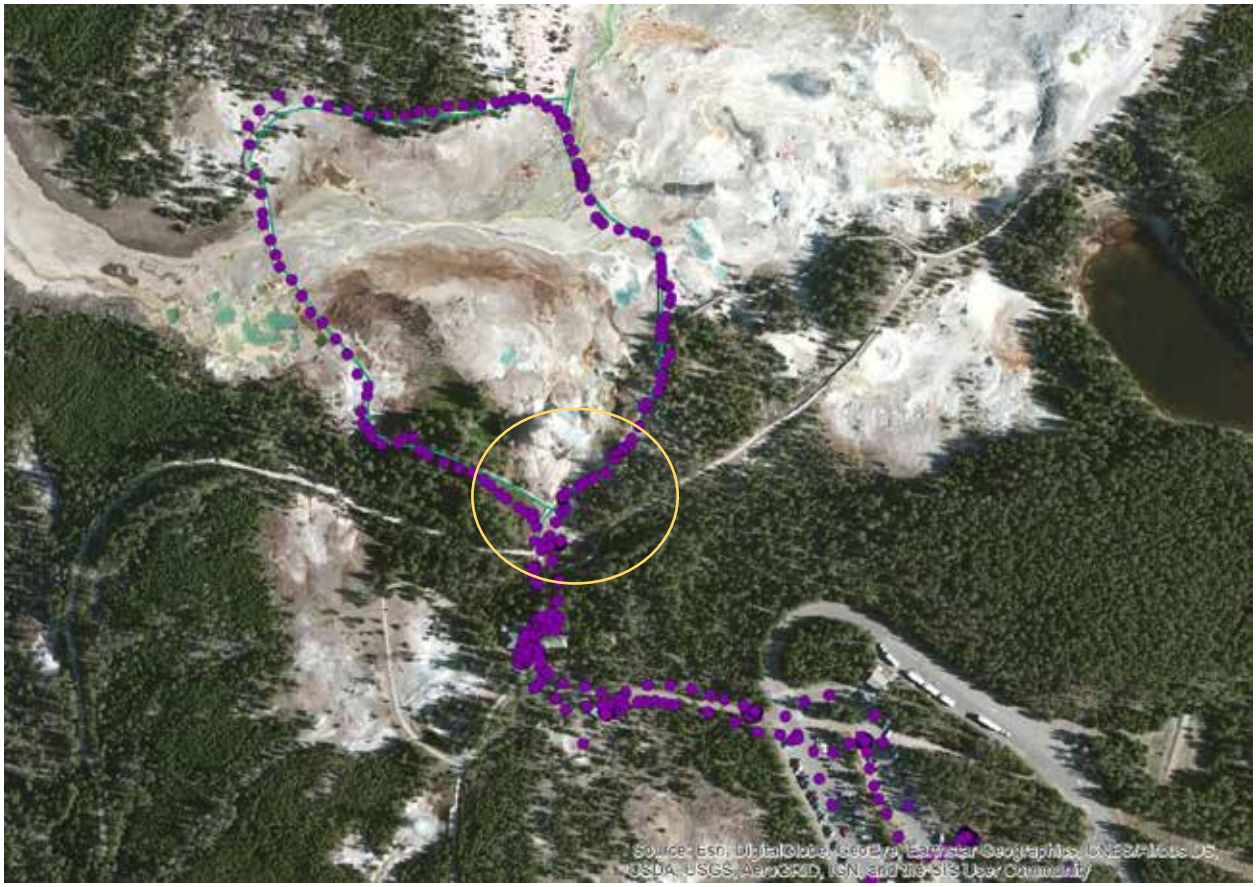
Repeat for all additional eTrex tracks.

Messy Example:

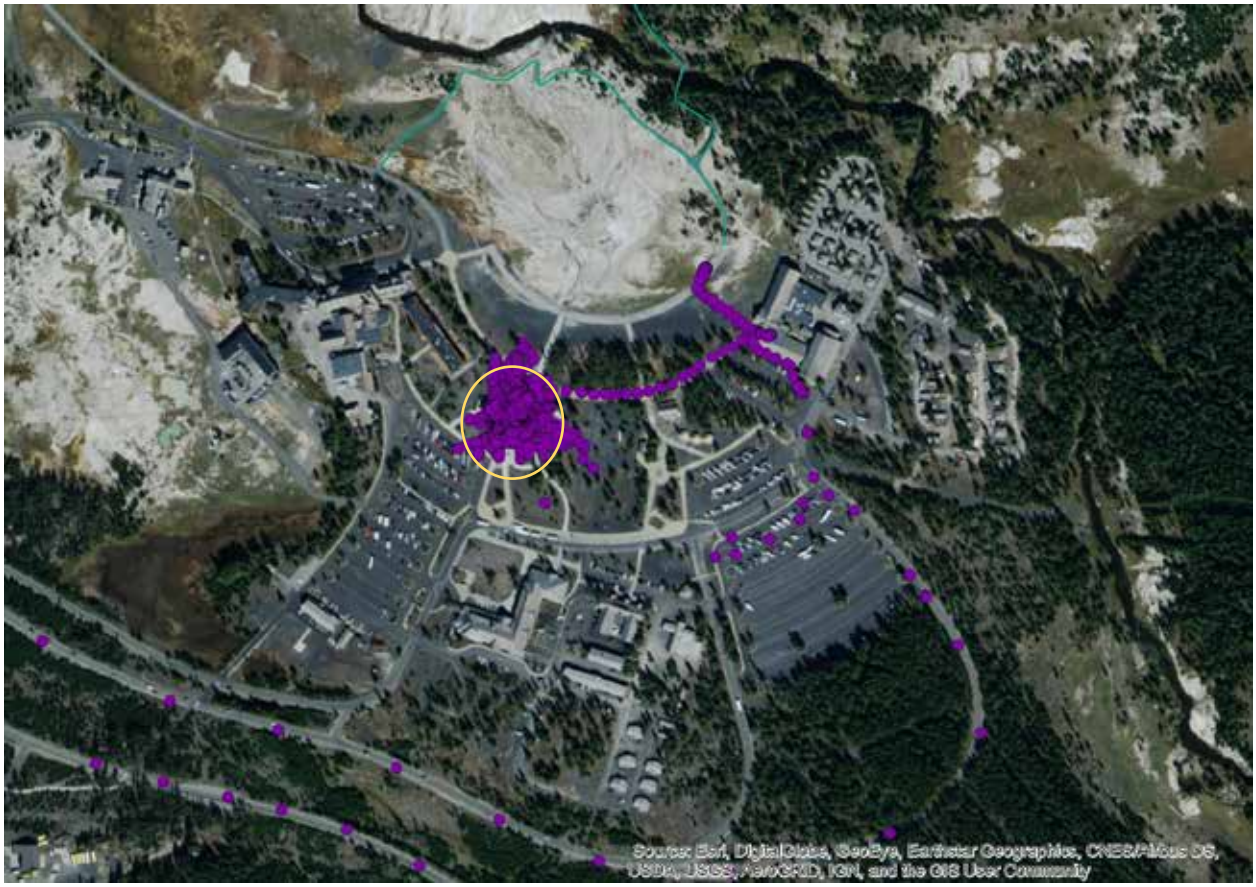
In the figure below a GPS unit was used to track a visitor at Norris Geyser Basin, left on and driven to Old Faithful and then used to track a visitor at Old Faithful.



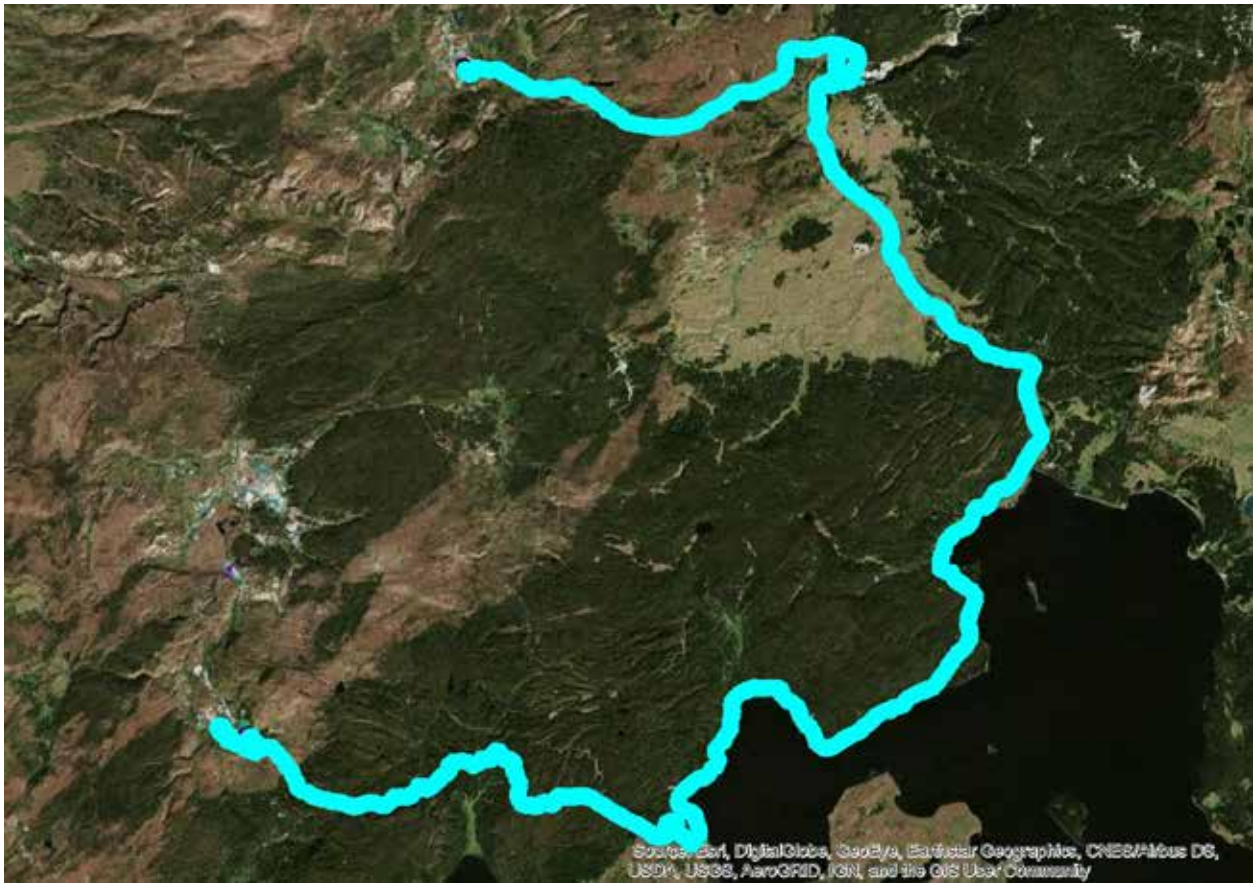
Here is a close-up of the visitor track at Norris Geyser Basin where you can see points in the parking lot and points “piling up” near the visitor center where the YCC crews waited to hand out the unit (circled in yellow).



Here is a close-up of the visitor track at Old Faithful where you can see points in the parking lot and points “piling up” near the visitor center where the YCC crews waited to hand out the unit or the unit was left in a box (circled in yellow).

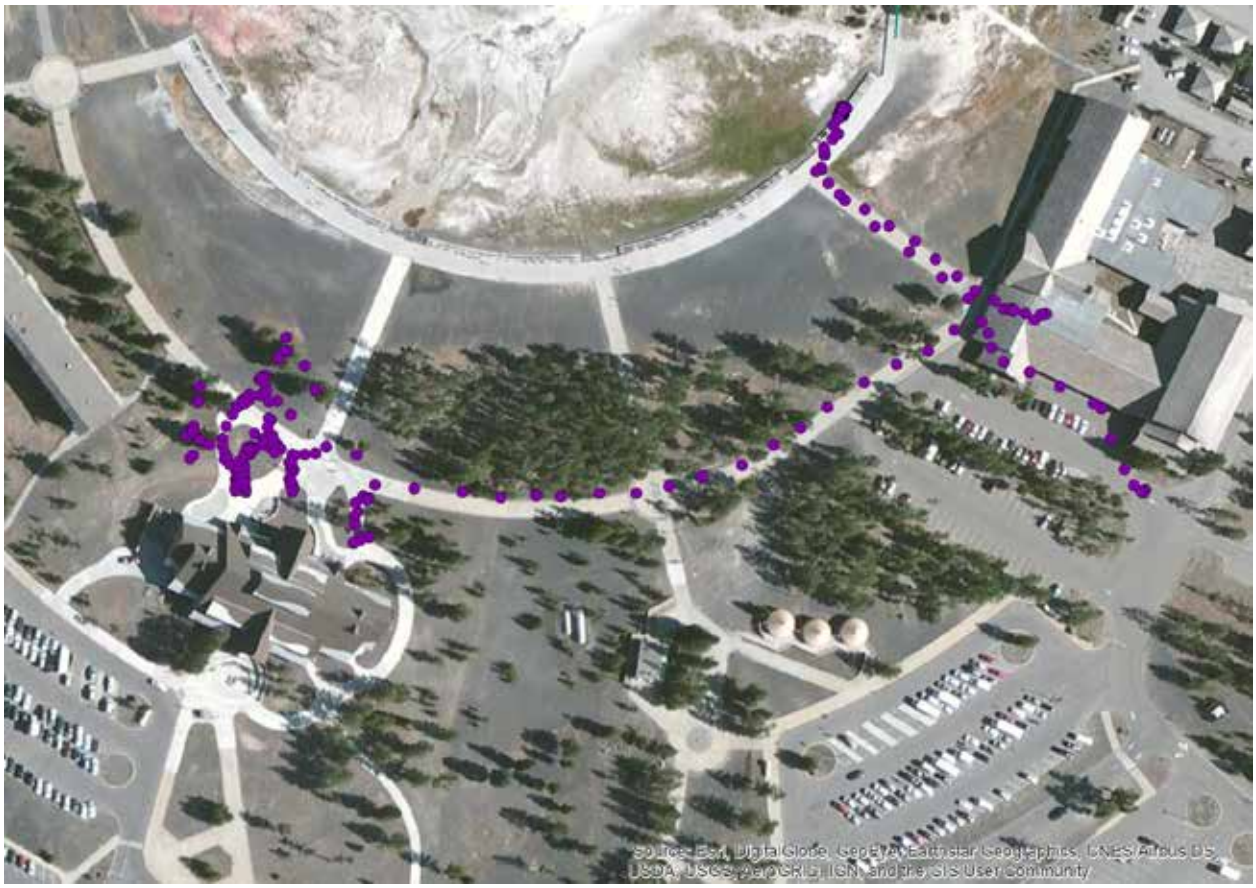


Here I have selected all the points collected while driving and will remove them using the “Delete Features” tool in ArcMap.



This is the Norris track after cleaning and after I have also removed the points that were collected in the visitor's center. These points now represent visitor use on the boardwalk and trail at Norris.

The Old Faithful example is a little bit tricker because the YCC crews hand out the units in the same location as visitors may walk. I manually selected and removed the GPS points that were likely due to the GPS unit sitting in the building in the dropbox. So use your best judgement and err on the side of leaving points in if you are unsure if it's from visitor behavior or GPS error. If the track was saved correctly you can also look at timestamps and the X&Y coordinates to see if the track represents any significant movement.



After cleaning, I would select all the GPS tracking points at Old Faithful and export them into their own individual shapefile. I would then delete these points from this file so that the file I originally opened would only contain GPS tracking points from Norris and a new shapefile I just corrected would only contain the single track from Old Faithful.

Appendix D: Visitor Behavior & Resource Impact Categories

Yellowstone YCC Crew 2017: Hiking Data Collection Team

Visitor Behavior Categories
(record every time behavior is observed)

OB 1	<1m off boardwalk in thermal area
OB 2	>1m off boardwalk in thermal area
OB 3	visitor observed in other closed area
Obj 1	Personal object dropped or blown into thermal area (e.g. hat, bottle)
Th Lit 1	Visitor littering in thermal area
Lit 1	Visitor littering in other area
Throw 1	Throwing object into thermal pool
Th Graf 1	Drawing graffiti in thermal mat
Graf 1	Drawing graffiti in other area
Flow	Groups obstructing flow of others
Rough	Roughhousing
Noise 1	Excessive traffic noise (e.g. motorcycles, engines, honking)
Noise 2	Other excessive human noise (e.g., shouting, music, use of phones)
Pet 1	Pet on boardwalk
Pet 2	Pet off leash
Feed	Feeding wildlife
Wild 1 *(spec)*	Visitor 5-25m from wildlife *(record species: bison, elk, bear, other)*
Wild 2 *(spec)*	Visitor <5m from wildlife *(record species: bison, elk, bear, other)*
Con 1	Non-verbal visitor conflict (e.g. tension observed as one visitor or group crowds or cuts in front of another)
Con 2	Verbal visitor conflict (e.g. audible verbal conflict between visitors)
Other 1	Please describe in detail

Resource Impact Categories
(record each observed impact only once)

Soc 1	Social trail <3m long
Soc 2	Social trail >3m long
Foot	Footprint observed in thermal area
Obj 2	Personal object observed in thermal area (e.g. hat, bottle)
Th Lit 2	Litter observed in thermal area
Lit 2	Litter observed in other area
Throw 2	Object observed in thermal pool
Th Graf 2	Graffiti observed in thermal mat
Graf 2	Graffiti observed in other area
Other 1	Please describe in detail

Appendix E: Summary Tables for Parking Lot Counts

SD = standard deviation

Queue = vehicles waiting in line for a parking lot

Undesignated = vehicles parked outside of lined/designated parking areas

Roadside = vehicles parked along the entry roads leading to focal attraction site parking lots

Restroom = number of people waiting in line for restrooms

Artist Point:

	Total Vehicles		RV		Bus		Motorcycle		Bikes		Queue		Undesignated		Roadside		Restroom	
Date	**Mean**	**±SD**	**Mean**	**±SD**	**Mean**	**±SD**	**Mean**	**±SD**	**Mean**	**±SD**	**Mean**	**±SD**	**Mean**	**±SD**	**Mean**	**±SD**	**Mean**	**±SD**
6/21/2017	119	19	4	1	4	2	2	2	0	0	16	2	12	6	0	0	14	4
6/23/2017	65	3	8	4	6	3	1	1	0	0	0	0	0	0	1	1	11	4
6/29/2017	106	11	10	2	2	2	0	1	0	0	45	42	3	3	0	0	12	8
7/3/2017	112	17	5	2	6	2	1	0	0	0	32	5	20	1	8	11	14	2
7/19/2017	103	7	7	2	2	2	1	2	0	0	23	13	0	0	0	0	11	5
Overall	**101**	**21**	**7**	**3**	**4**	**2**	**1**	**0**	**0**	**0**	**23**	**17**	**7**	**9**	**2**	**3**	**12**	**1**

	Total Vehicles		RV		Bus		Motorcycle		Bikes		Queue		Undesignated		Roadside		Restroom	
Time	**Mean**	**±SD**	**Mean**	**±SD**	**Mean**	**±SD**	**Mean**	**±SD**	**Mean**	**±SD**	**Mean**	**±SD**	**Mean**	**±SD**	**Mean**	**±SD**	**Mean**	**±SD**
9:00	78	16	7	3	4	2	1	1	0	0	0	0	0	0	0	0	12	4
10:00	82	21	11	1	5	4	1	1	0	0	4	5	1	1	1	1	6	3
11:00	107	6	10	5	0	0	1	1	0	0	25	27	4	6	0	0	16	11
12:00	108	N/A	6	N/A	0	N/A	2	N/A	0	N/A	23	N/A	0	N/A	0	N/A	20	N/A
13:00	105	8	9	4	2	2	0	0	0	0	57	59	0	0	0	0	10	1
14:00	118	16	7	3	4	1	1	1	0	0	40	25	8	9	4	8	13	3
15:00	106	6	6	3	5	3	3	2	0	0	27	13	12	10	0	0	10	2
16:00	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Overall	**100**	**15**	**8**	**2**	**3**	**2**	**1**	**1**	**0**	**0**	**25**	**20**	**3**	**5**	**1**	**2**	**12**	**5**

Fairy Falls:

	Total Vehicles		RV		Bus		Motorcycle		Bikes		Queue		Undesignated		Roadside		Restroom	
Date	**Mean**	**±SD**	**Mean**	**±SD**	**Mean**	**±SD**	**Mean**	**±SD**	**Mean**	**±SD**	**Mean**	**±SD**	**Mean**	**±SD**	**Mean**	**±SD**	**Mean**	**±SD**
7/20/2017	39	19	2	4	0	0	0	0	0	0	3	3	0	0	0	0	0	0
7/24/2017	91	52	1	2	0	0	1	1	0	0	3	4	2	3	11	9	0	0
7/28/2017	72	27	0	0	0	0	3	1	0	0	0	0	0	0	1	2	0	0
8/1/2017	110	13	0	1	1	1	1	1	0	1	2	2	13	8	5	1	0	0
8/9/2017	141	49	3	1	1	1	3	4	0	0	5	4	19	24	19	13	0	0
Overall	**91**	**38**	**1**	**1**	**0**	**0**	**2**	**1**	**0**	**0**	**3**	**2**	**7**	**9**	**7**	**8**	**0**	**0**

	Total Vehicles		RV		Bus		Motorcycle		Bikes		Queue		Undesignated		Roadside		Restroom	
Time	**Mean**	**±SD**	**Mean**	**±SD**	**Mean**	**±SD**	**Mean**	**±SD**	**Mean**	**±SD**	**Mean**	**±SD**	**Mean**	**±SD**	**Mean**	**±SD**	**Mean**	**±SD**
9:00	41	N/A	0	N/A	0	N/A	3	N/A	0	N/A	0	N/A	0	N/A	0	N/A	0	N/A
10:00	71	22	1	2	1	1	1	1	0	0	0	0	0	0	1	6	0	0
11:00	92	52	1	2	0	1	3	4	0	0	5	4	4	6	8	11	0	0
12:00	91	60	0	0	0	0	1	2	0	0	3	3	4	8	1	2	0	0
13:00	119	53	2	2	0	1	2	2	1	1	3	3	23	25	11	15	0	0
14:00	112	54	3	4	0	1	0	1	0	0	2	3	11	13	12	121	0	0
15:00	102	N/A	4	N/A	0	N/A	2	N/A	0	N/A	2	N/A	1	N/A	8	N/A	0	N/A
16:00	0	N/A	0	N/A	0	N/A	1	N/A	0	N/A	2	N/A	0	N/A	6	N/A	0	N/A
Overall	**78**	**40**	**1**	**1**	**0**	**0**	**2**	**1**	**0**	**0**	**2**	**2**	**5**	**8**	**6**	**5**	**0**	**0**

Midway Geyser Basin:

	Total Vehicles		RV		Bus		Motorcycle		Bikes		Queue		Undesignated		Roadside		Restroom	
Date	**Mean**	**±SD**	**Mean**	**±SD**	**Mean**	**±SD**	**Mean**	**±SD**	**Mean**	**±SD**	**Mean**	**±SD**	**Mean**	**±SD**	**Mean**	**±SD**	**Mean**	**±SD**
6/20/2017	60	4	4	3	2	1	1	2	0	0	17	4	7	11	0	0	9	11
6/22/2017	59	12	7	1	7	5	0	0	0	0	13	6	2	3	3	4	15	4
6/26/2017	69	5	2	2	4	4	1	1	0	0	9	4	11	9	2	1	4	4
6/27/2017	77	N/A	4	N/A	3	N/A	0	N/A	9	N/A	26	N/A	29	N/A	23	N/A	8	N/A
6/30/2017	75	4	4	0	2	1	0	0	5	6	16	15	27	4	12	16	4	6
7/5/2017	80	4	2	0	6	2	3	2	1	1	18	11	22	21	24	20	9	10
7/20/2017	69	12	3	1	3	2	2	6	0	0	36	11	2	1	40	23	4	4
7/27/2017	32	55	3	2	3	2	2	2	1	1	25	10	22	5	39	26	0	0
8/2/2017	107	24	3	1	2	2	1	2	0	0	31	5	21	5	35	33	16	5
8/8/2017	72	13	6	4	3	2	3	4	0	0	27	4	20	31	52	24	32	10
Overall	**70**	**19**	**4**	**2**	**3**	**2**	**1**	**1**	**2**	**3**	**22**	**9**	**16**	**10**	**23**	**18**	**10**	**9**

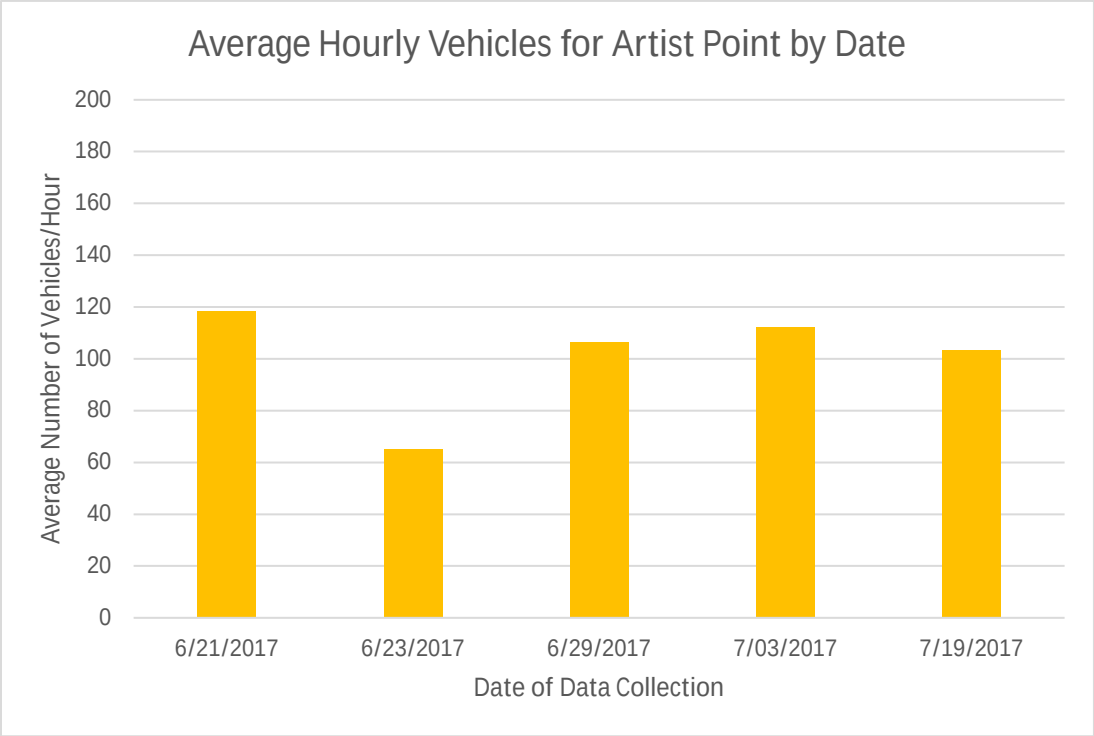
	Total Vehicles		RV		Bus		Motorcycle		Bikes		Queue		Undesignated		Roadside		Restroom	
Time	**Mean**	**±SD**	**Mean**	**±SD**	**Mean**	**±SD**	**Mean**	**±SD**	**Mean**	**±SD**	**Mean**	**±SD**	**Mean**	**±SD**	**Mean**	**±SD**	**Mean**	**±SD**
9:00	60	35	3	2	4	3	1	3	0	0	9	1	16	12	1	1	5	10
10:00	78	29	4	2	4	2	0	0	2	4	23	10	14	12	13	11	9	9
11:00	88	23	6	4	4	1	0	1	0	0	30	9	11	9	36	18	48	89
12:00	53	32	2	1	5	3	2	1	1	1	30	9	35	25	57	9	15	17
13:00	67	35	3	1	3	3	2	3	0	1	24	10	13	13	42	27	9	9
14:00	54	34	4	2	2	1	4	5	0	1	34	27	33	32	32	35	24	31
15:00	33	38	3	3	3	2	2	2	1	2	25	10	18	18	23	29	5	3
16:00	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Overall	**62**	**18**	**3**	**2**	**3**	**3**	**1**	**3**	**1**	**2**	**25**	**8**	**20**	**10**	**29**	**19**	**17**	**16**

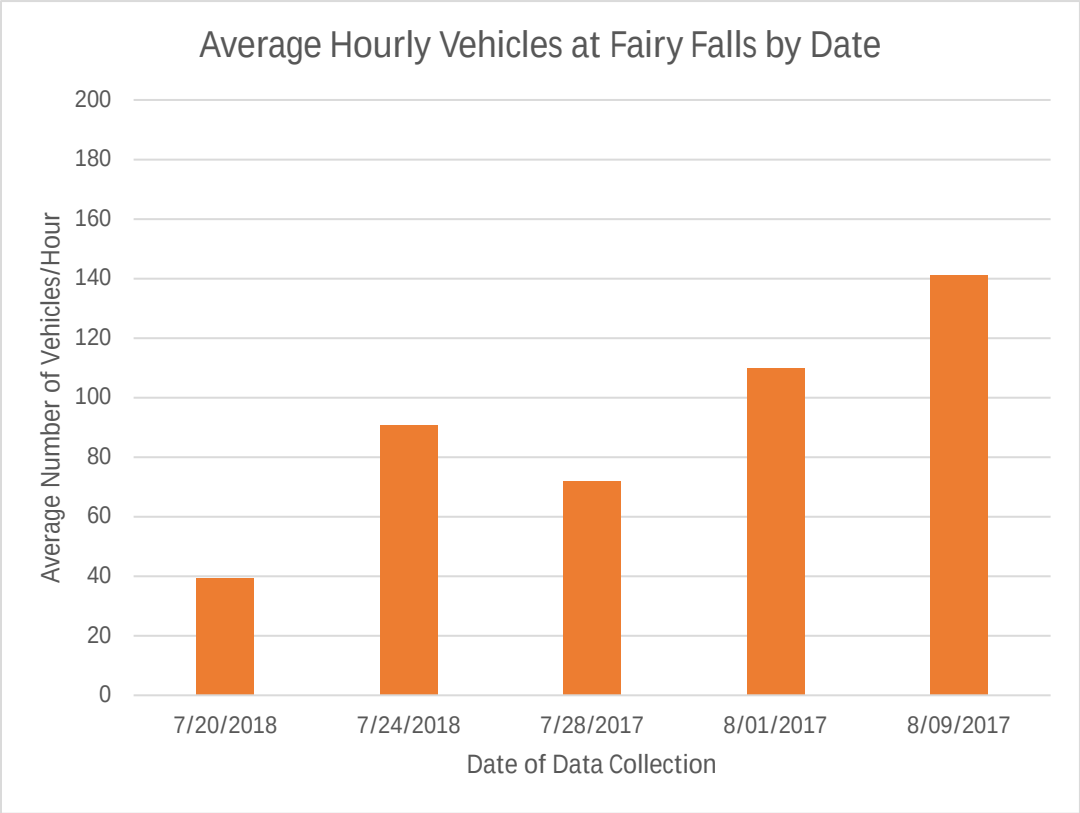
Norris Geyser Basin:

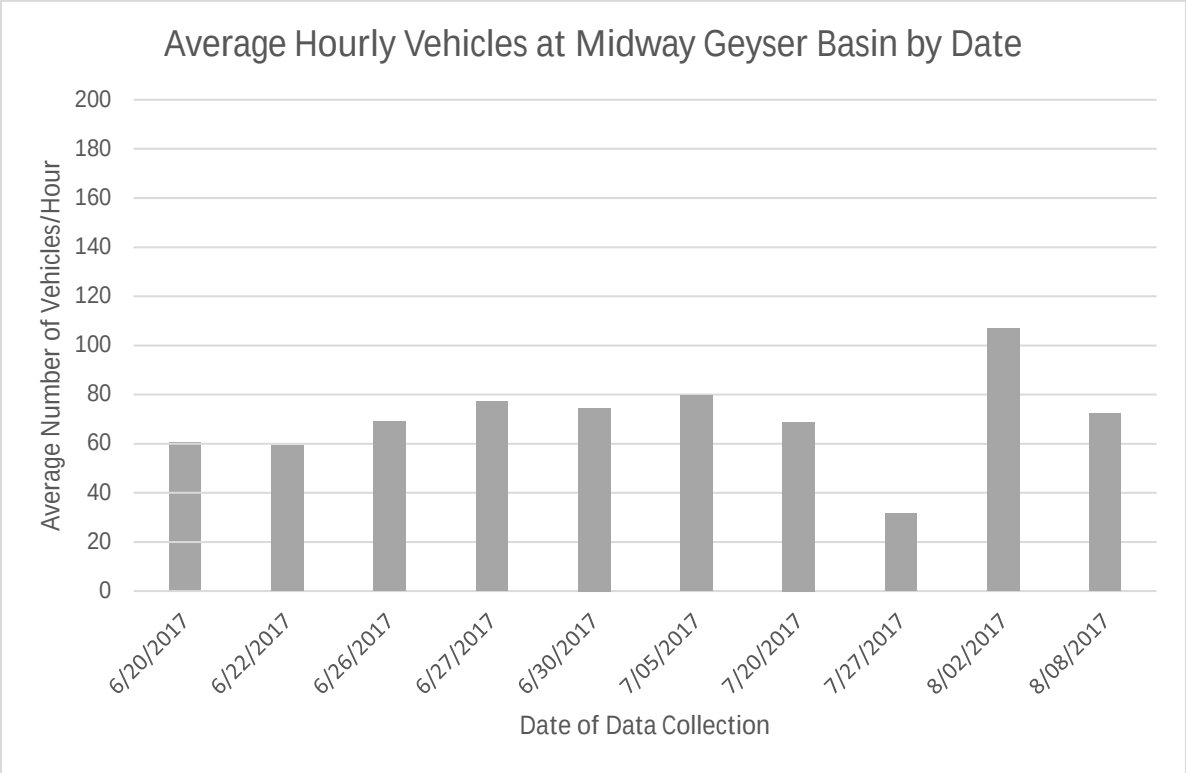
	Total Vehicles		RV		Bus		Motorcycle		Bikes		Queue		Undesignated		Roadside		Restroom	
Date	**Mean**	**±SD**	**Mean**	**±SD**	**Mean**	**±SD**	**Mean**	**±SD**	**Mean**	**±SD**	**Mean**	**±SD**	**Mean**	**±SD**	**Mean**	**±SD**	**Mean**	**±SD**
6/19/2017	155	16	12	4	2	1	1	1	0	0	19	0	16	15	0	0	1	1
6/21/2017	115	39	7	5	4	3	0	0	1	1	39	44	2	3	0	0	9	8
6/26/2017	98	32	5	4	0	1	1	2	0	0	2	4	0	0	0	0	0	0
6/27/2017	157	11	10	5	2	1	1	1	0	0	16	10	7	1	0	0	4	7
7/6/2017	154	47	11	5	2	1	1	1	1	1	8	6	2	2	1	1	7	3
7/12/2017	176	31	8	3	1	1	3	2	1	1	12	13	16	7	4	5	6	5
7/26/2017	138	20	9	5	1	1	1	1	0	0	5	9	4	4	0	0	2	2
8/3/2017	191	50	6	5	3	3	2	2	0	0	44	27	20	16	1	2	8	8
8/11/2017	117	25	12	6	1	1	0	0	0	0	5	4	1	2	0	0	1	2
Overall	**144**	**30**	**9**	**3**	**2**	**1**	**1**	**1**	**0**	**0**	**17**	**15**	**8**	**8**	**1**	**1**	**4**	**3**

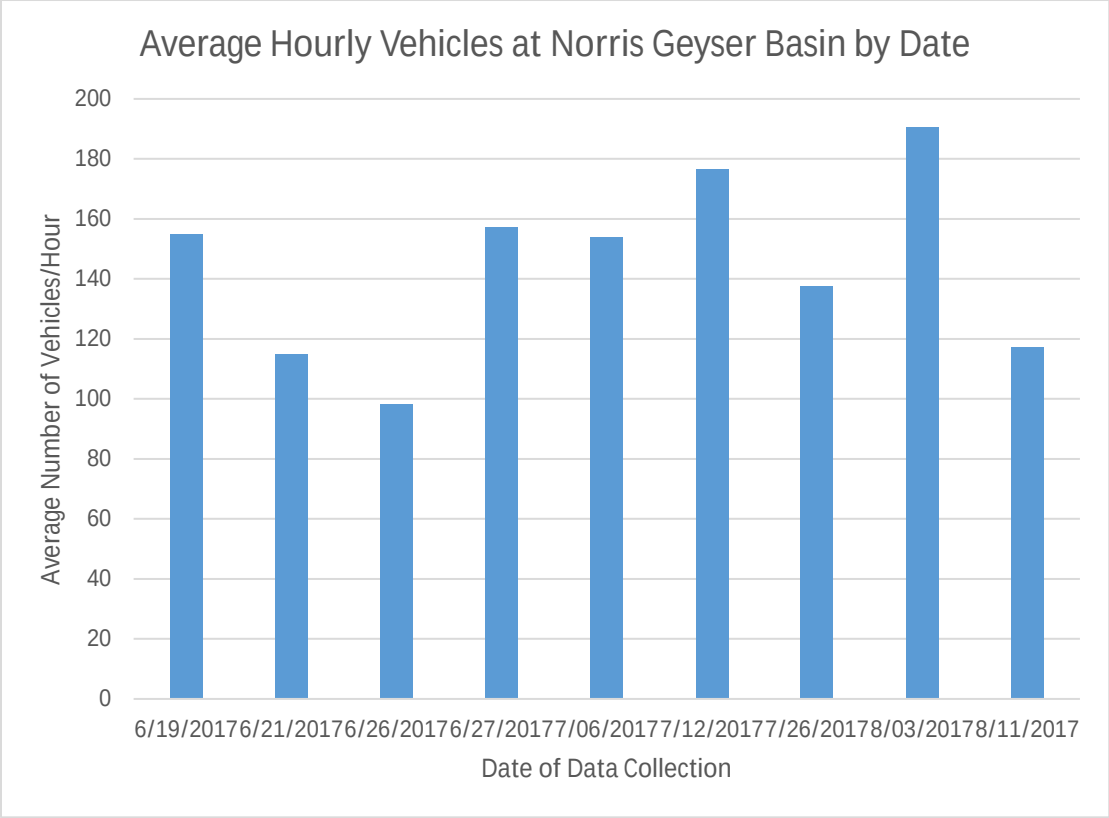
	Total Vehicles		RV		Bus		Motorcycle		Bikes		Queue		Undesignated		Roadside		Restroom	
Time	**Mean**	**±SD**	**Mean**	**±SD**	**Mean**	**±SD**	**Mean**	**±SD**	**Mean**	**±SD**	**Mean**	**±SD**	**Mean**	**±SD**	**Mean**	**±SD**	**Mean**	**±SD**
9:00	65	11	4	3	2	2	0	0	0	0	0	0	0	0	0	0	2	2
10:00	138	32	9	5	3	2	1	1	1	1	17	27	3	4	0	0	4	3
11:00	147	60	11	5	2	3	1	1	1	1	24	27	8	11	2	4	6	7
12:00	188	41	11	6	2	2	2	1	1	1	18	32	9	9	2	2	9	8
13:00	124	27	7	4	1	1	2	2	0	1	5	5	8	8	1	2	3	4
14:00	169	21	9	2	1	1	2	1	0	0	13	8	6	4	1	1	5	4
15:00	171	39	9	5	1	0	1	1	0	0	27	23	13	17	0	0	5	4
16:00	166	3	9	4	3	1	0	1	0	0	16	8	18	9	0	0	8	7
Overall	**146**	**39**	**9**	**2**	**2**	**1**	**1**	**1**	**0**	**0**	**15**	**9**	**8**	**6**	**1**	**1**	**5**	**2**

Appendix F: Average Hourly Vehicle Counts for Focal Attraction Sites by Date





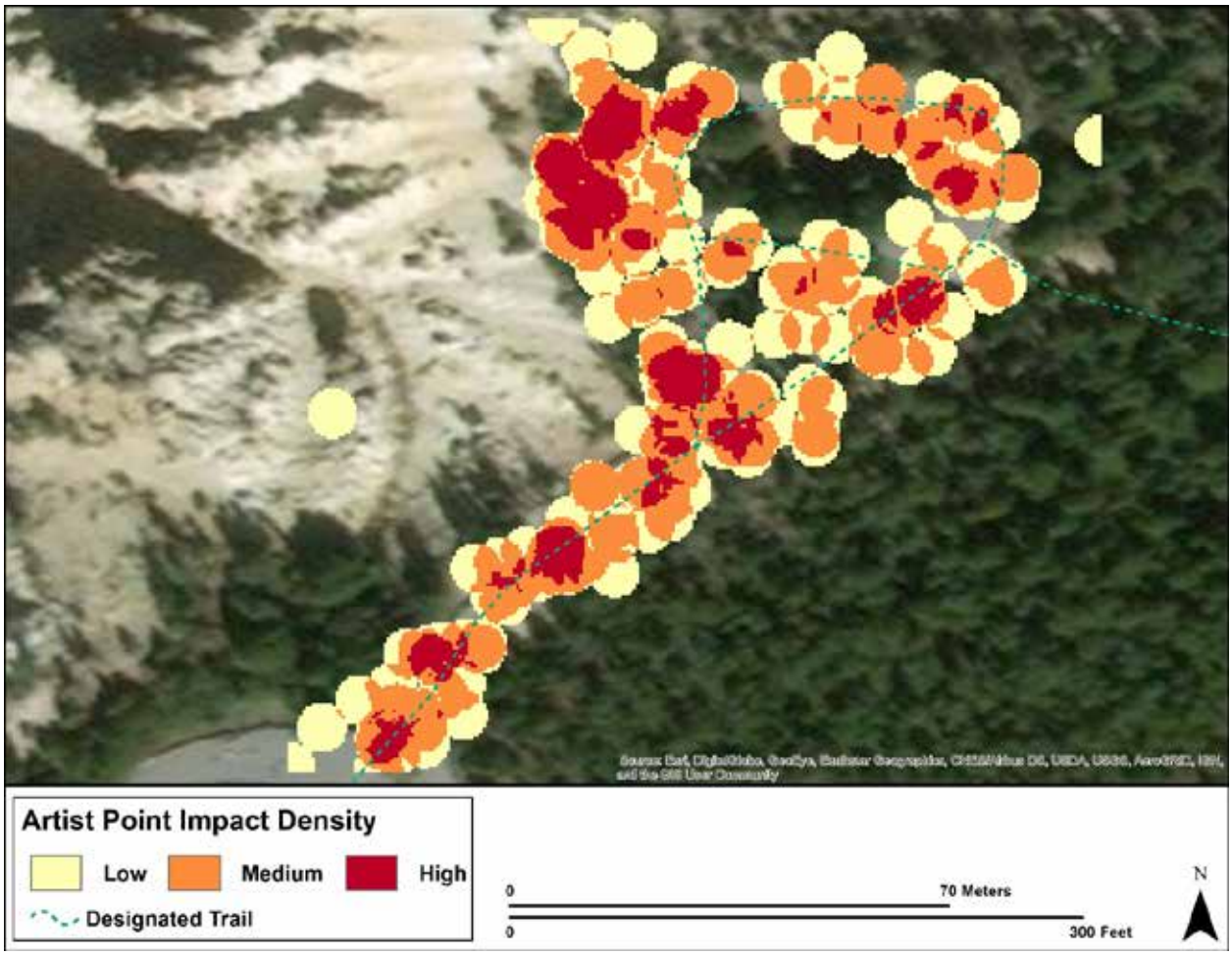

Average Hourly Vehicles at Midway Geyser Basin by Date
Average Number of Vehicles/Hour
200
180
160
140
120
100
80
60
40
20
0
6/20/2017
6/22/2017
6/26/2017
6/27/2017
6/30/2017
7/05/2017
7/20/2017
7/27/2017
8/02/2017
8/08/2017
Date of Data Collection

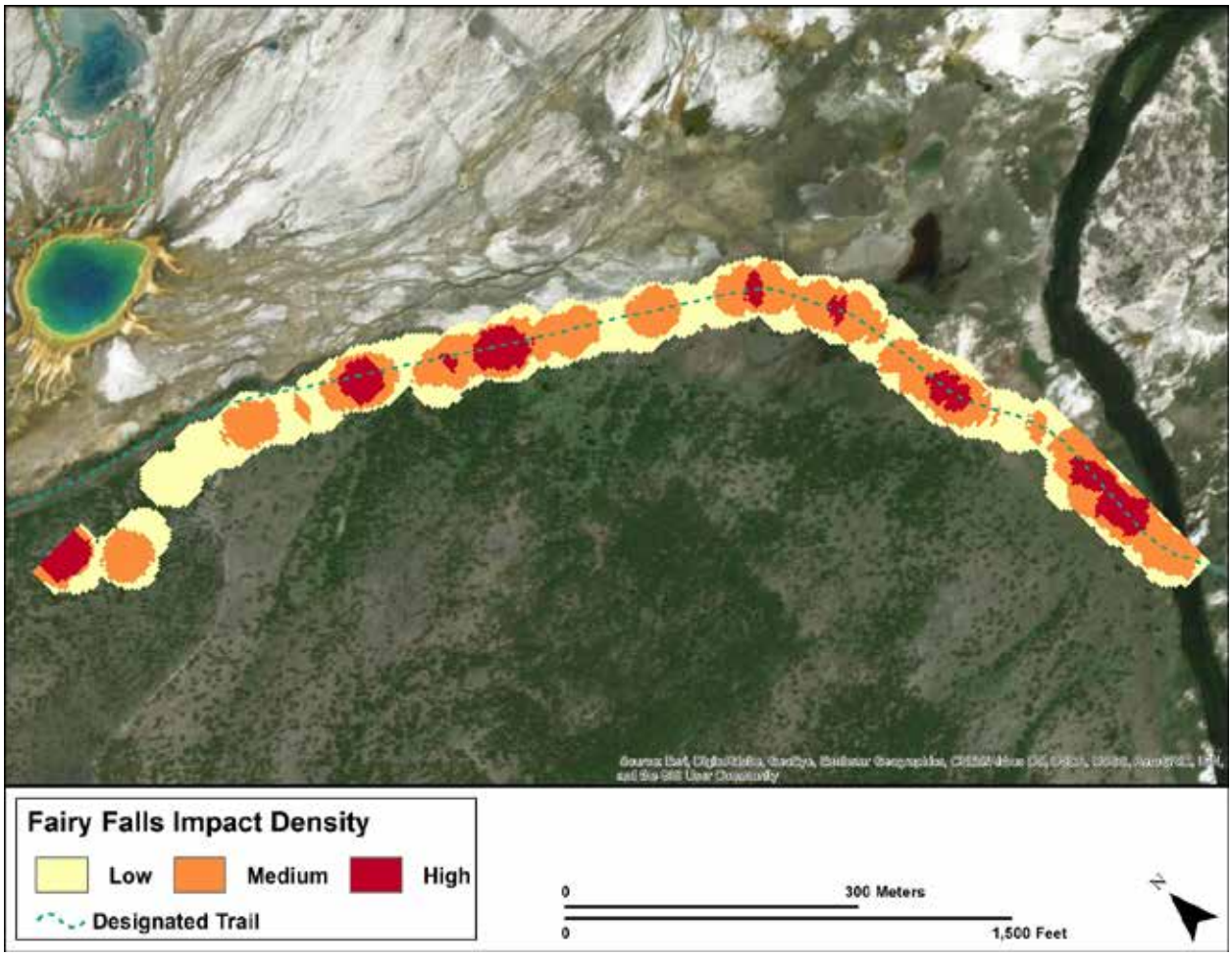

Average Hourly Vehicles at Norris Geyser Basin by Date
Average Number of Vehicles/Hour
200
180
160
140
120
100
80
60
40
20
0
6/19/2017
6/21/2017
6/26/2017
6/27/2017
7/06/2017
7/12/2017
7/26/2017
8/03/2017
8/11/2017
Date of Data Collection

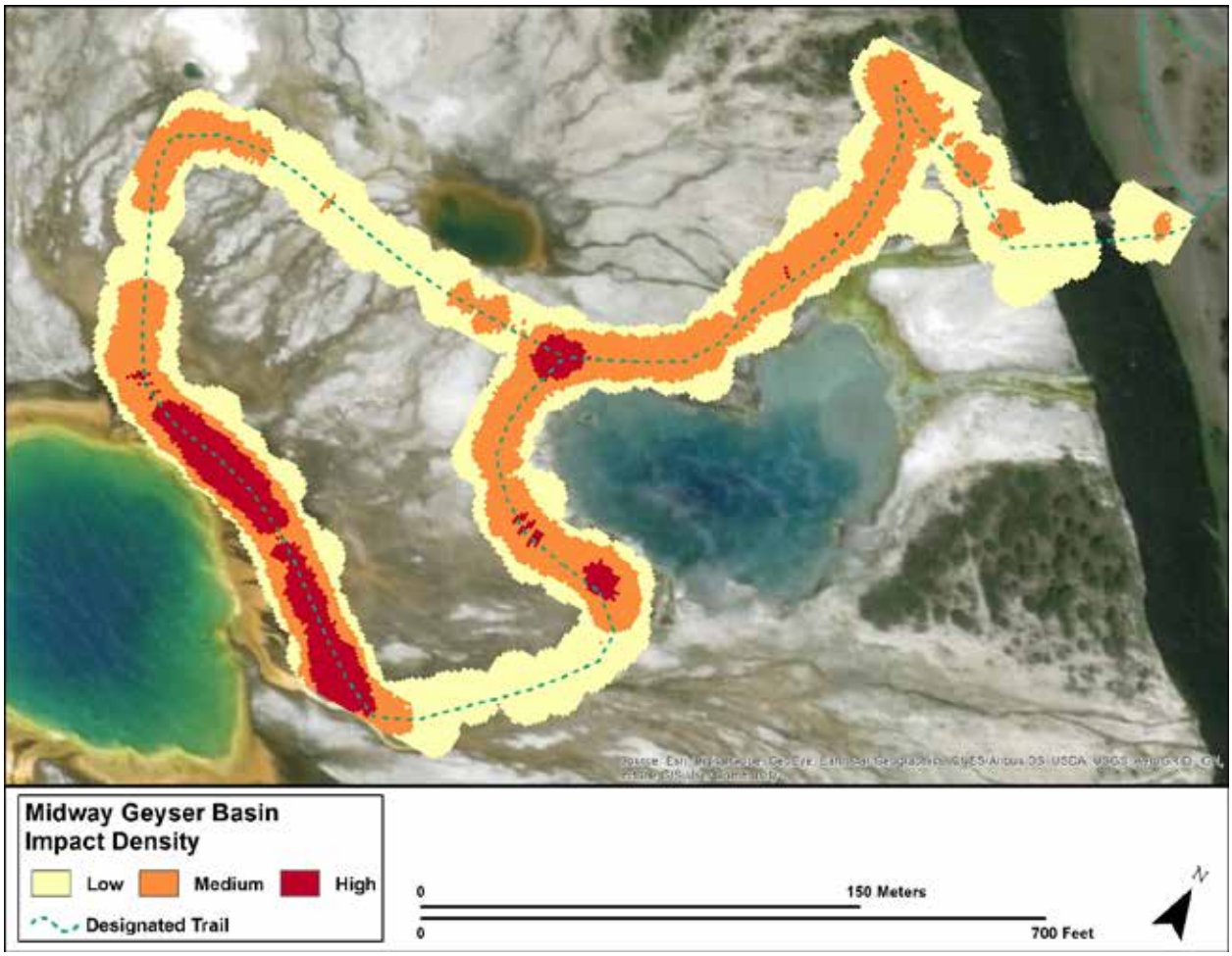
Appendix G: Density of Visitor Behaviors & Resource Impacts

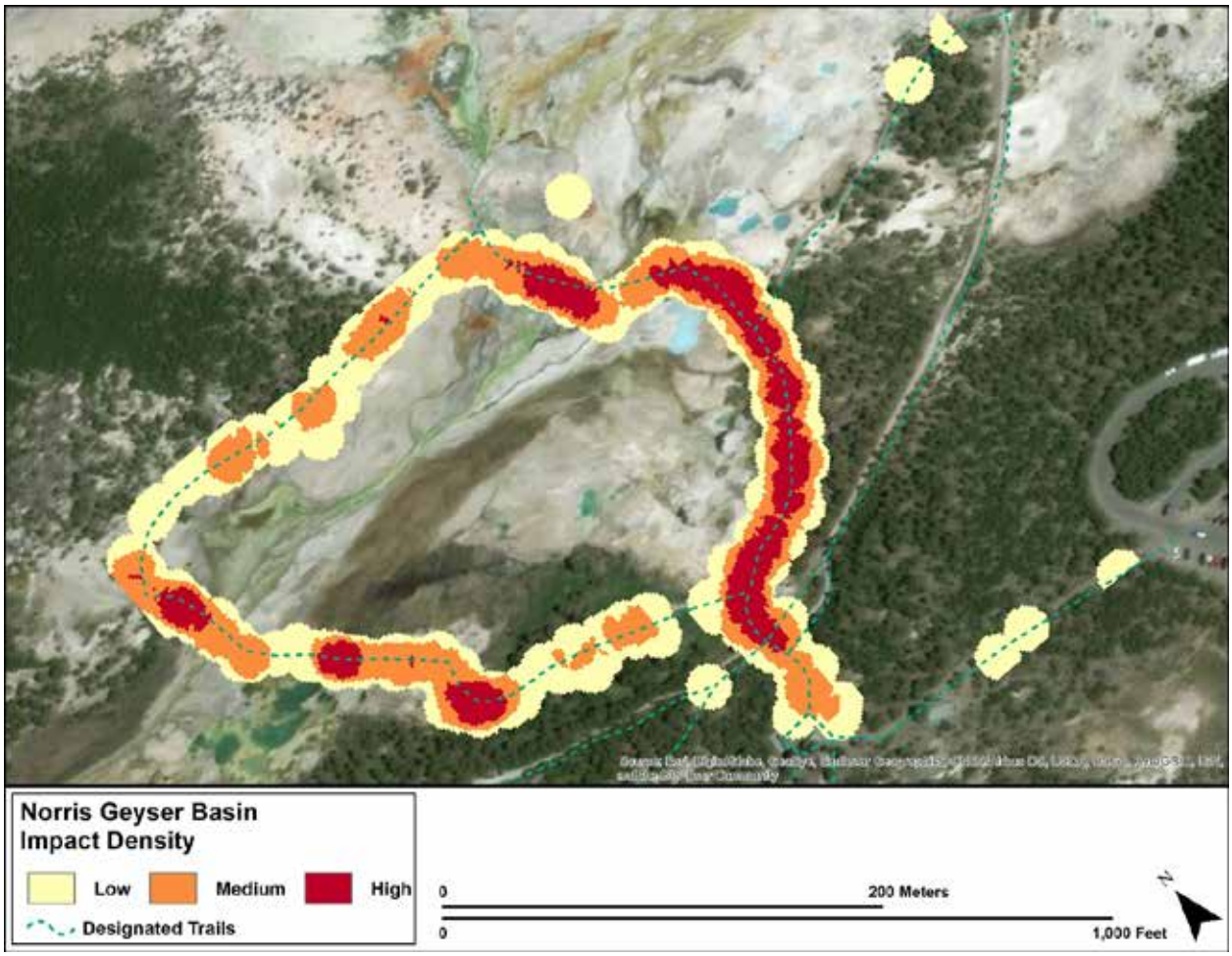
How to interpret these maps: The visitor behavior and resource impact waypoints shown in the report, for each focal attraction site, were used to calculate the point densities shown in the following maps. The areas in red show there the majority of impacts were mapped by the YCC crews across the entire sampling period. The areas in light yellow show were the lowest number of impacts were mapped by the YCC crews. In otherwords, the areas shown in red are locations along the designated trail where most of the resources and visitor behavior impacts are occuring.

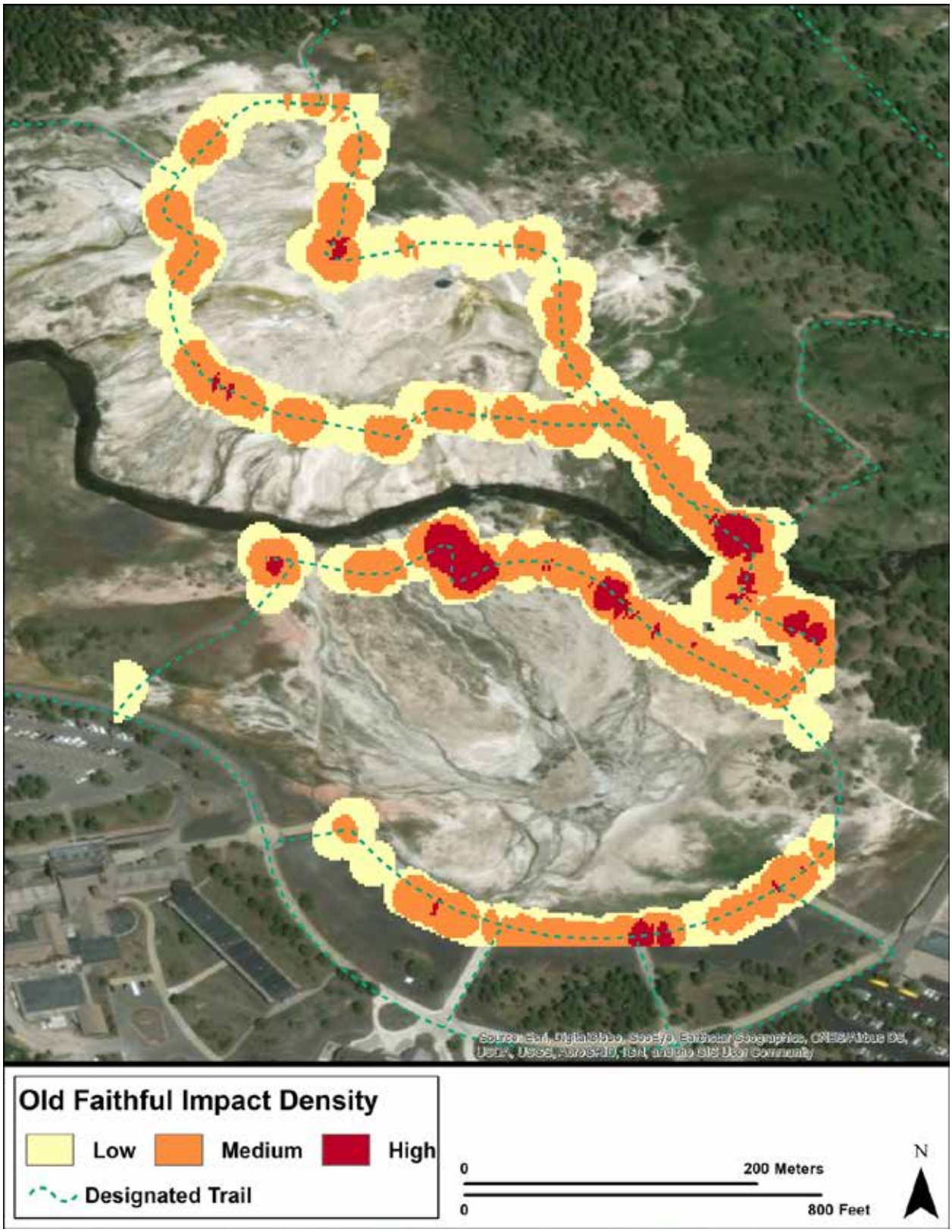
These maps primary purpose is to highlight locations (those in red) where further analysis or examination is needed (for example see Appendix I to compare where individual behavior and resource impacts are occuring). The areas highlighted in red are locations which may be of management concern because more behavior and resource impacts are occuring here compared to other locations in the focal attraction site. Areas shown in yellow have very few occurances of behavior and resource impacts and therefore may be less of a management concern from the prospective of potential impacts to the visitor experience or resources.




Fairy Falls Impact Density
Low
Medium
High
Designated Trail
0
300 Meters
0
1,500 Feet
N


Midway Geyser Basin
Impact Density
Low
Medium
High
Designated Trail
0
150 Meters
0
700 Feet
N


Norris Geyser Basin
Impact Density
Low
Medium
High
Designated Trails
0
200 Meters
0
1,000 Feet
N


Old Faithful Impact Density
Low
Medium
High
Designated Trail
0
200 Meters
0
800 Feet
N

Appendix H: Summary of All Visitor Behaviors and Resource Impacts Waypoints

Please see Appendix D for list of behavior and resource impact codes.

Note: May not total 100% as some waypoints were marked without an associated behavior code. "Unknown Code" means that the code written by the YCC Crews was unreadable.

Artist Point

6/21/2017	37	29	78%	1	3%	1	3%			1	9%	1	3%					2	5%	3	8%
6/29/2017	11	10	91%																		

Fairy Falls

7/24/2017	8			2	25%			1	13%			1	13%	2	25%	1	13%	1	13%
8/1/2017	7	5	71%																		
Totals	**89**	**5**	**6%**	**70**	**79%**	**2**	**2%**	**3**	**3%**	**1**	**1%**	**1**	**1%**	**4**	**4%**	**2**	**2%**	**1**	**1%**

Midway Geyser Basin

	Behavior Code:	Lit 2		Con 2		Flow		Foot		Graf 2		Noise 2		Ob 1	
Date	**Total**	**#**	**%**	**#**	**%**	**#**	**%**	**#**	**%**	**#**	**%**	**#**	**%**	**#**	**%**
6/20/2017	108	9	8%					11	10%	2	2%				
6/22/2017	100	75	75%					3	3%	1.0	10%				
6/26/2017	65			1	2%			4	6%	1	2%				
6/30/2017	51	29	57%												
7/5/2017	140	10	7%			48	34%	1	1%			2	2%	2	2%
7/27/2017	51	26	51%					1	2%					2	4%
8/2/2017	49														
8/8/2017	100	19	19%			18	18%	6	6%			3	3%	2	2%
8/9/2017	7														
Totals	**671**	**168**	**25%**	**1**	**0%**	**66**	**10%**	**26**	**4%**	**4**	**1%**	**5**	**1%**	**6**	**1%**

	Behavior Code:	Pet 1		Th lit 2		Obj 2		Th Graf 2		Other 1		Ob 2/Th Lit 2		Throw 2		Can 1		Rough	
Date	**Total**	**#**	**%**	**#**	**%**	**#**	**%**	**#**	**%**	**#**	**%**	**#**	**%**	**#**	**%**	**#**	**%**	**#**	**%**
6/20/2017	108			50	46%	23	21%	12	11%										
6/22/2017	100					10	10%	1	1%	1	1%			1	2%	1	2%		
6/26/2017	65			41	63%	6	9%	9	14%	1	2%								
6/30/2017	51					2	3%					3	5%						
7/5/2017	140	1	1%	2	2%	2	2%	18	13%	1	1%							1	1%
7/27/2017	51									1	2%								
8/2/2017	49	1	2%	46	94%			1	2%										
8/8/2017	100			37	37%	2	2%	7	7%	2	2%							1	1%
8/9/2017	7	1	14%	5	71%														
Totals	**671**	**3**	**0%**	**181**	**27%**	**45**	**7%**	**48**	**7%**	**6**	**1%**	**3**	**0%**	**1**	**0%**	**1**	**0%**	**2**	**0%**

	Behavior Code:	Th graf 1		Th lit 1		Unknown Code		Pet 2		Noise 1		Wild 2	
Date	**Total**	**#**	**%**	**#**	**%**	**#**	**%**	**#**	**%**	**#**	**%**	**#**	**%**
6/20/2017	108	1	1%										
6/22/2017	100												
6/26/2017	65												
6/30/2017	51												
7/5/2017	140	1	1%										
7/27/2017	51	1	2%	19	27%	2	4%						
8/2/2017	49							1	2%				
8/8/2017	100									2	2%	1	1%
8/9/2017	7							1	14%				
Totals	**671**	**3**	**0%**	**19**	**3%**	**2**	**0%**	**2**	**0%**	**2**	**0%**	**1**	**0%**

Norris Geyser Basin

6/19/2017	38					15	39%											4	11%	6	16%	11	29%	
6/27/2017	79					37	47%			3	4%							1	1%	27	34%	8	10%	
7/26/2017	33					12	36%							1	1%			1	1%	20	61%			
8/7/2017	56					20	36%			10	18%							9	16%	13	23%			

6/19/2017	38	1	3%								1	3%												
6/27/2017	79					3	4%																	
7/26/2017	33																							
8/7/2017	56					1	2%				1	2%								2	4%			
Totals	**573**	**4**	**1%**	**15**	**3%**	**9**	**2%**	**6**	**1%**	**1**	**0%**	**2**	**0%**	**2**	**0%**	**5**	**1%**							

Old Faithful

	Behavior Code:	Lit 1		Lit 2		Con 2		Flow		Foot		Graf 2		Noise 2		Ob 1		Pet 1	
Date	**Total**	**#**	**%**	**#**	**%**	**#**	**%**	**#**	**%**	**#**	**%**	**#**	**%**	**#**	**%**	**#**	**%**	**#**	**%**
6/20/2017	69			24	35%			1	1%		1%					2.0	3%	1	1%
6/22/2017	65	1	2%	20	31%					9	14%								
6/28/2017	109			44	40%					2	2%	1	1%						
7/7/2017	95			72	76%			5	5%					6	6%	4	4%	3	3%
7/25/2017	17	1	6%	2	12%													3	18%
8/7/2017	56			20	36%					10	18%	2	4%			9	16%		
8/10/2017	63	1	2%	23	37%	1	2%	4	6%	5	8%					4	6%		
Totals	**474**	**3**	**1%**	**205**	**43%**	**1**	**0%**	**10**	**2%**	**26**	**5%**	**3**	**1%**	**6**	**1%**	**19**	**4%**	**7**	**1%**

	Behavior Code:	Th lit 2		Obj 2		Unknown Code		Th Graf 2		Other 1		Ob 3		Soc1		Wild 2	
Date	**Total**	**#**	**%**	**#**	**%**	**#**	**%**	**#**	**%**	**#**	**%**	**#**	**%**	**#**	**%**	**#**	**%**
6/20/2017	69	37	54%														
6/22/2017	65	33	51%	1	2%	1	2%										
6/28/2017	109	59	54%	2	2%			1		1	1%						
7/7/2017	95			2	2%					3	3%						
7/25/2017	17	6	35%	2	12%					2	12%	1	6%				
8/7/2017	56	13	23%							1	2%			1	2%		
8/10/2017	63	20	32%	1	2%			1	2%	1	2%	1	2%			1	2%
Totals	**474**	**168**	**35%**	**8**	**2%**	**1**	**0%**	**2**	**0%**	**8**	**2%**	**2**	**0%**	**1**	**0%**	**1**	**0%**

Appendix I: Maps of Locations of Individual Visitor Behaviors and Resource Impact Waypoints

Artist Point Visitor Behavior Impacts: Graffiti Observed in Other Area

Graffiti

0 100 Meters

0 500 Feet

N

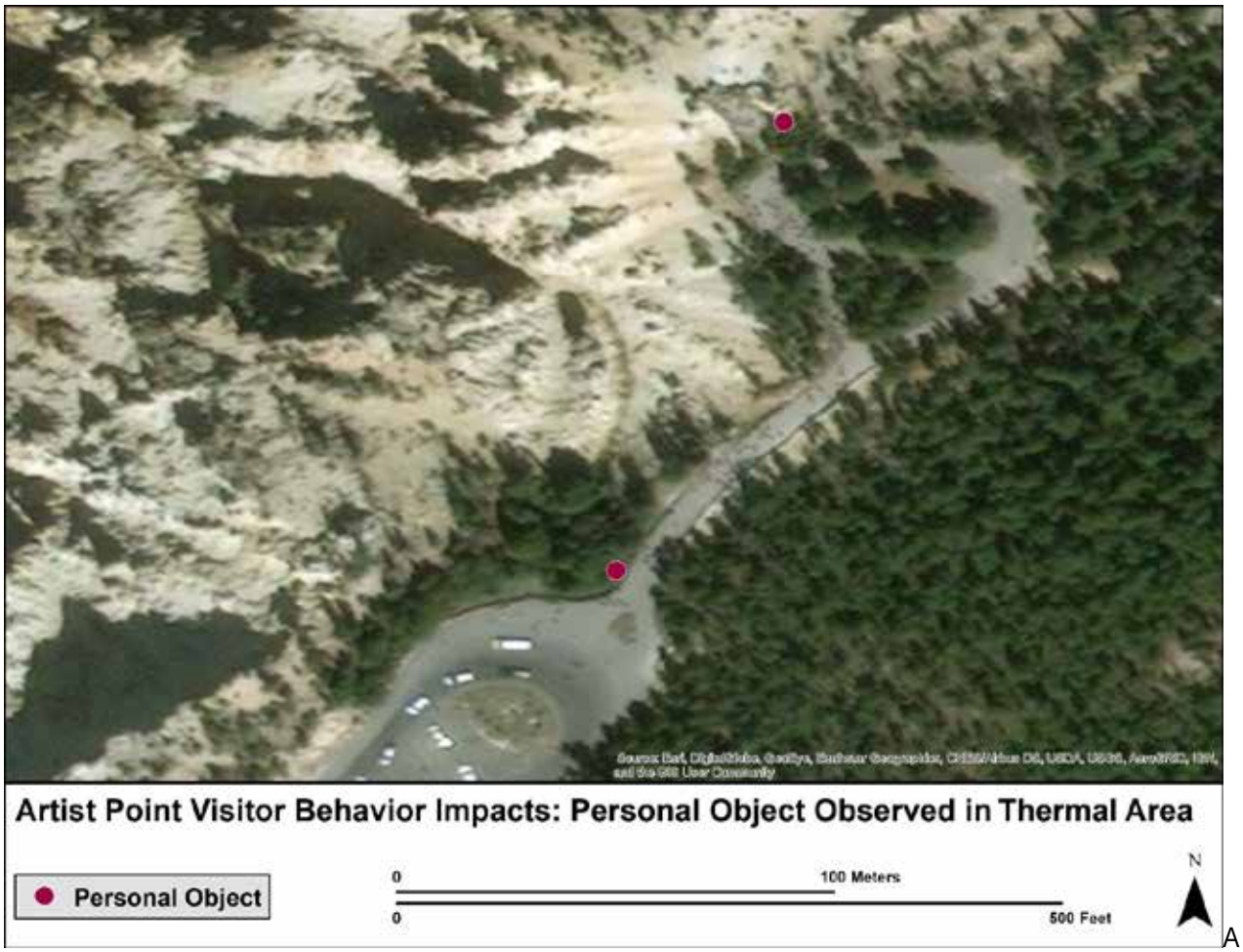
Artist Point Visitor Behavior Impacts: Litter Observed in Other Area

Litter

0 100 Meters

0 500 Feet

N



Artist Point Visitor Behavior Impacts: Personal Object Observed in Thermal Area

Personal Object

0 100 Meters

0 500 Feet

N

A

Artist Point Visitor Behavior Impacts: Pet on Boardwalk

Pet on Boardwalk

0 100 Meters

0 500 Feet

N

Artist Point Visitor Behavior Impacts: Social Trail Less Than 3 Meters Long

● **Social Trail**

0 — 100 Meters

0 — 500 Feet

N

Artist Point Visitor Behavior Impacts: Social Trail Greater Than 3 Meters Long

● **Social Trail**

0 — 100 Meters

0 — 500 Feet

N

Fairy Falls Visitor Behavior Impacts: Verbal Visitor Conflict

Verbal Conflict

0 — 500 Meters

0 — 2,000 Feet

N

Fairy Falls Visitor Behavior Impacts: Footprint in Thermal Area

Footprint

0 500 Meters

0 2,000 Feet

N

Fairy Falls Visitor Behavior Impacts: Visitor Littering in Other Area

Littering

0 500 Meters

0 2,000 Feet

N

Fairy Falls Visitor Behavior Impacts: Litter Observed in Other Area

Observed Litter

0 500 Meters

0 2,000 Feet

N

Fairy Falls Visitor Behavior Impacts: Visitor Less Than 1 Meter Off Boardwalk

Visitor Off Boardwalk

0 — 500 Meters

0 — 2,000 Feet

N

Fairy Falls Visitor Behavior Impacts: Visitor More Than 1 Meter Off Boardwalk

Visitor Off Boardwalk

0 — 500 Meters

0 — 2,000 Feet

N

Fairy Falls Visitor Behavior Impacts: Personal Object Observed in Thermal Area

Personal Object

0 500 Meters

0 2,000 Feet

N

Fairy Falls Visitor Behavior Impacts: Other

Other

0 500 Meters

0 2,000 Feet

N

Fairy Falls Visitor Behavior Impacts: Pet on Boardwalk

Pet

0 500 Meters

0 2,000 Feet

N

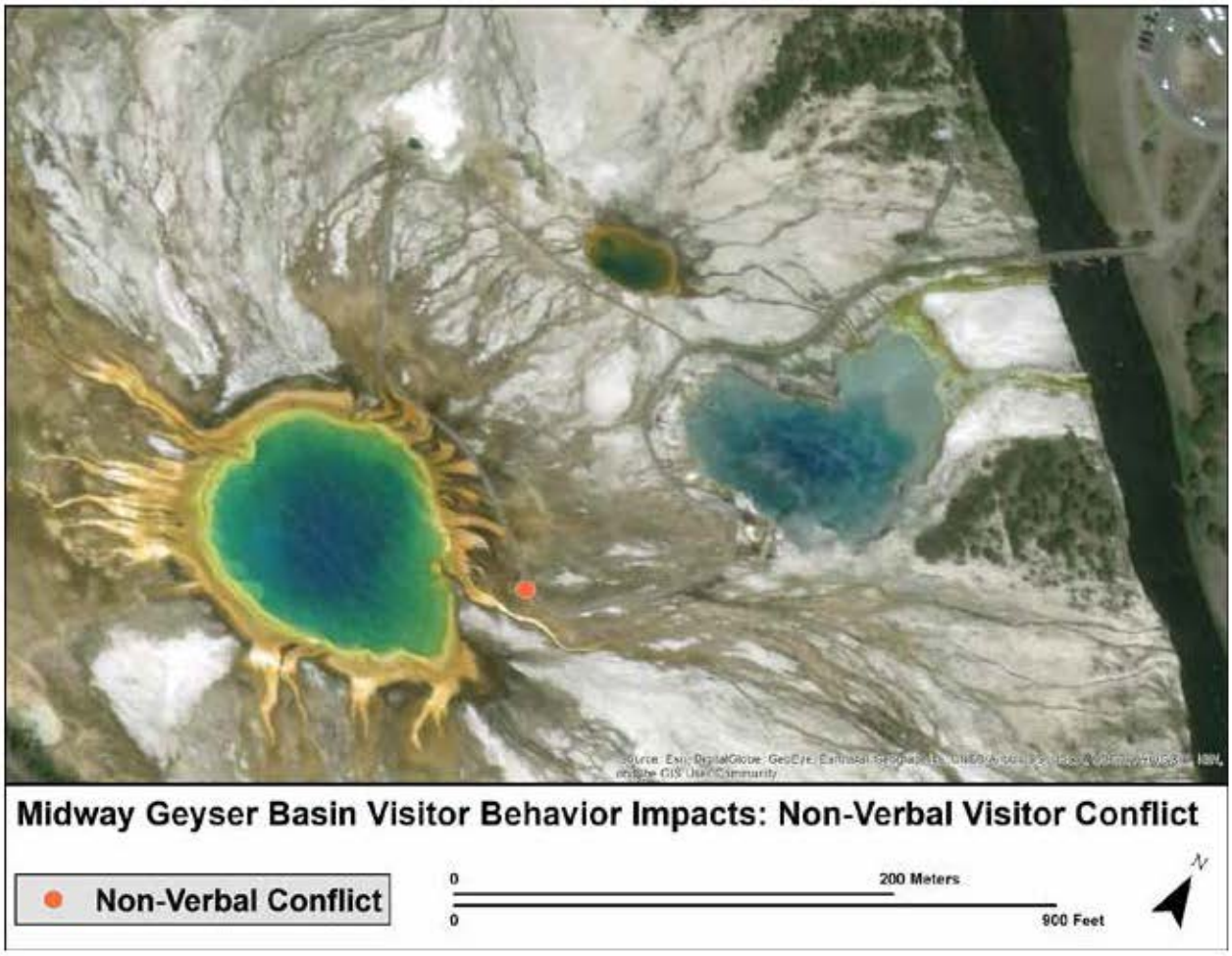
Fairy Falls Visitor Behavior Impacts: Litter Observed in Thermal Area

Litter

0 500 Meters

0 2,000 Feet

N



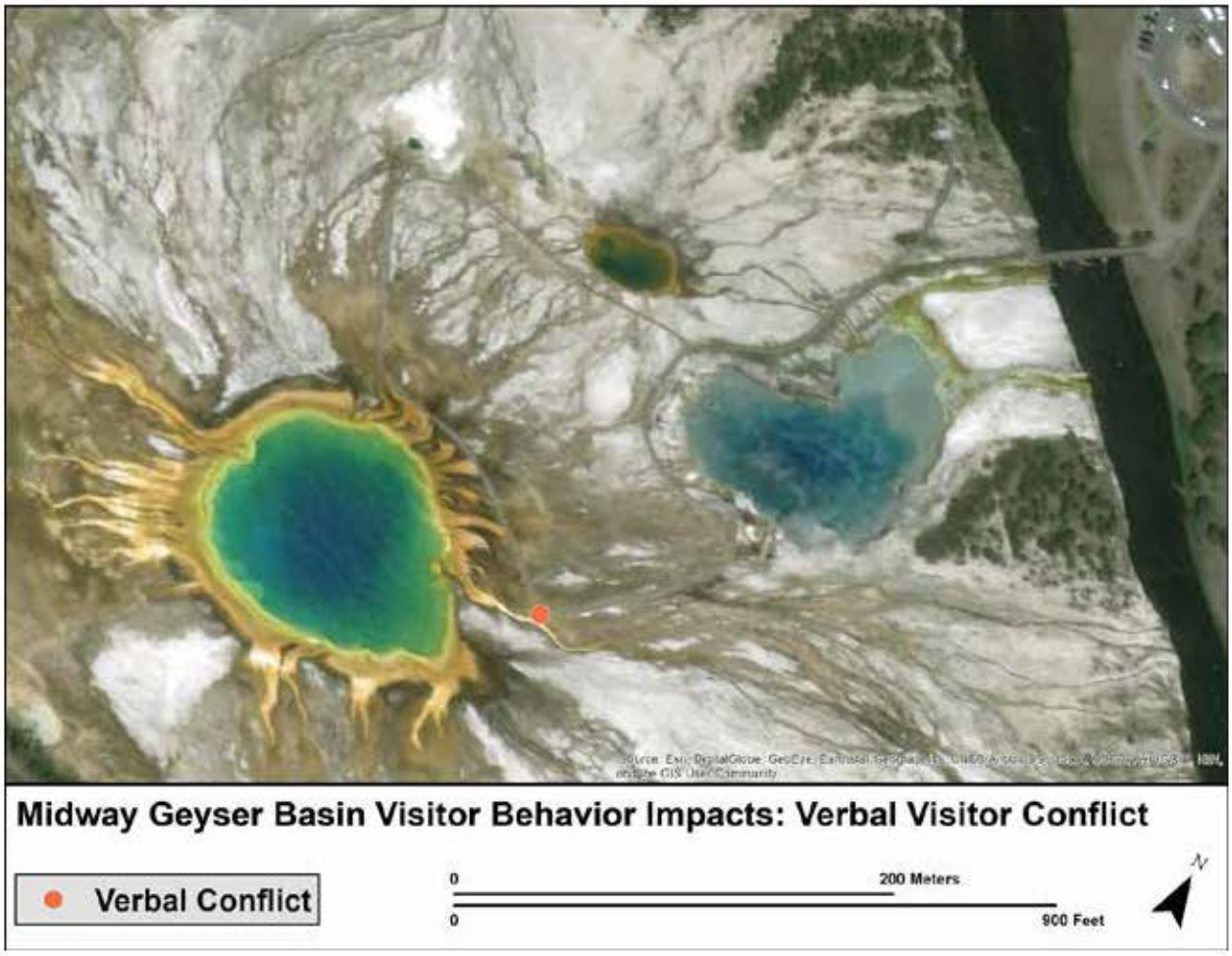
Midway Geyser Basin Visitor Behavior Impacts: Non-Verbal Visitor Conflict

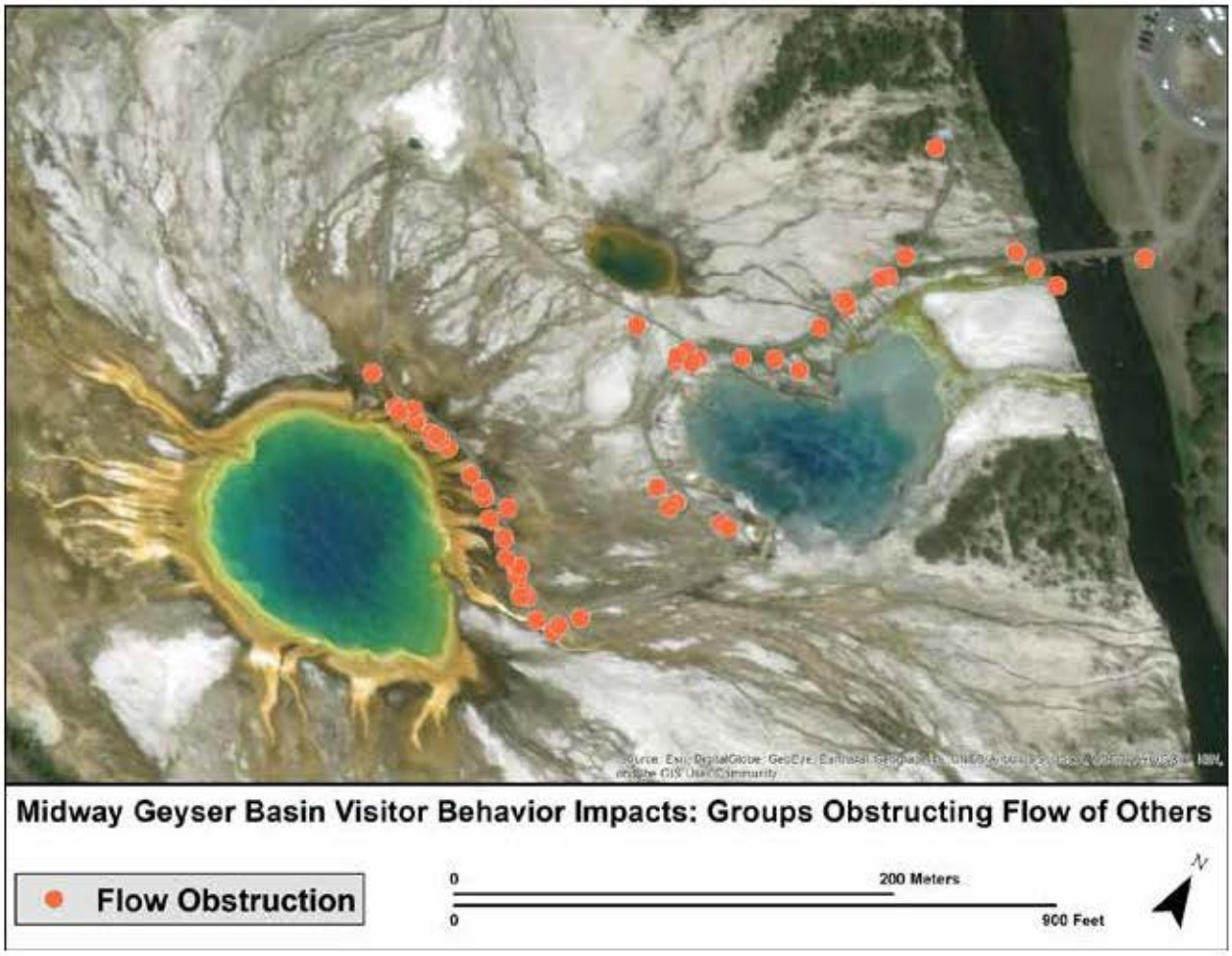
Non-Verbal Conflict

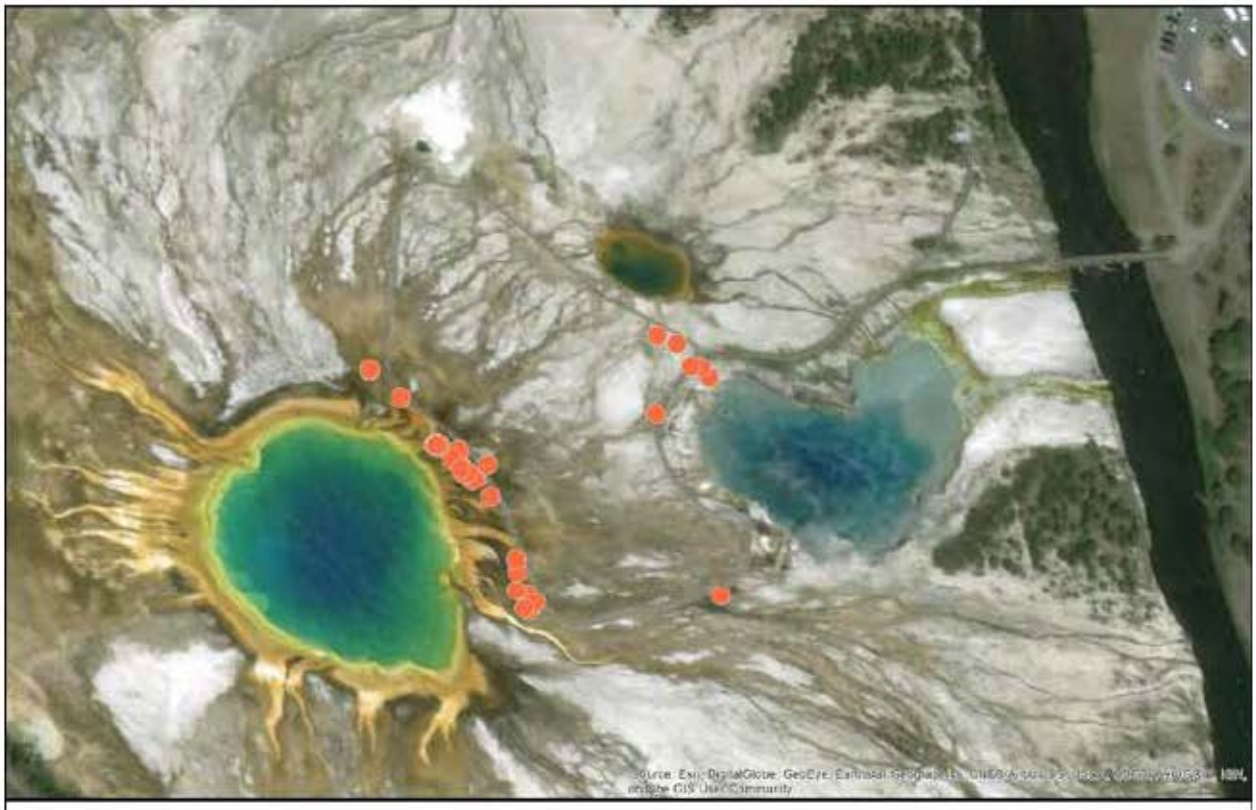
0 200 Meters

0 900 Feet

N


Midway Geyser Basin Visitor Behavior Impacts: Verbal Visitor Conflict
Verbal Conflict
0
200 Meters
0
900 Feet
N


Midway Geyser Basin Visitor Behavior Impacts: Groups Obstructing Flow of Others
Flow Obstruction
0
200 Meters
0
900 Feet
N



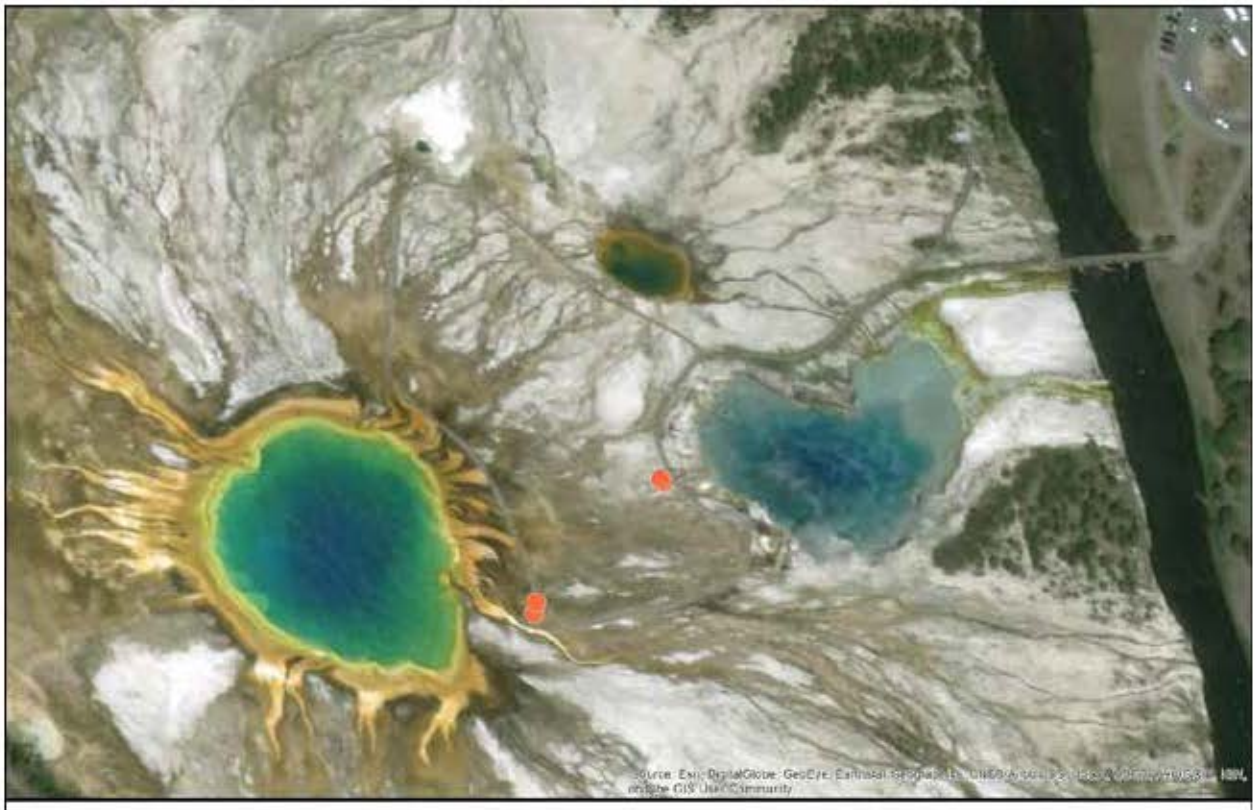
Midway Geyser Basin Visitor Behavior Impacts: Footprint in Thermal Area

Footprint

0 — 200 Meters

0 — 900 Feet

N



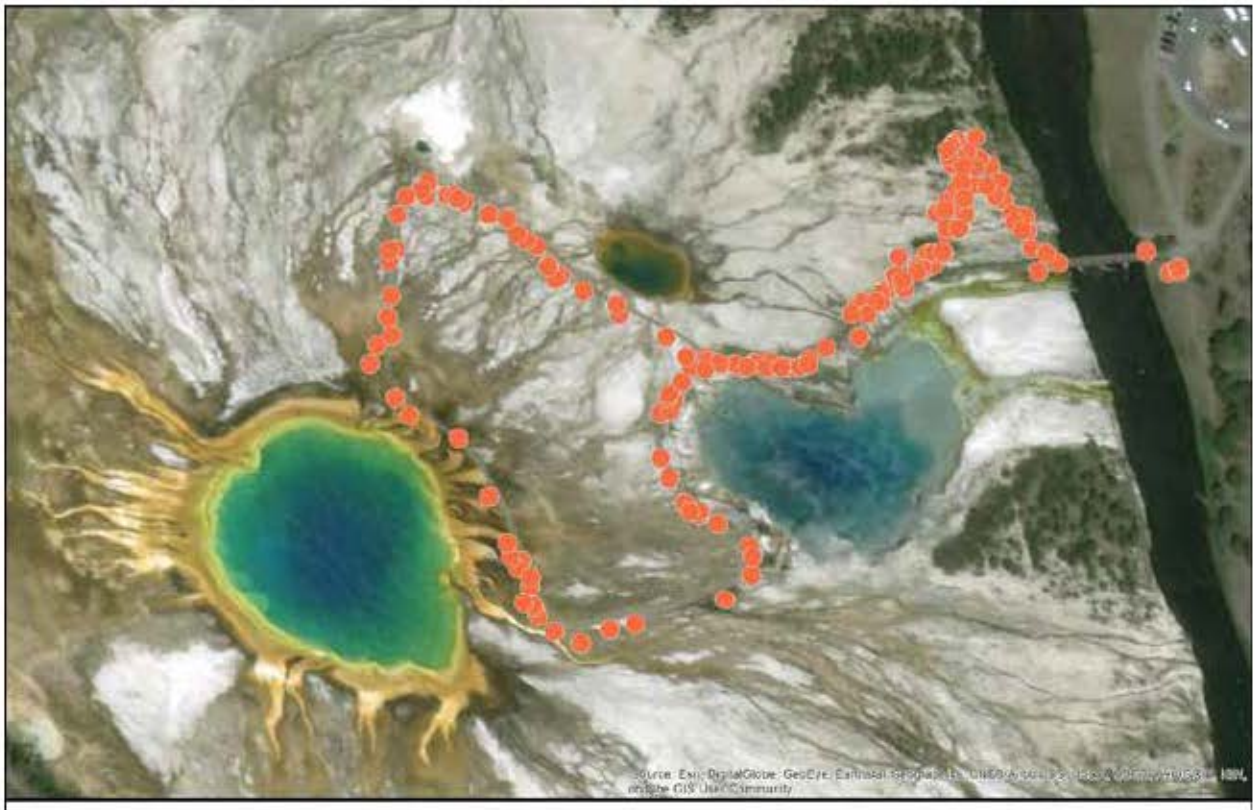
Midway Geyser Basin Visitor Behavior Impacts: Graffiti Observed in Other Area

Graffiti

0 200 Meters

0 900 Feet

N



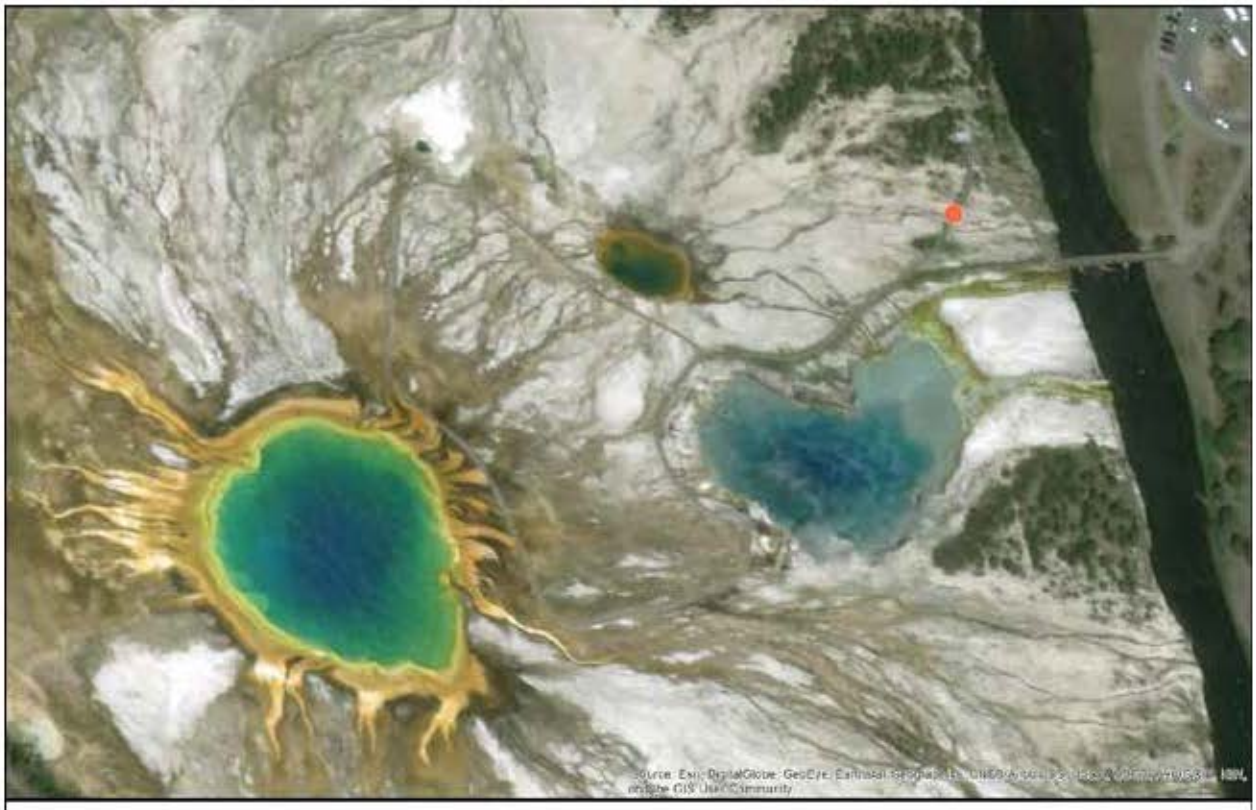
Midway Geyser Basin Visitor Behavior Impacts: Litter Observed in Other Area

Litter

0 200 Meters

0 900 Feet

N



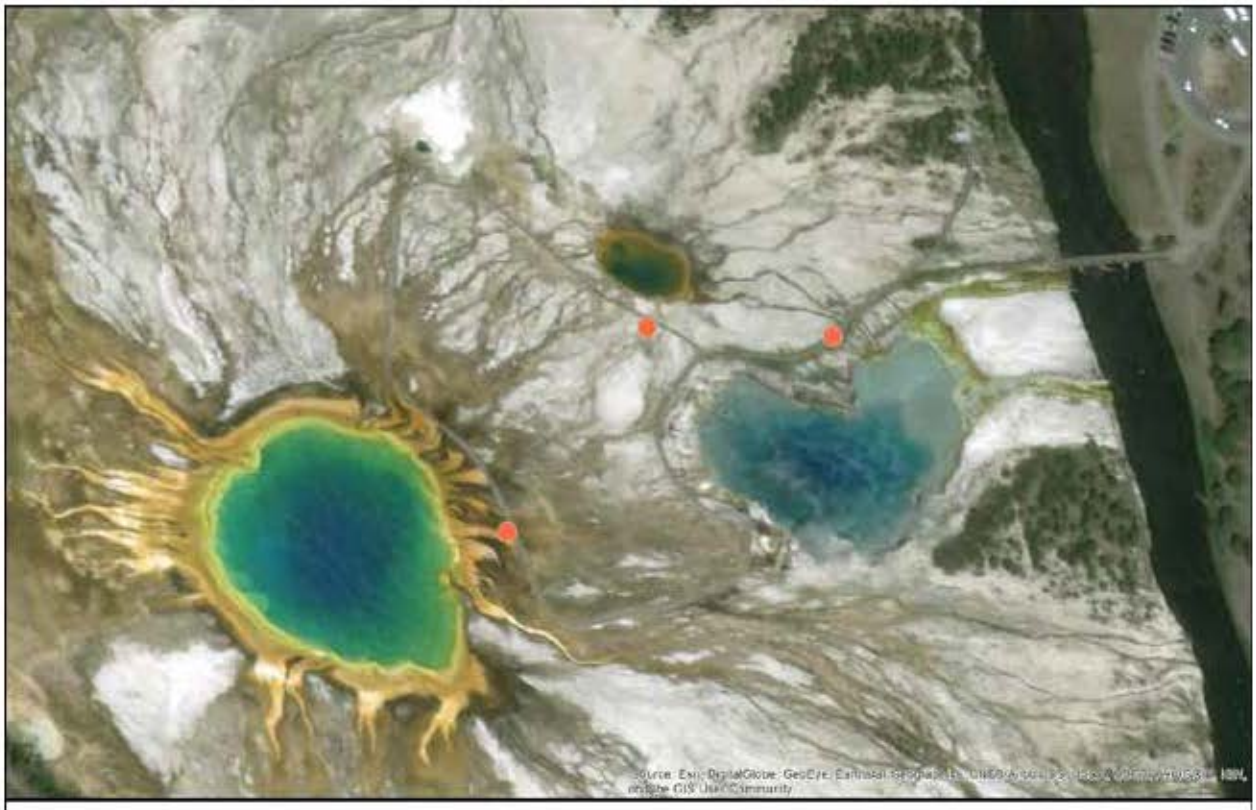
Midway Geyser Basin Visitor Behavior Impacts: Excessive Traffic Noise

Noise

0 — 200 Meters

0 — 900 Feet

N



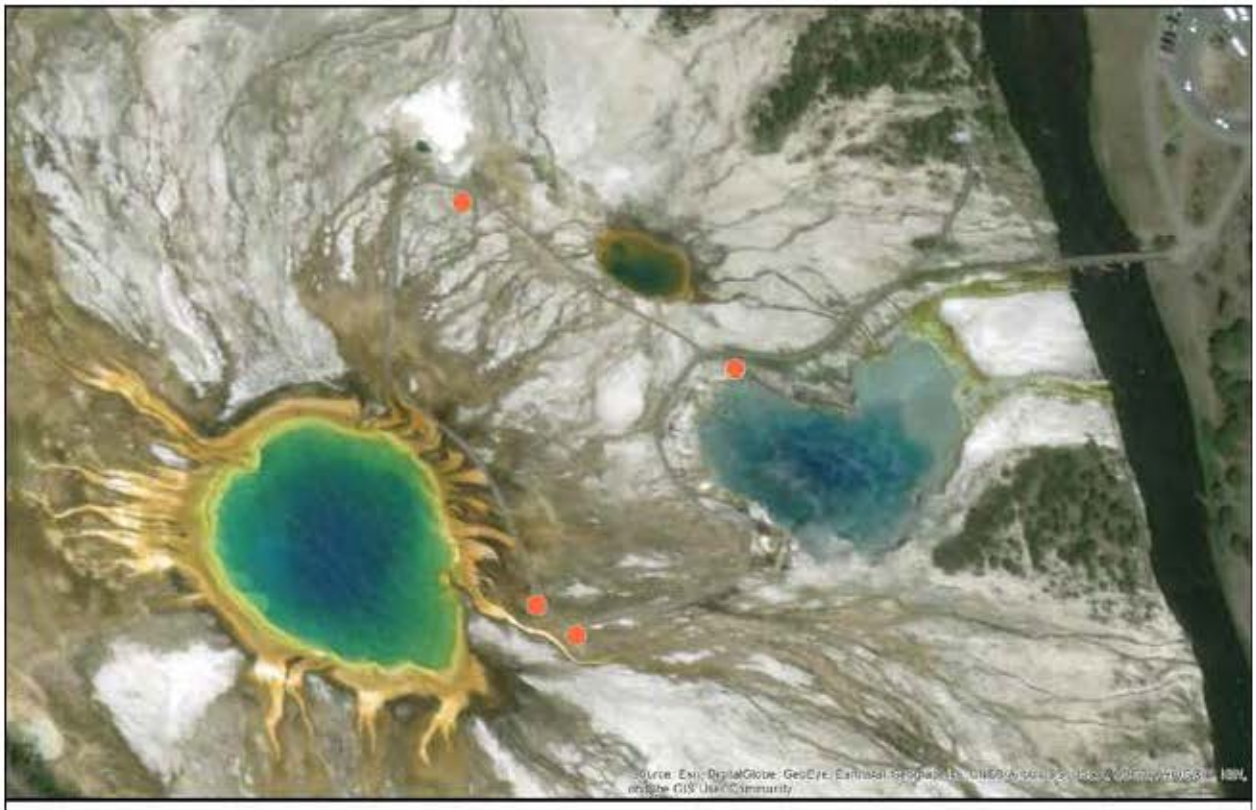
Midway Geyser Basin Visitor Behavior Impacts: Excessive Human Noise

Noise

0 — 200 Meters

0 — 900 Feet

N



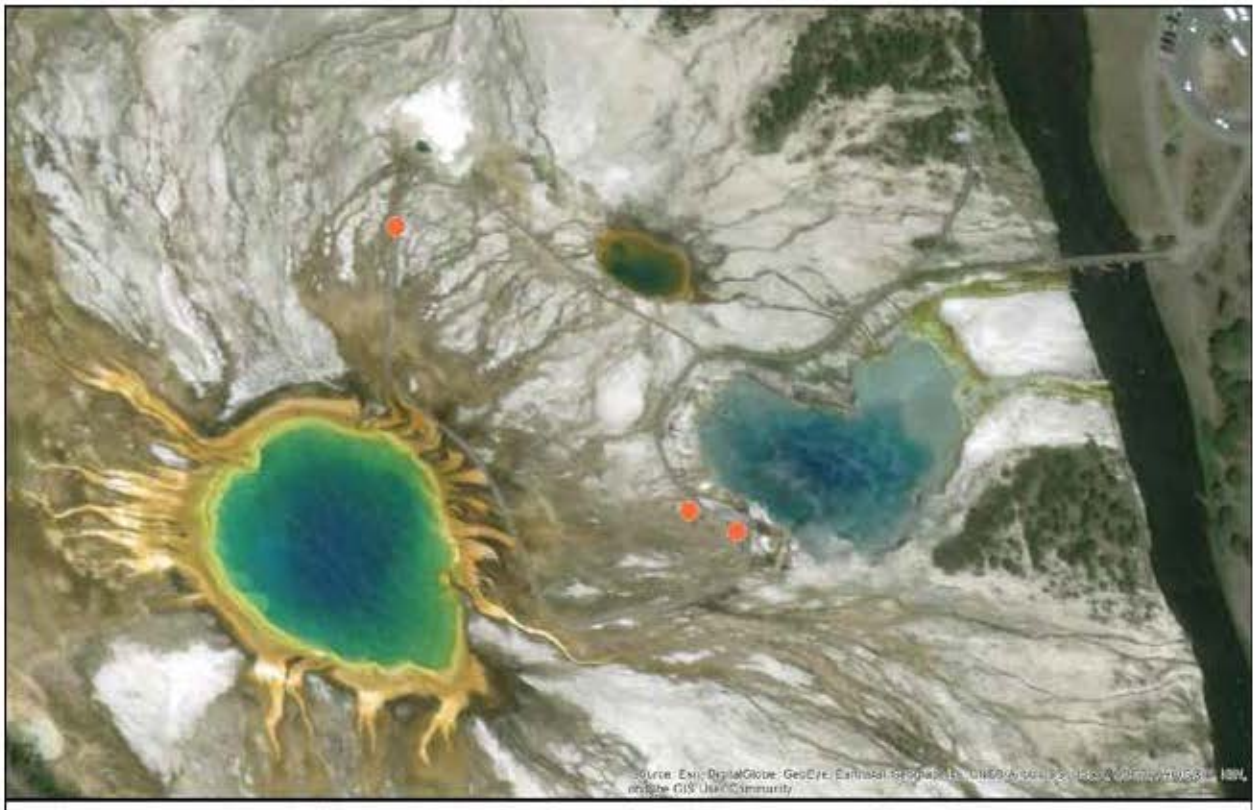
Midway Geyser Basin Visitor Behavior Impacts: Visitor Less Than 1 Meter Off Boardwalk

Visitor Off Boardwalk

0 — 200 Meters

0 — 900 Feet

N



Midway Geyser Basin Visitor Behavior Impacts: Visitor Greater Than 1 Meter Off Boardwalk

Visitor Off Boardwalk

0 — 200 Meters

0 — 900 Feet

N

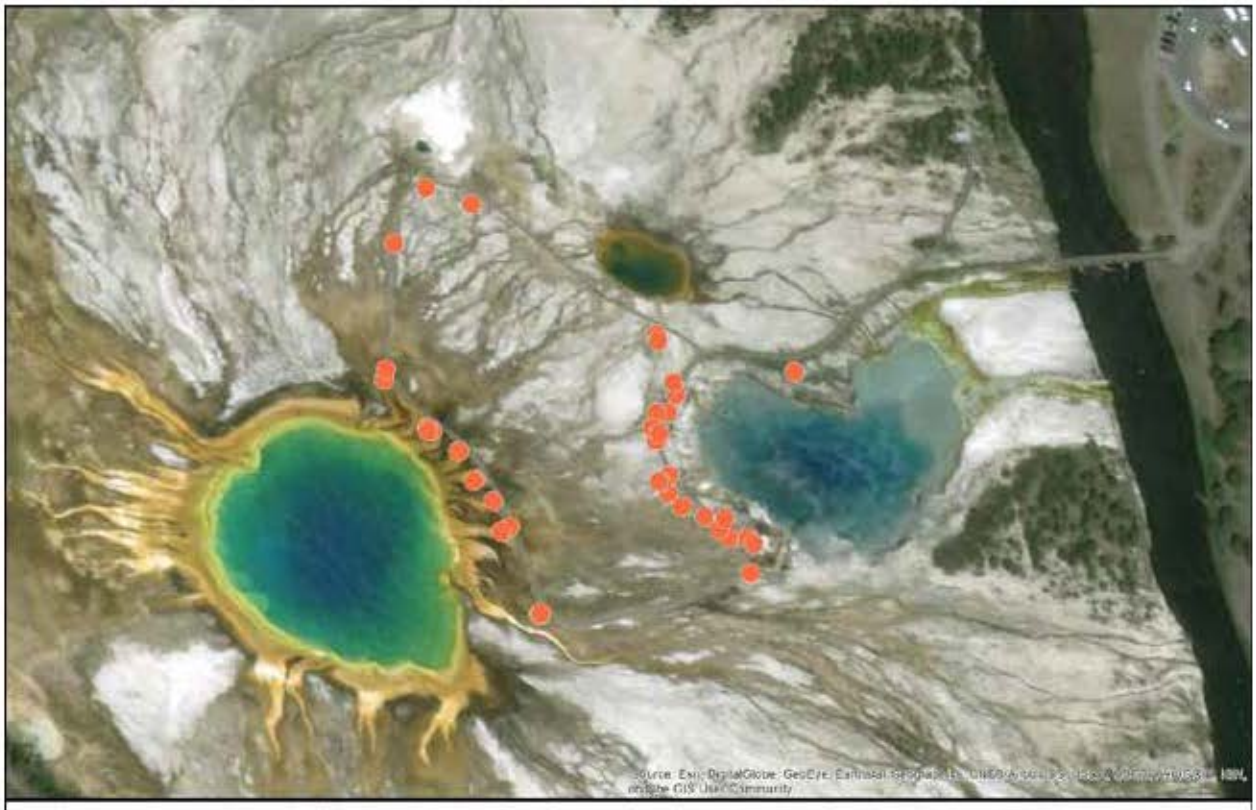
Midway Geyser Basin Visitor Behavior Impacts: Personal Object Dropped into Thermal Area

Object in Thermal Area

0 — 200 Meters

0 — 900 Feet

N



Midway Geyser Basin Visitor Behavior Impacts: Personal Object Observed in Thermal Area

Object in Thermal Area

0 — 200 Meters

0 — 900 Feet

N

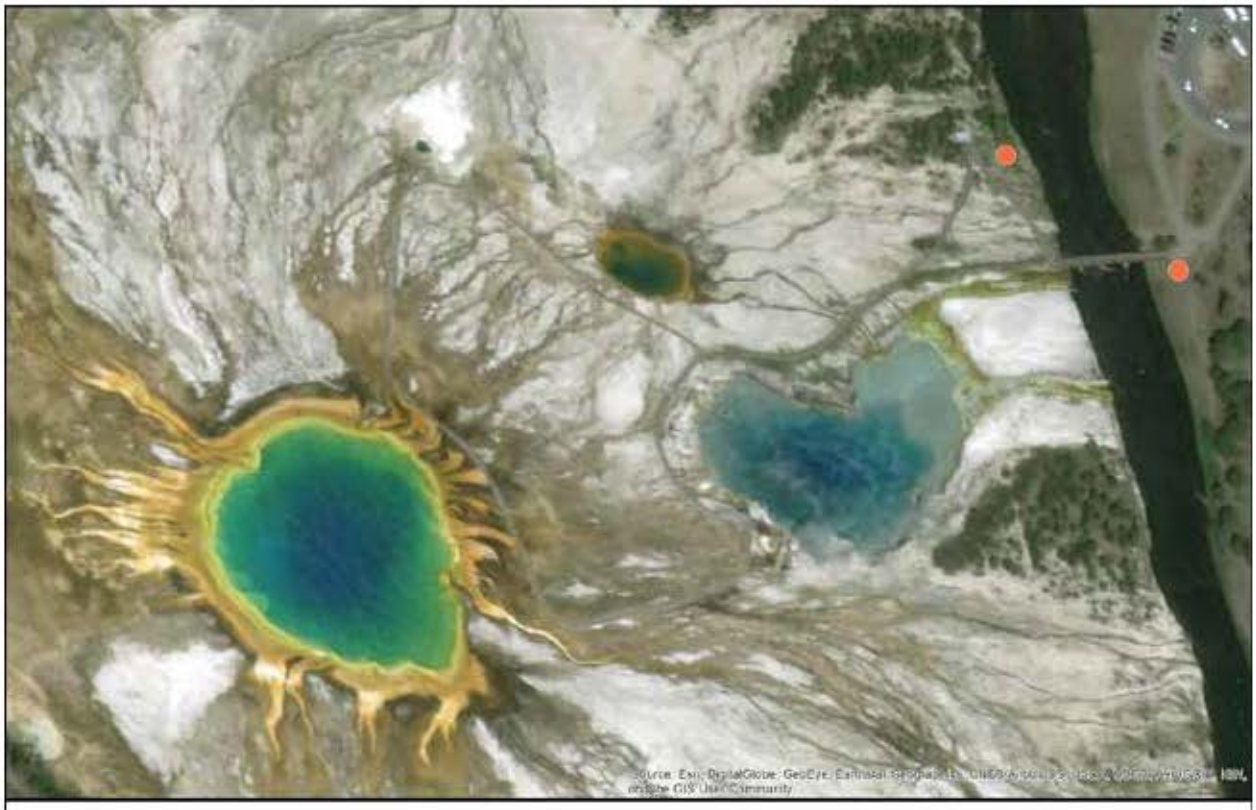
Midway Geyser Basin Visitor Behavior Impacts: Other

Other

0 200 Meters

0 900 Feet

N



Midway Geyser Basin Visitor Behavior Impacts: Pet on Boardwalk

Pet on Boardwalk

0 200 Meters

0 900 Feet

N

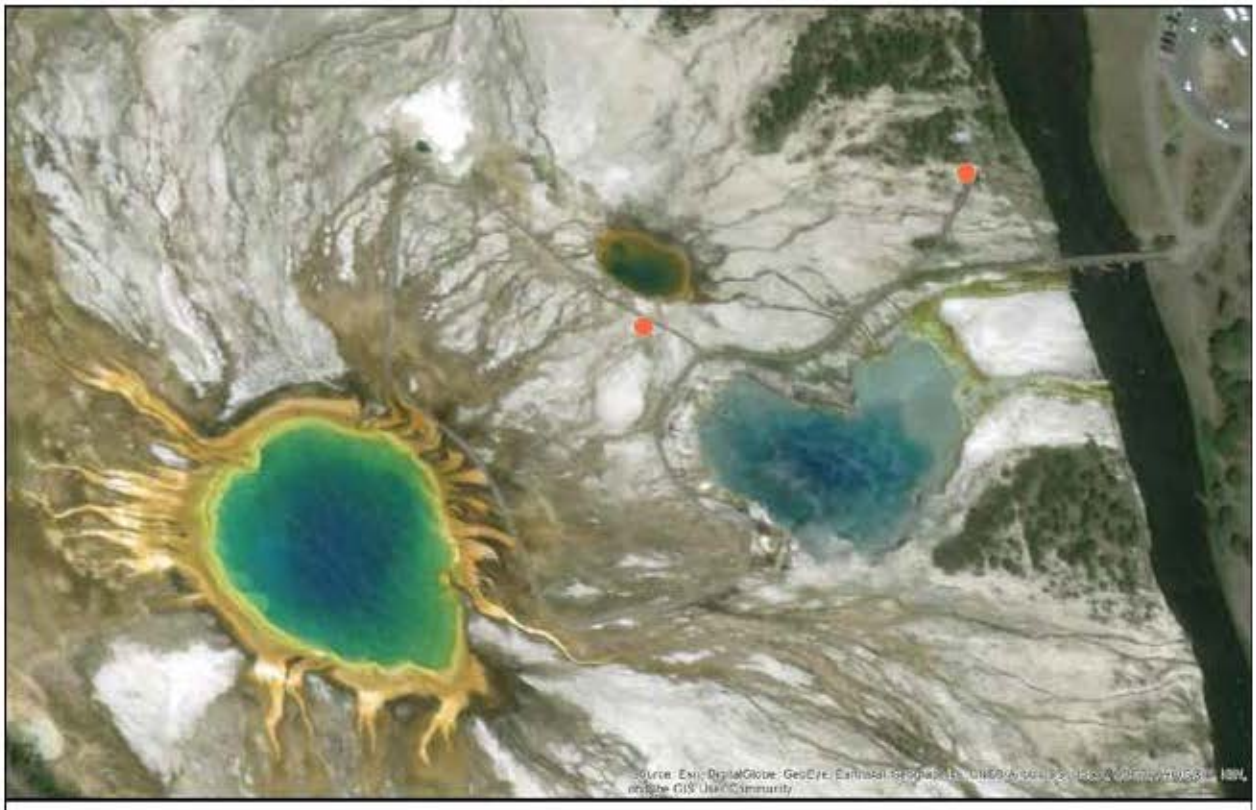
Midway Geyser Basin Visitor Behavior Impacts: Pet off Leash

Pet off Leash

0 — 200 Meters

0 — 900 Feet

N



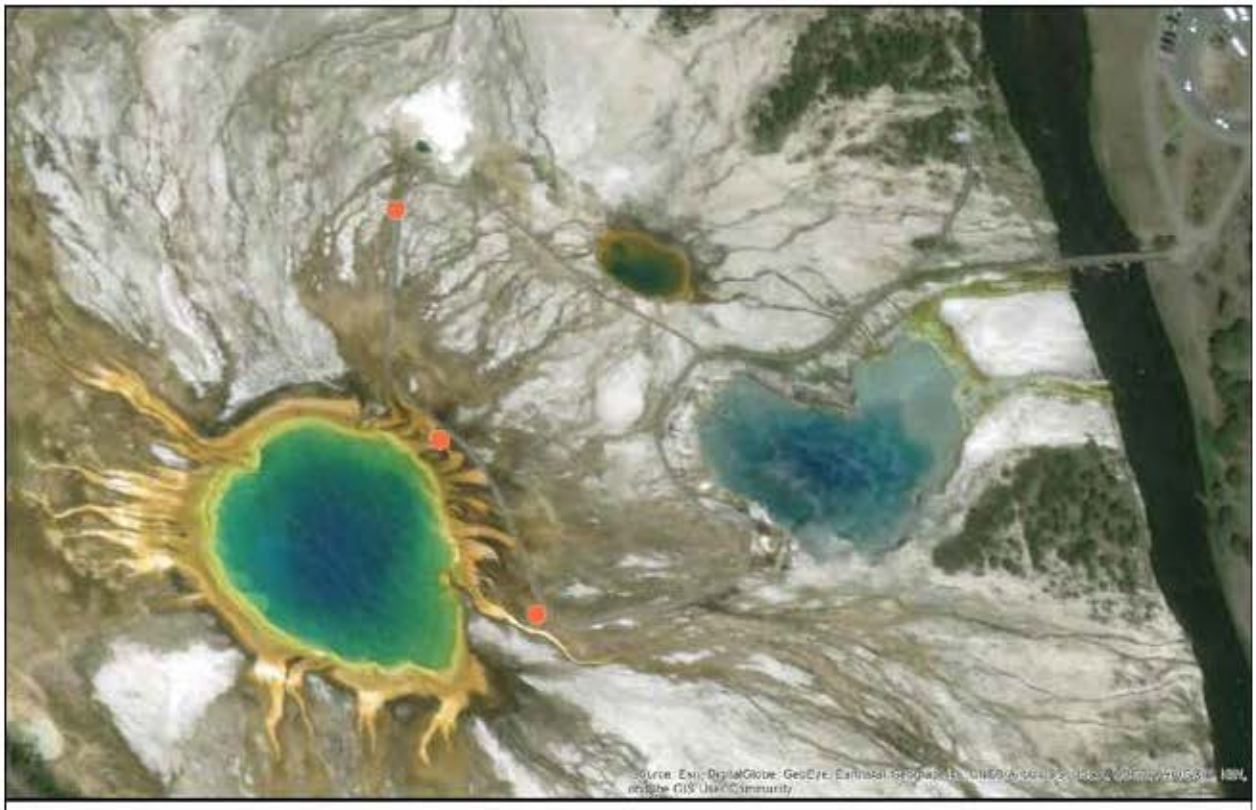
Midway Geyser Basin Visitor Behavior Impacts: Roughhousing

Roughhousing

0 — 200 Meters

0 — 900 Feet

N



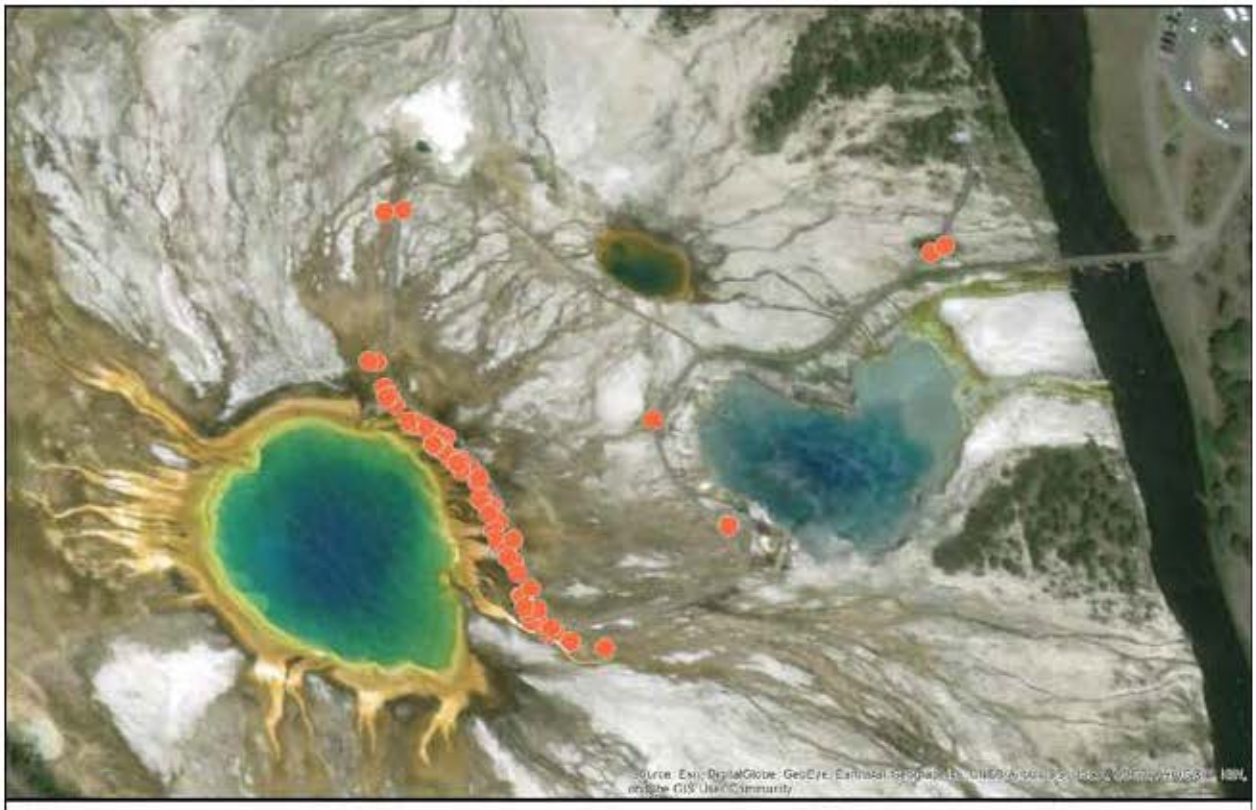
Midway Geyser Basin Visitor Behavior Impacts: Drawing Graffiti in Thermal Mat

Drawing Graffiti

0 200 Meters

0 900 Feet

N



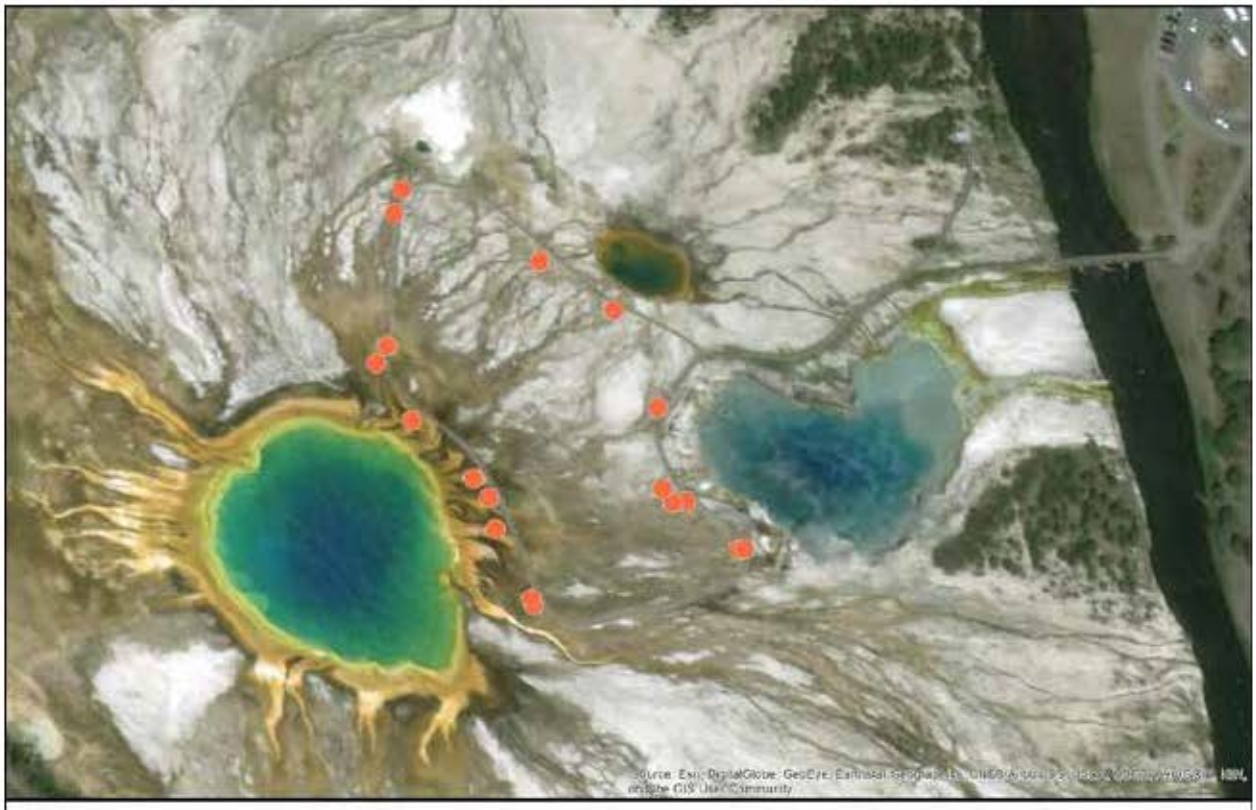
Midway Geyser Basin Visitor Behavior Impacts: Graffiti Observed in Thermal Mat

Graffiti

0 200 Meters

0 900 Feet

N



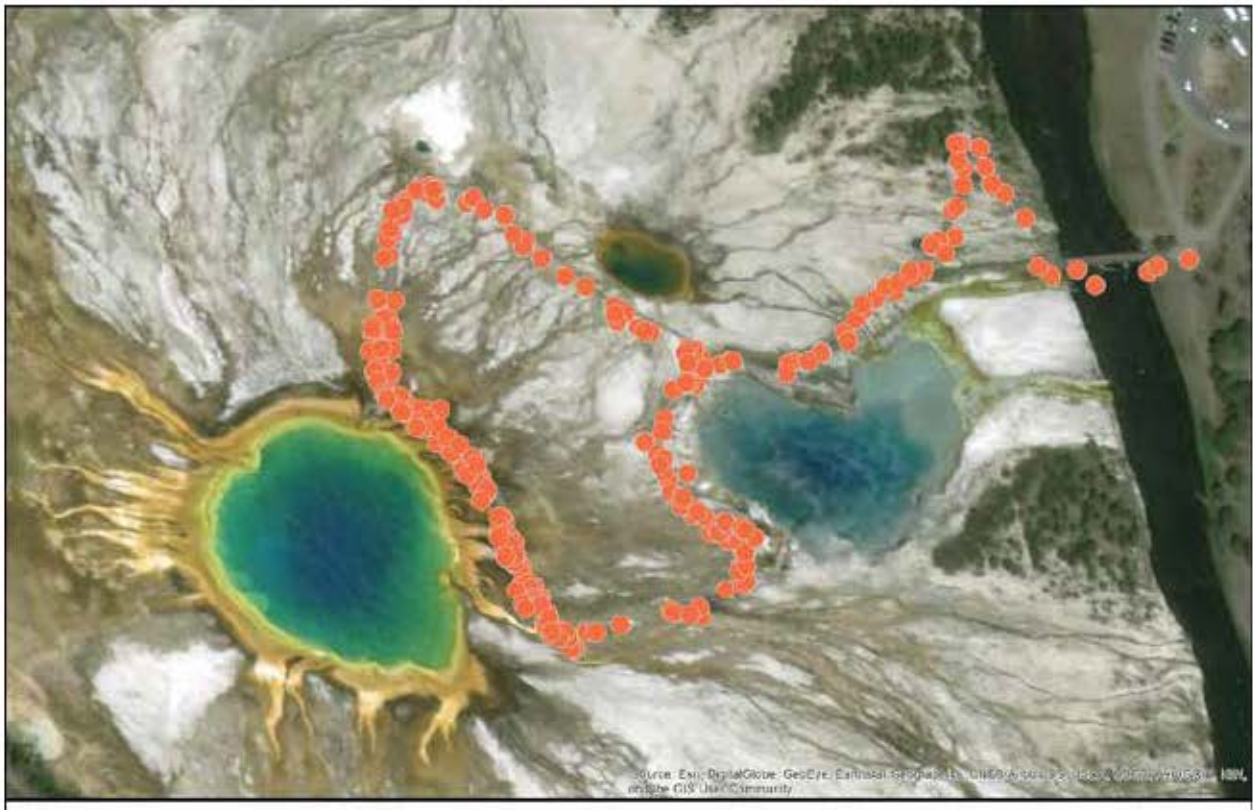
Midway Geyser Basin Visitor Behavior Impacts: Visitor Littering in Thermal Area

Littering

0 — 200 Meters

0 — 900 Feet

N



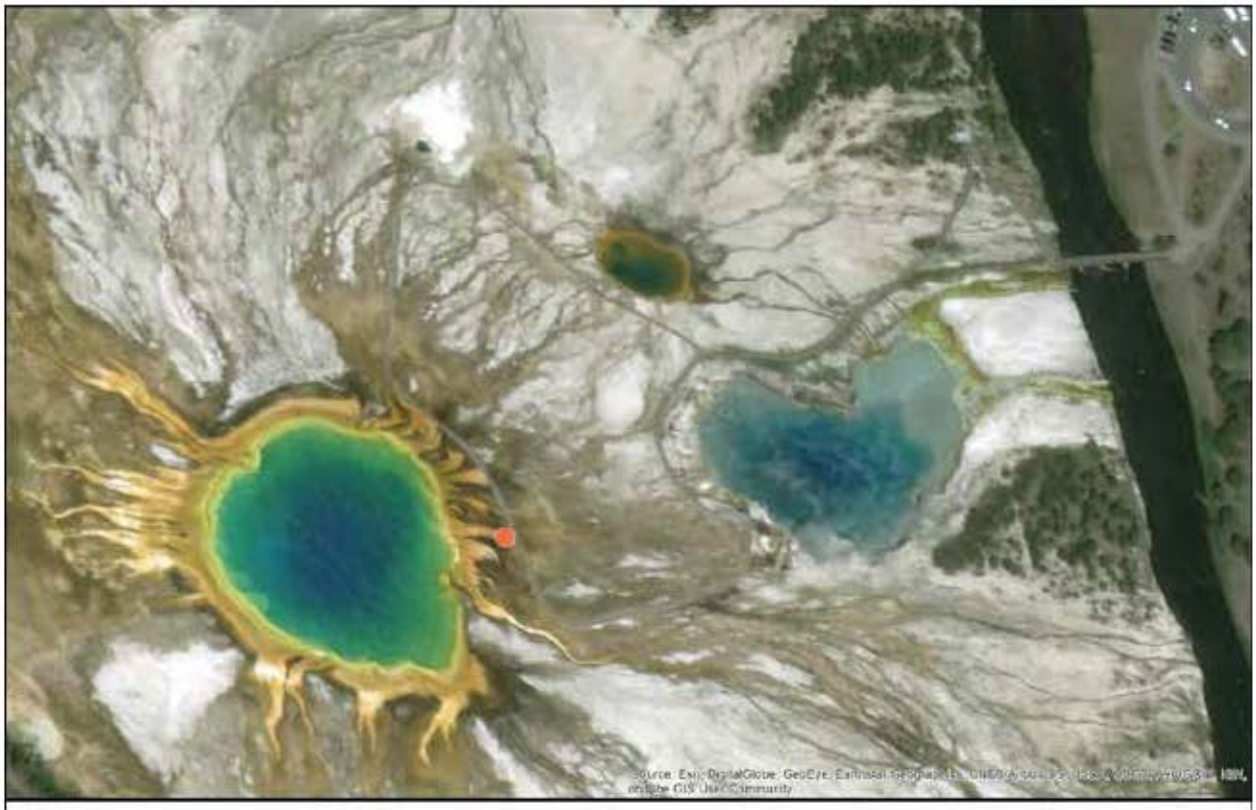
Midway Geyser Basin Visitor Behavior Impacts: Litter Observed in Thermal Area

Litter

0 — 200 Meters

0 — 900 Feet

N



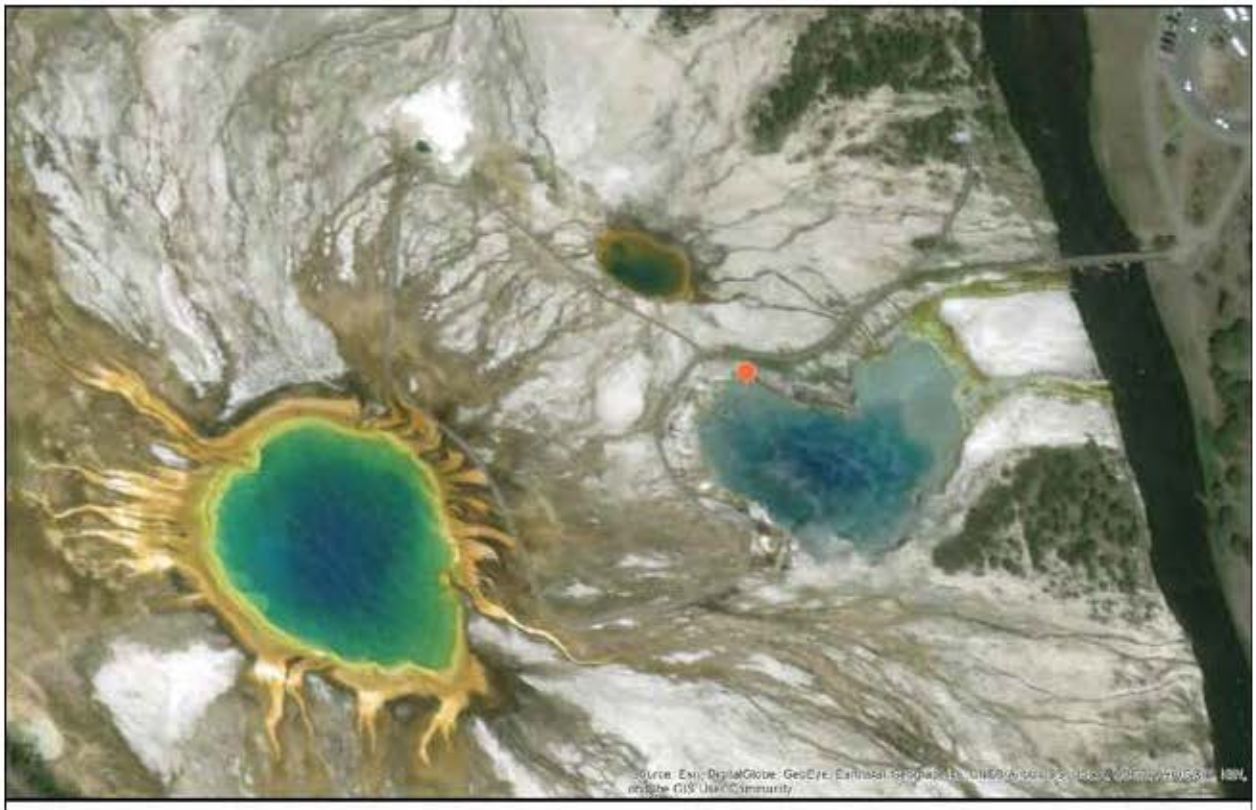
Midway Geyser Basin Visitor Behavior Impacts: Object Observed in Thermal Area

Object Observation

0 — 200 Meters

0 — 900 Feet

N



Midway Geyser Basin Visitor Behavior Impacts: Visitor Less than 5 Meters from Wildlife

Visitor Near Wildlife

0 — 200 Meters

0 — 900 Feet

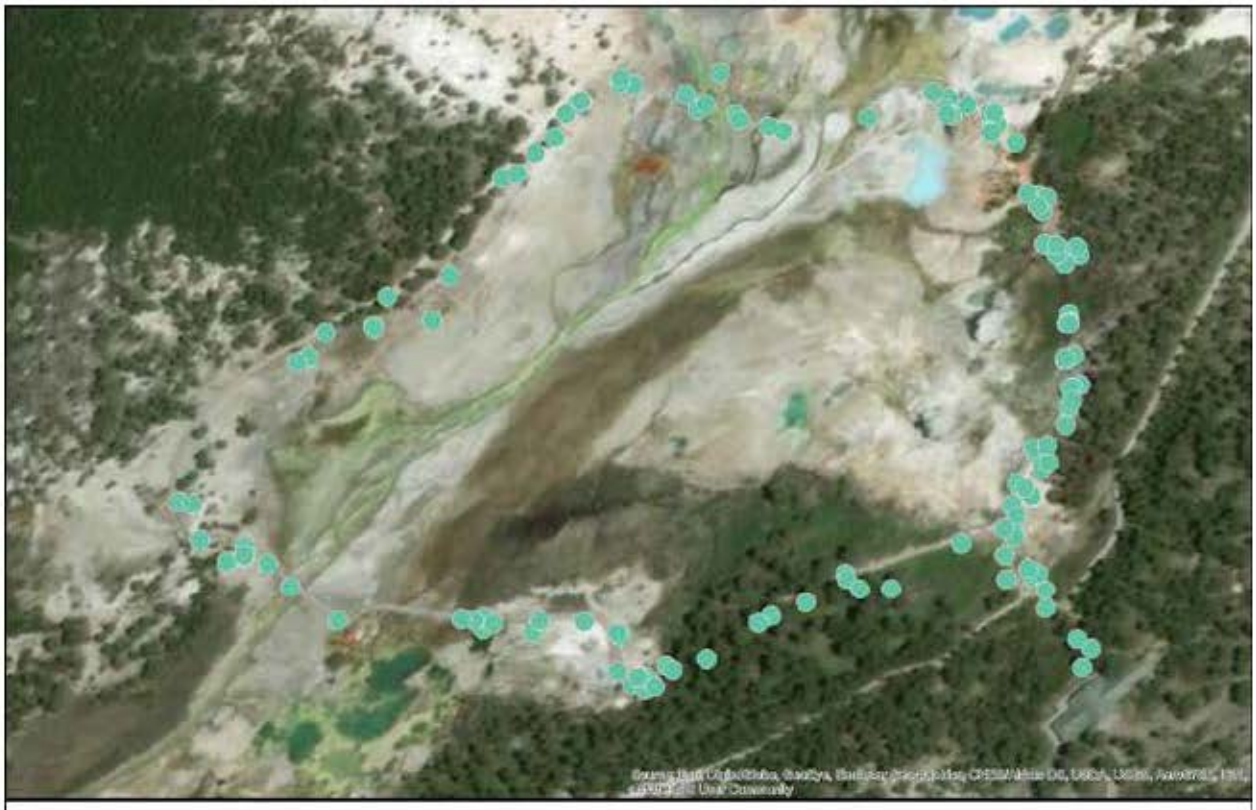
N

Norris Geyser Basin Visitor Behavior Impacts: Footprint in Thermal Area

Footprint

0 100 Meters

0 500 Feet

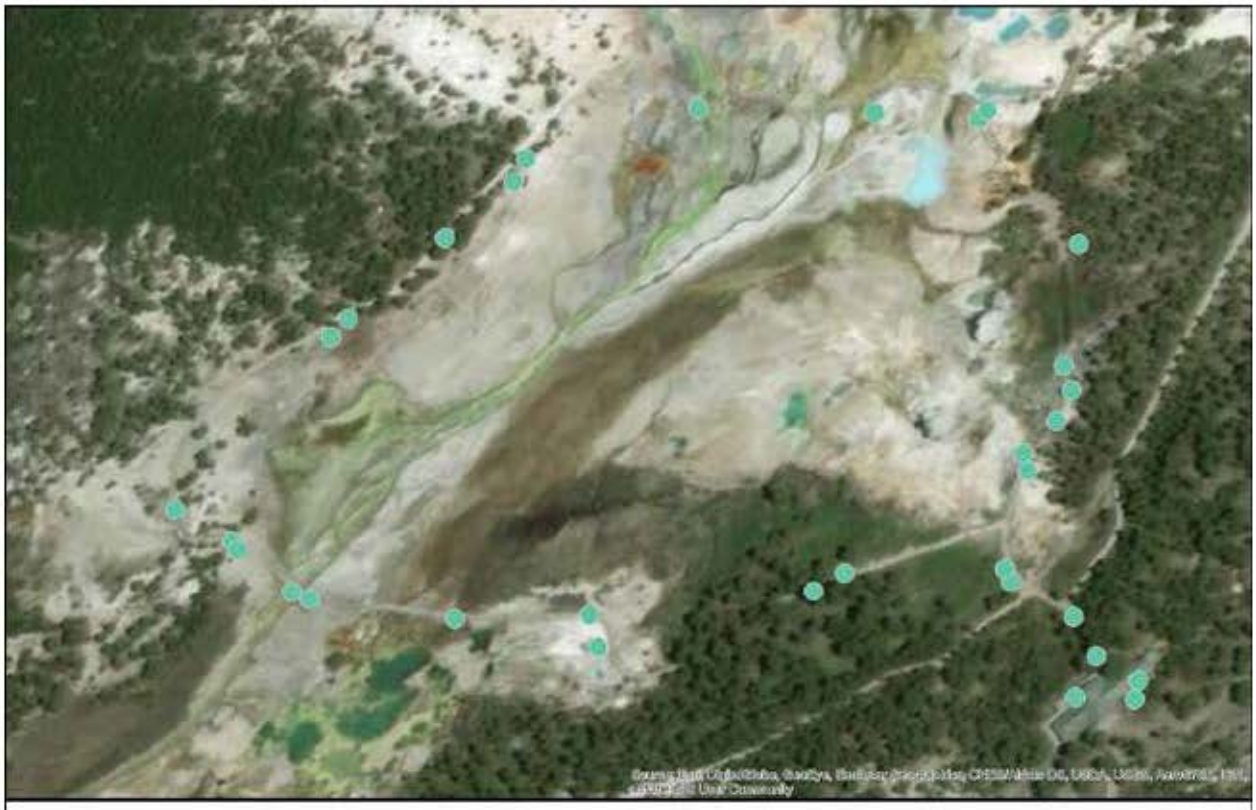


Norris Geyser Basin Visitor Behavior Impacts: Litter Observed in Other Area

Observed Litter

0 100 Meters

0 500 Feet



Norris Geyser Basin Visitor Behavior Impacts: Visitor Less Than 1 Meter Off Boardwalk

Visitor Off Boardwalk

0 100 Meters

0 500 Feet

Norris Geyser Basin Visitor Behavior Impacts: Visitor Observed in Other Closed Area

Observed Visitor

0 100 Meters

0 500 Feet

N

Norris Geyser Basin Visitor Behavior Impacts: Personal Object in Thermal Area

Observed Object

0 — 100 Meters

0 — 500 Feet

N

Norris Geyser Basin Visitor Behavior Impacts: Other

Other

0 100 Meters

0 500 Feet

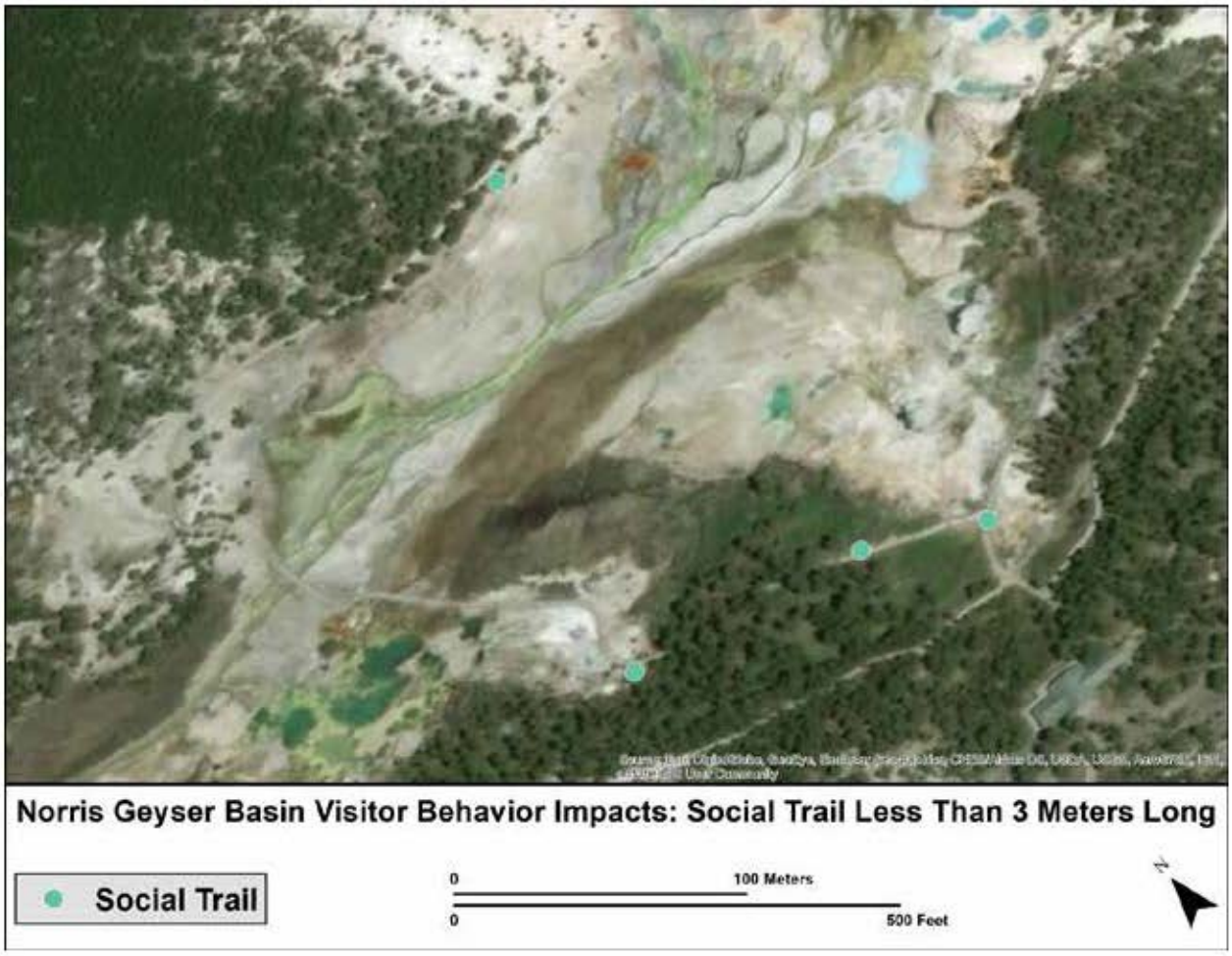
Norris Geyser Basin Visitor Behavior Impacts: Roughhousing

Roughhousing

0 100 Meters

0 500 Feet

N


Norris Geyser Basin Visitor Behavior Impacts: Social Trail Less Than 3 Meters Long
Social Trail
0
100 Meters
0
500 Feet

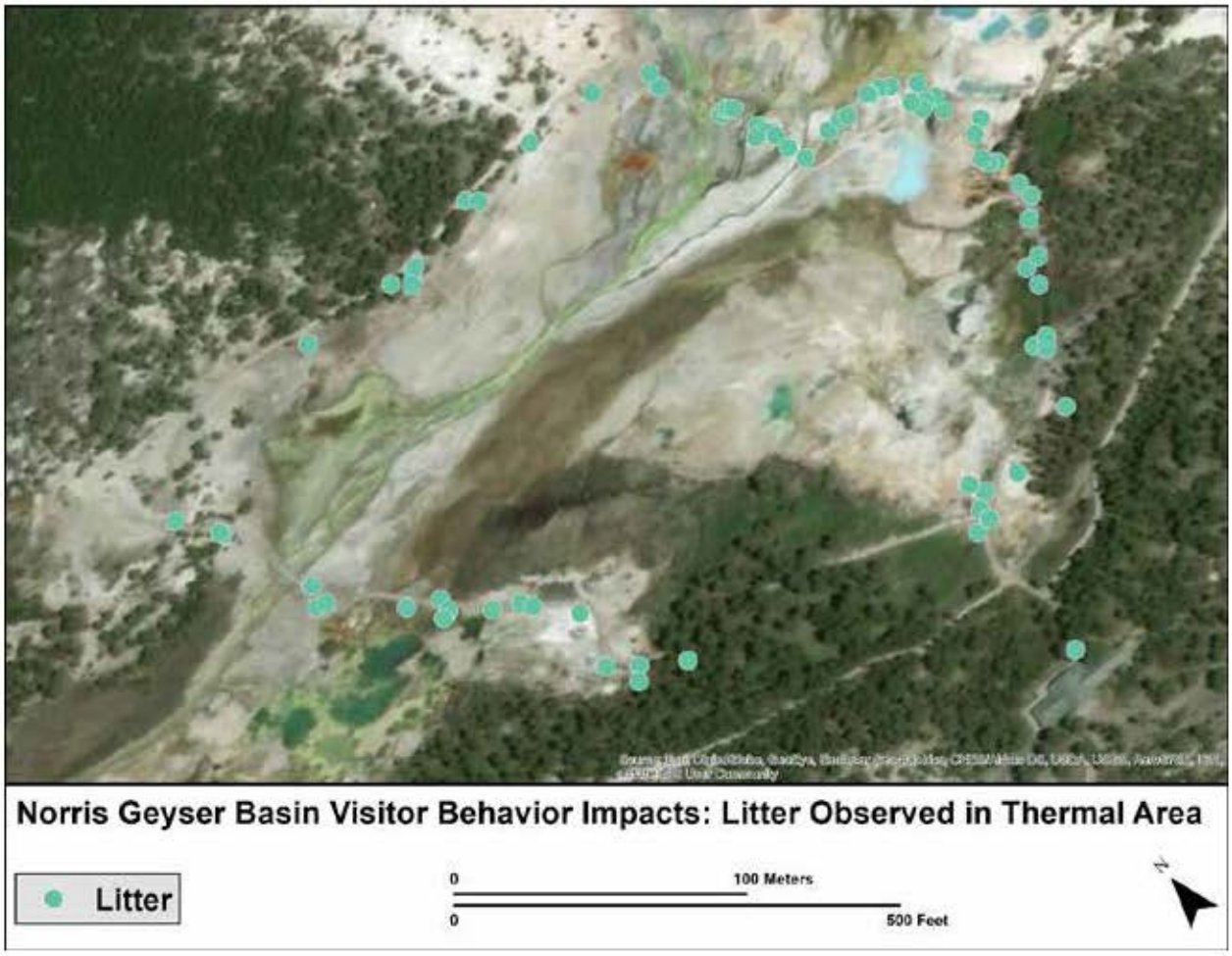
Norris Geyser Basin Visitor Behavior Impacts: Graffiti Observed in Thermal Mat

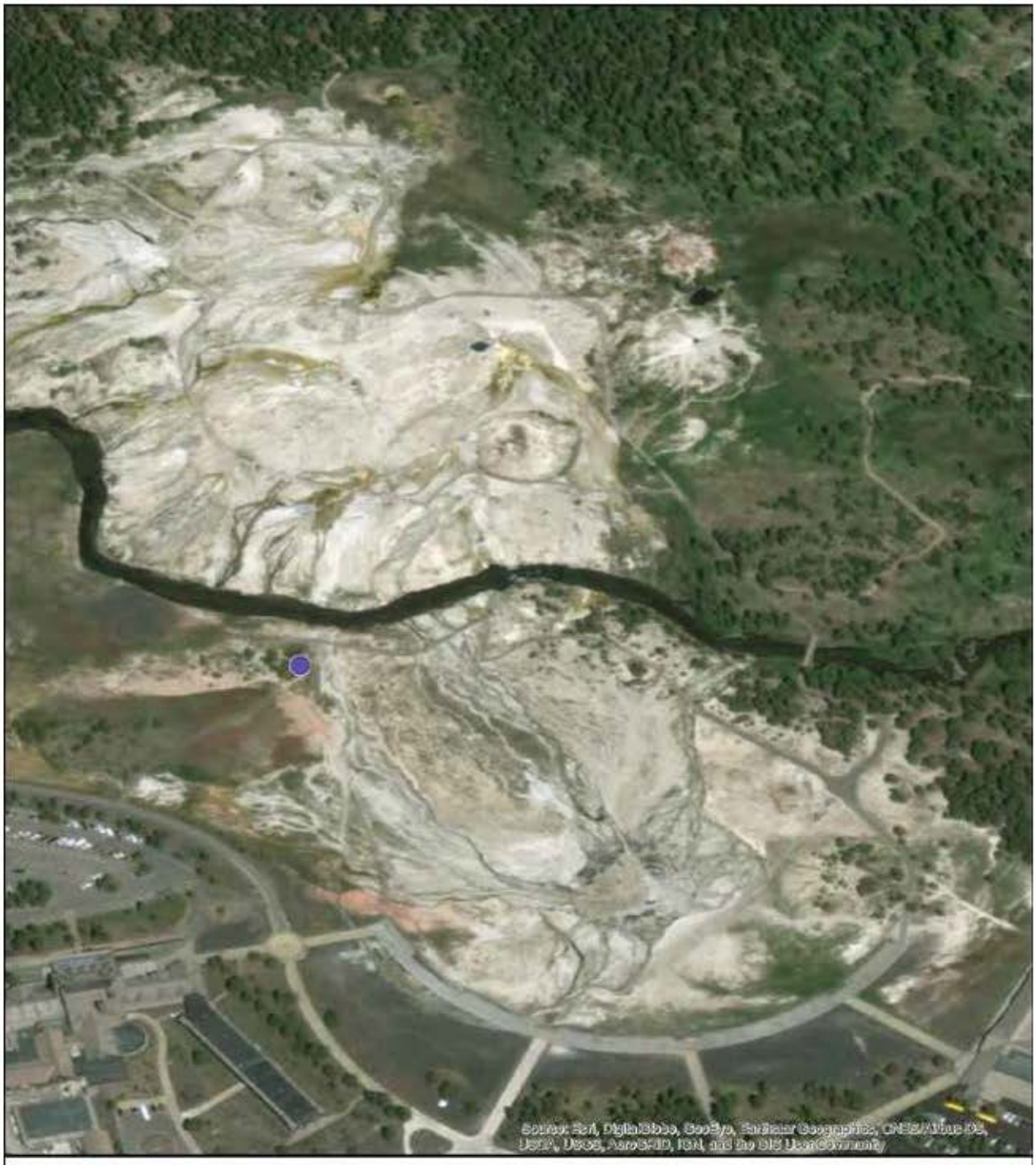
Graffiti

0 100 Meters

0 500 Feet

N


Norris Geyser Basin Visitor Behavior Impacts: Litter Observed in Thermal Area
Litter
0
100 Meters
0
500 Feet



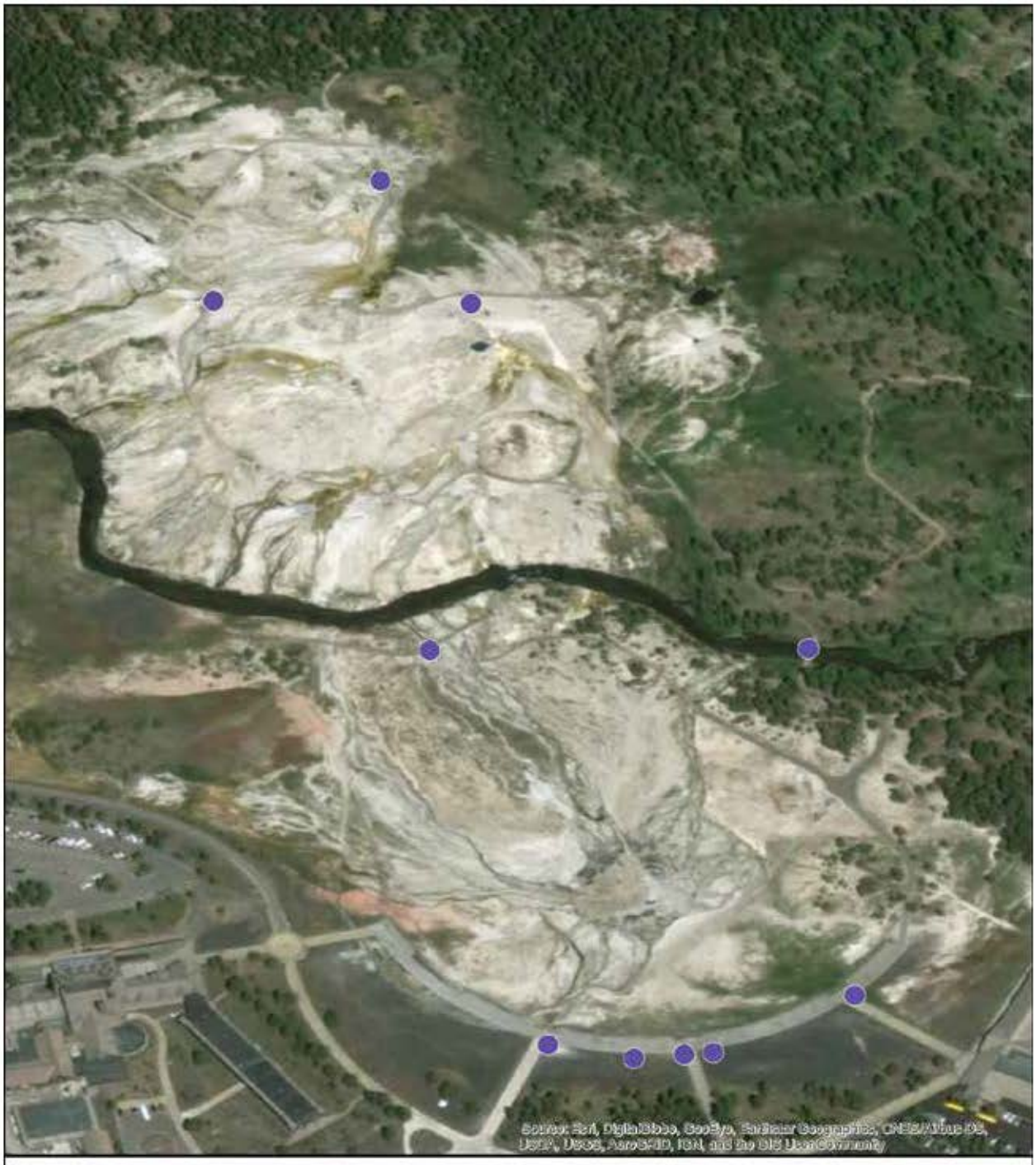
Old Faithful Visitor Behavior Impacts: Verbal Visitor Conflict

Visitor Conflict

0 100 200 Meters

0 1,000 Feet

N



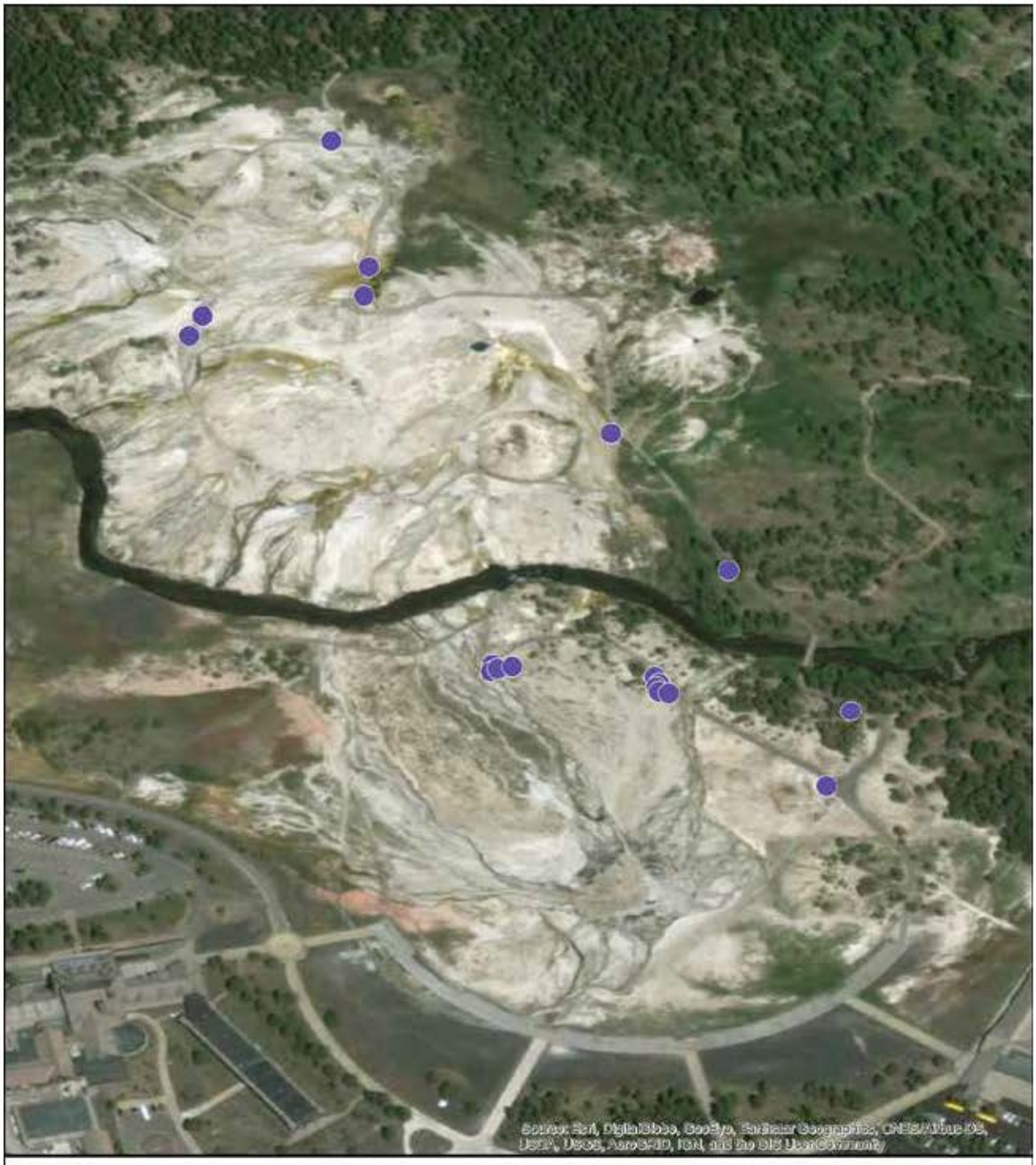
Old Faithful Visitor Behavior Impacts: Groups Obstructing Flow of Others

Flow Obstruction

0 100 200 Meters

0 1,000 Feet

N



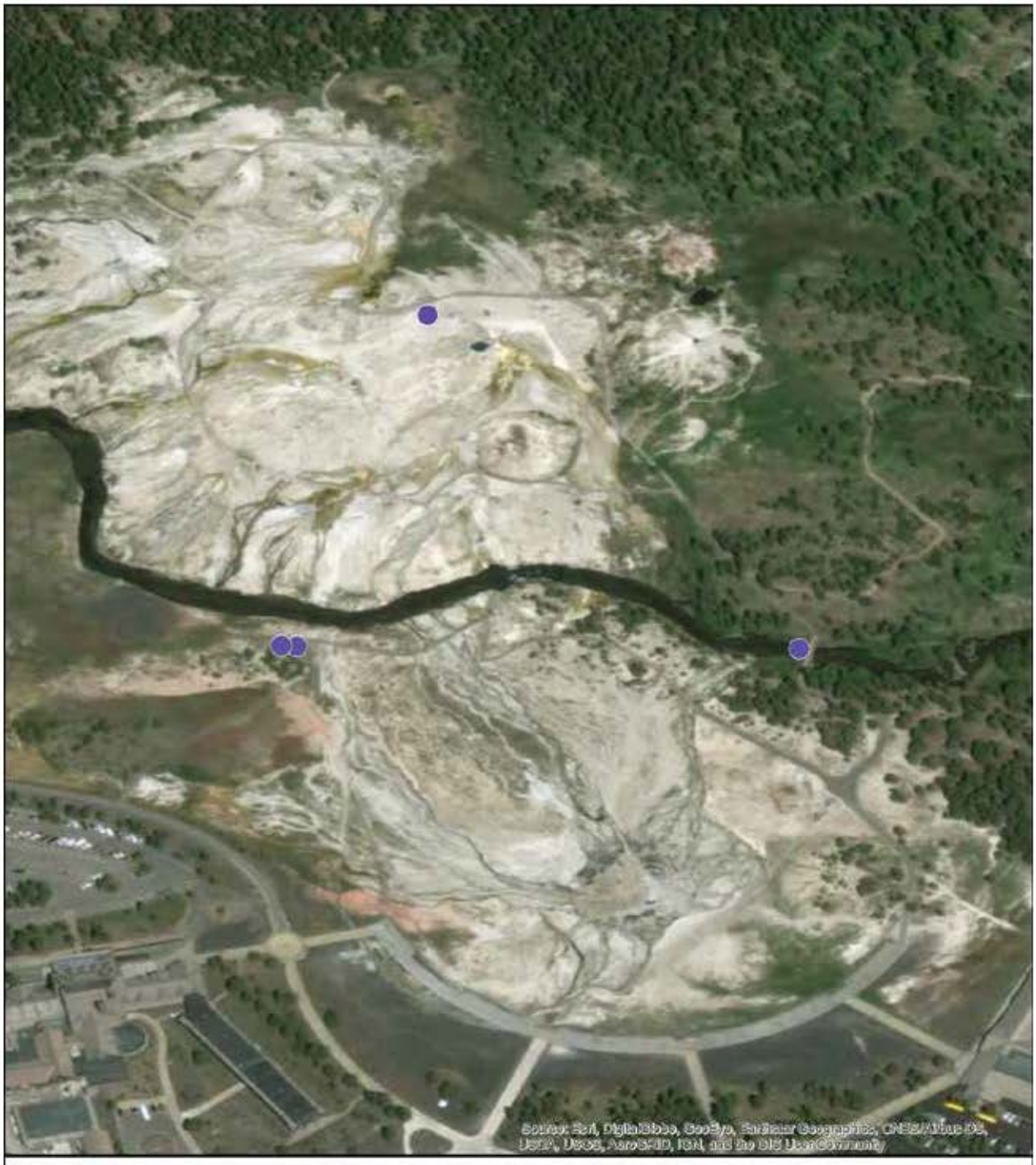
Old Faithful Visitor Behavior Impacts: Footprint in Thermal Area

Footprint

0 100 200 Meters

0 1,000 Feet

N



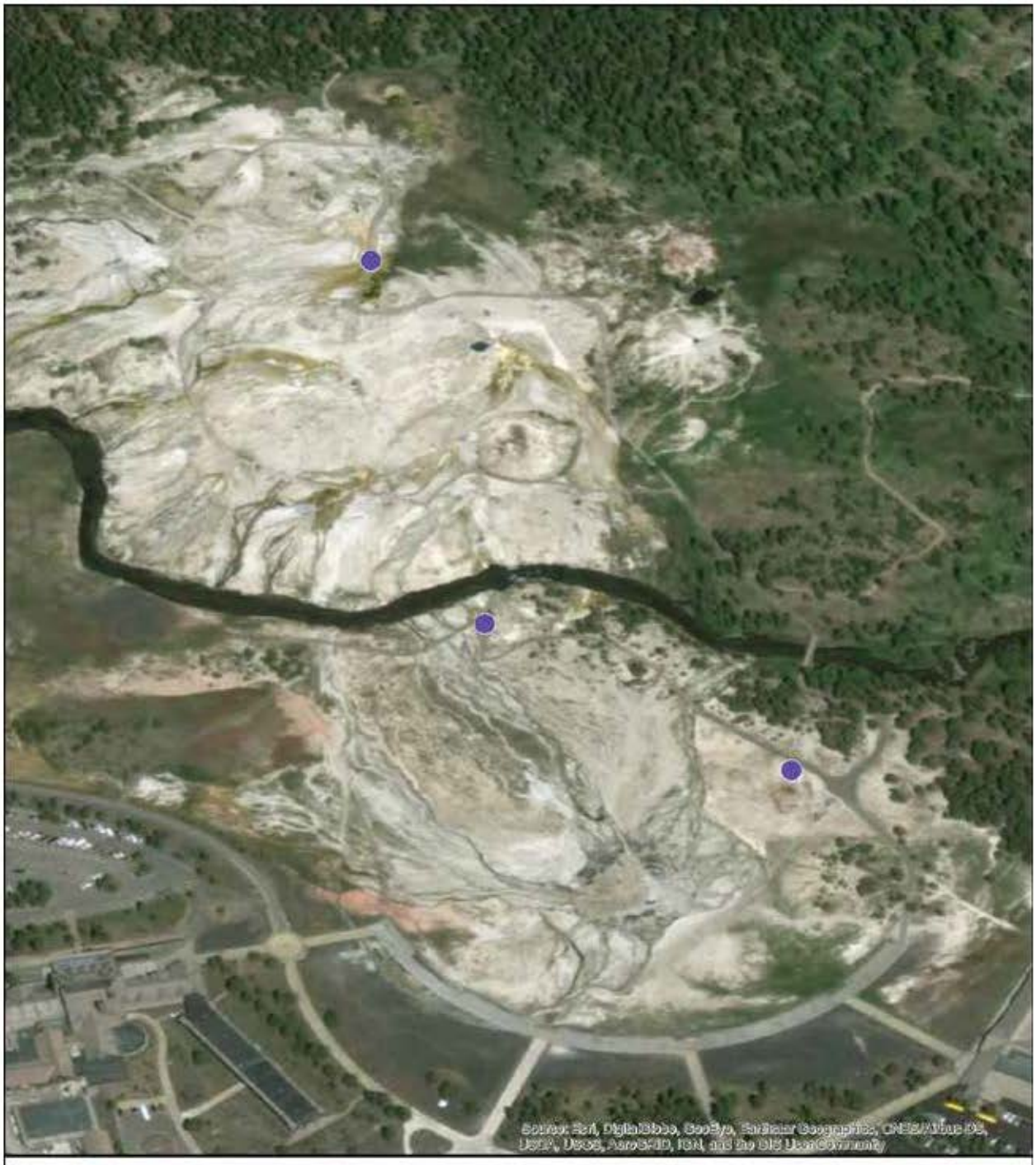
Old Faithful Visitor Behavior Impacts: Graffiti Observed in Other Area

Graffiti

0 100 200 Meters

0 1,000 Feet

N



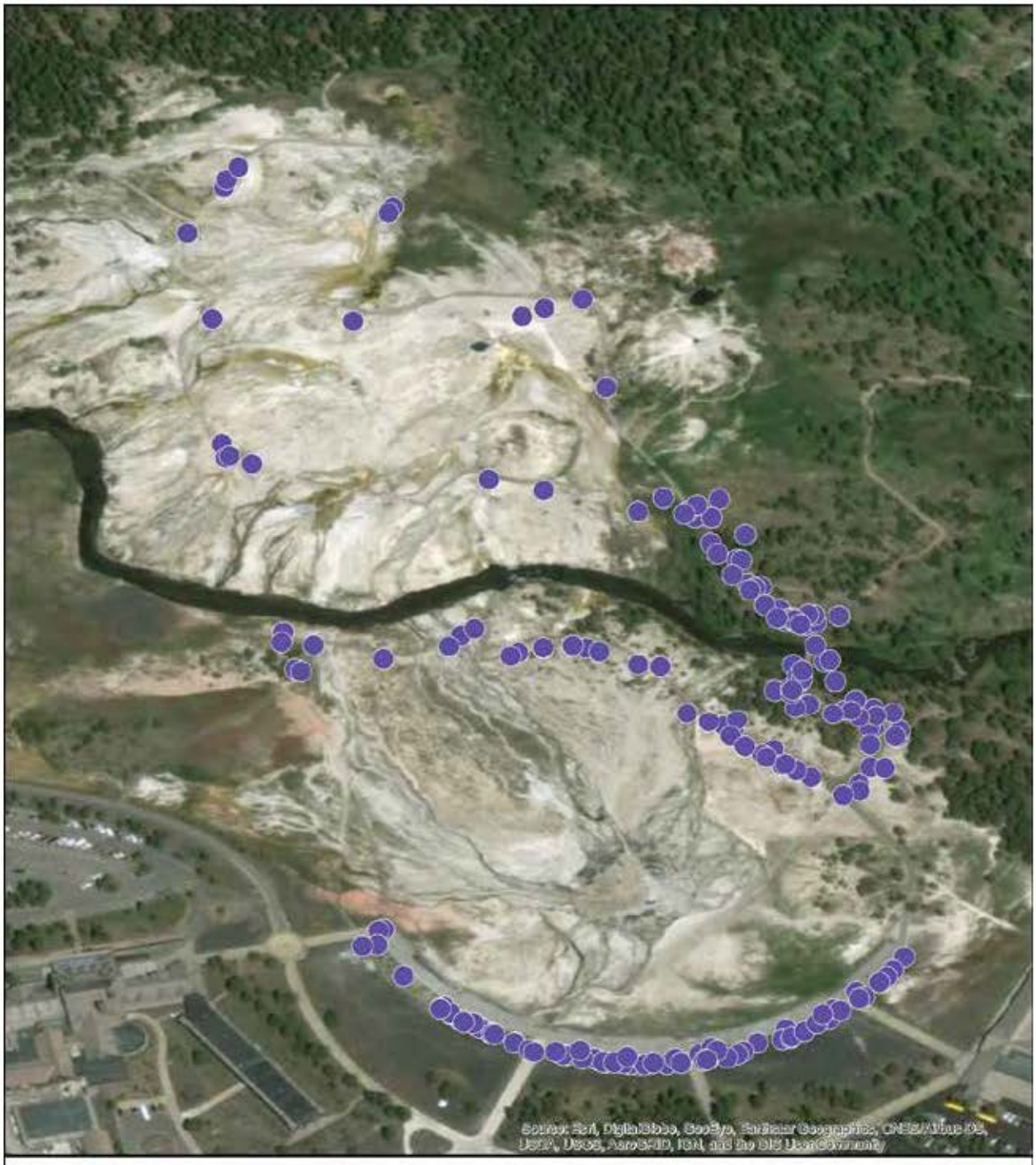
Old Faithful Visitor Behavior Impacts: Visitor Littering in Other Area

● Observed Littering

0 100 200 Meters

0 1,000 Feet

N



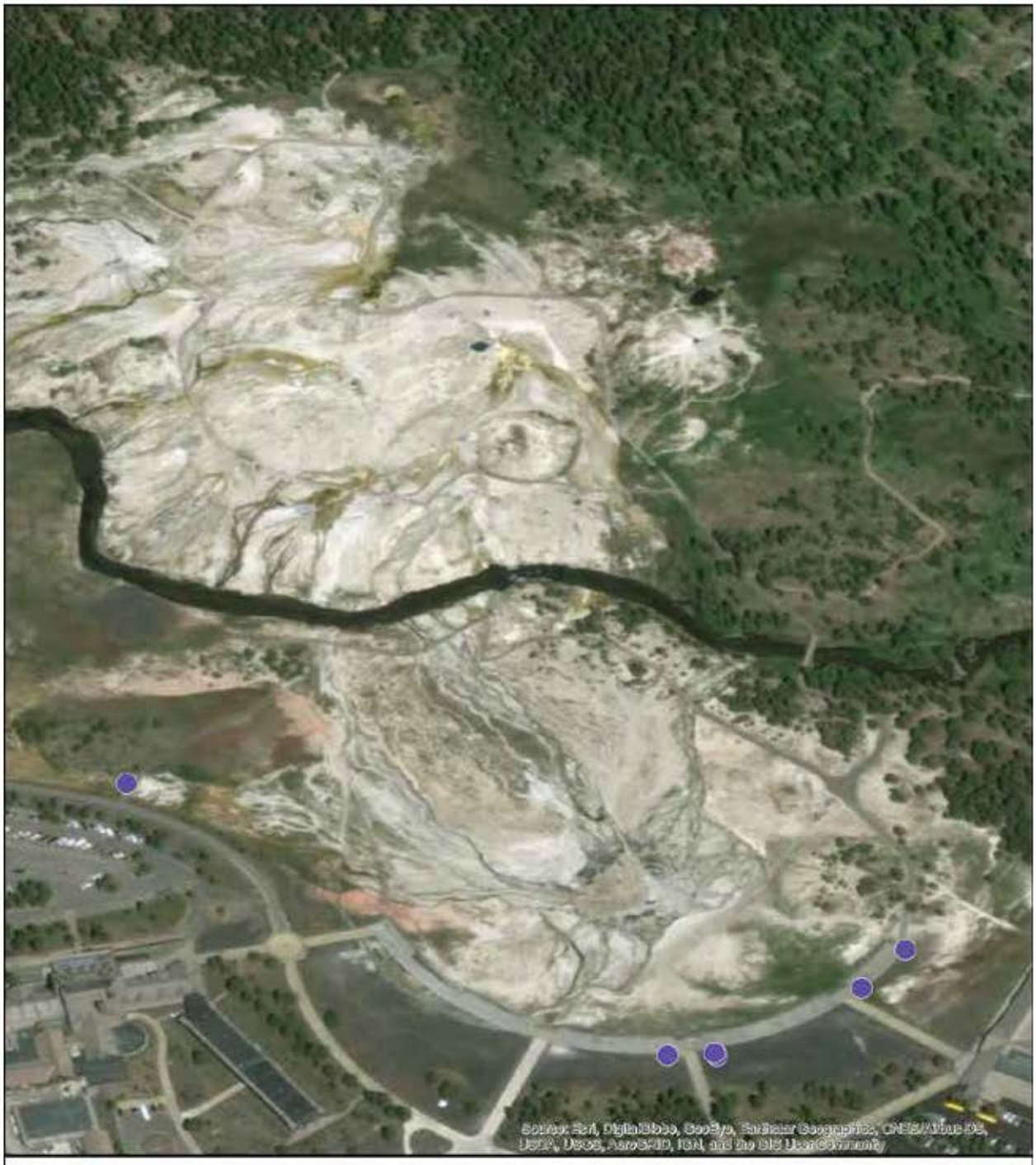
Old Faithful Visitor Behavior Impacts: Litter Observed in Other Area

Litter

0 100 200 Meters

0 1,000 Feet

N



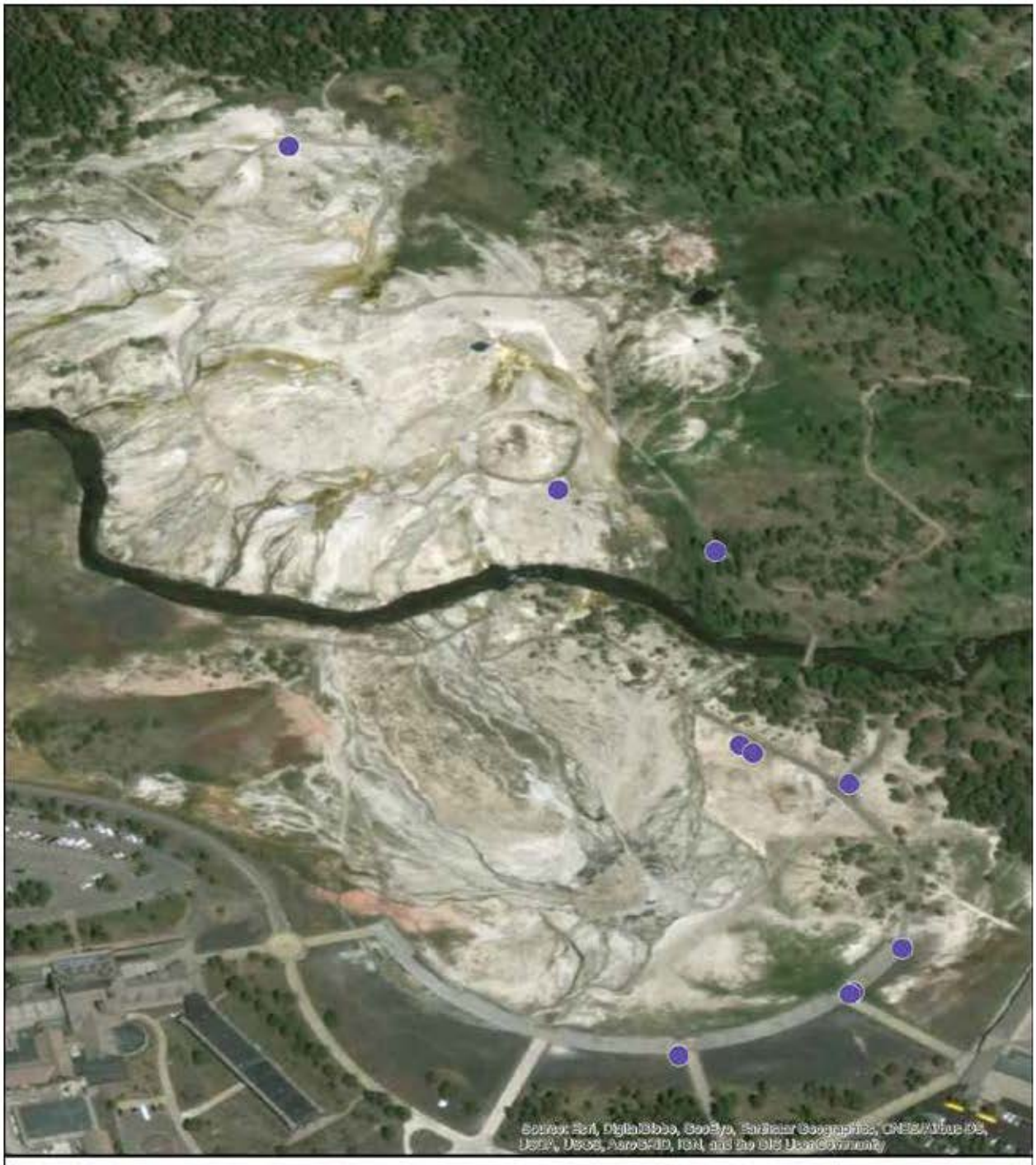
Old Faithful Visitor Behavior Impacts: Other Excessive Human Noise

Noise

0 100 200 Meters

0 1,000 Feet

N



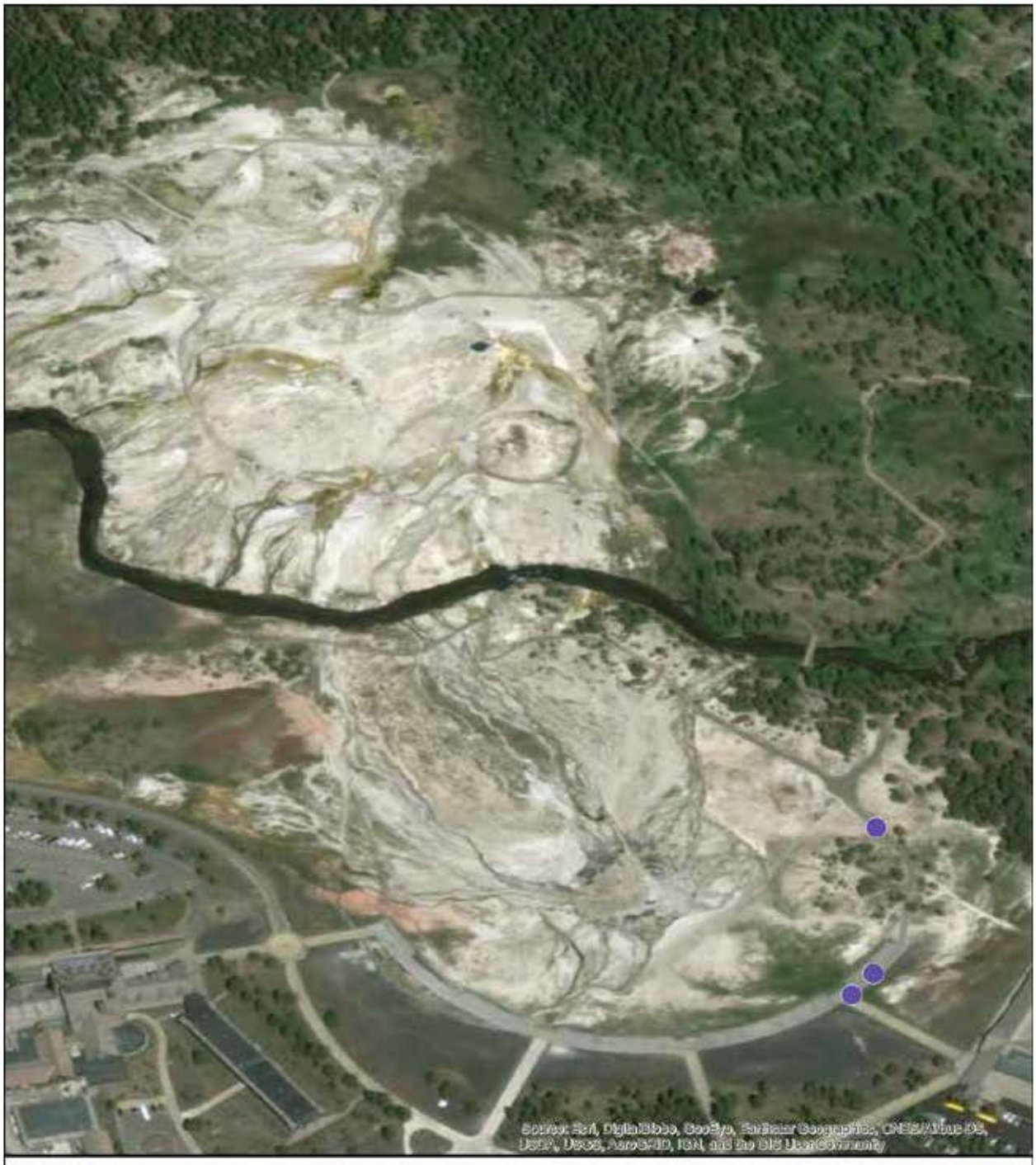
Old Faithful Visitor Behavior Impacts: Visitor Less Than 1 Meter Off Boardwalk

● Visitor Off Boardwalk

0 100 200 Meters

0 1,000 Feet

N



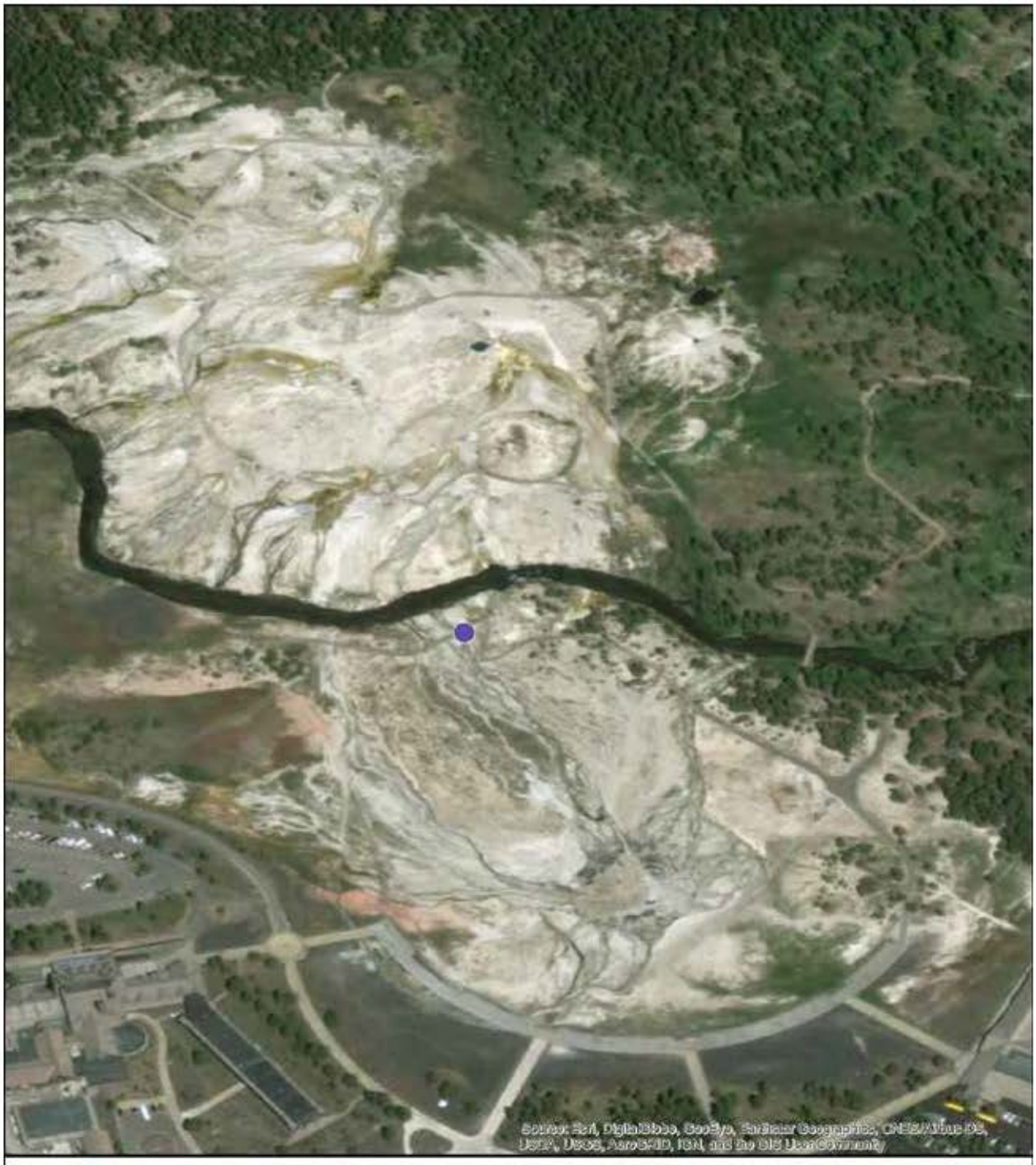
Old Faithful Visitor Behavior Impacts: Visitor More Than 1 Meter Off Boardwalk

● Visitor Off Boardwalk

0 100 200 Meters

0 1,000 Feet

N



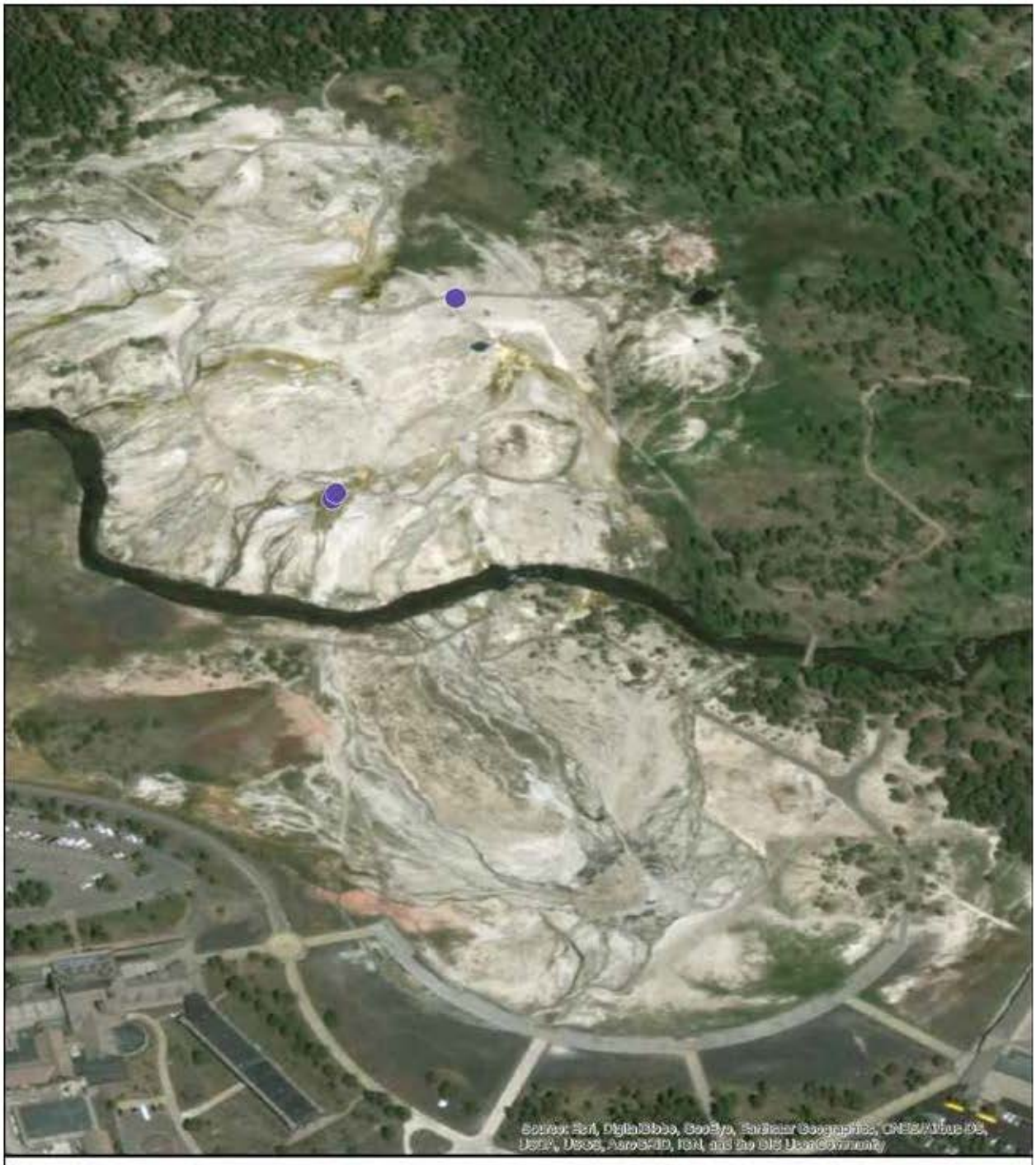
Old Faithful Visitor Behavior Impacts: Personal Object Dropped into Thermal Area

● Object in Thermal Area

0 100 200 Meters

0 1,000 Feet

N



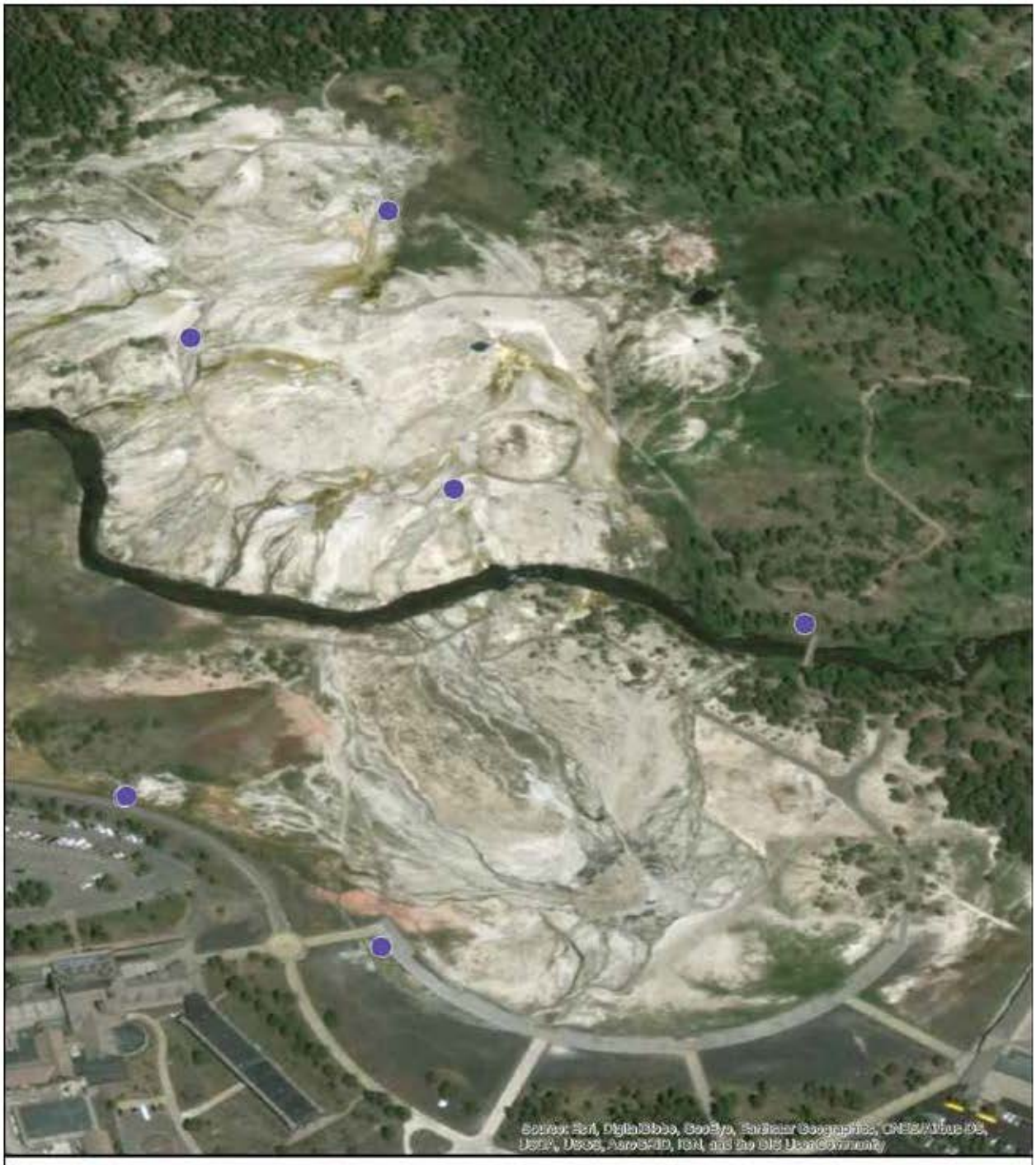
Old Faithful Visitor Behavior Impacts: Personal Object Observed in Thermal Area

● Personal Object

0 100 200 Meters

0 1,000 Feet

N



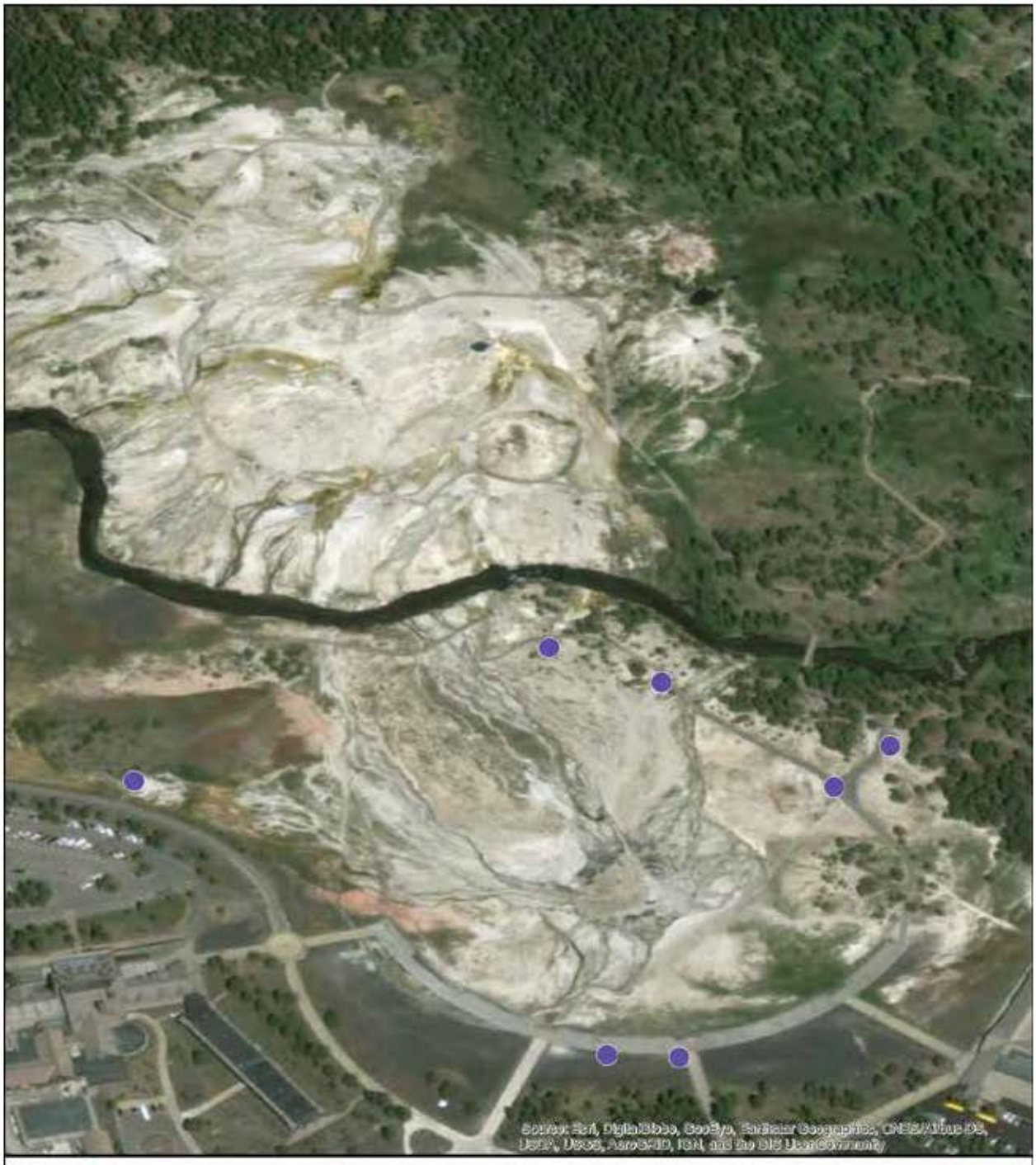
Old Faithful Visitor Behavior Impacts: Other

Other

0 100 200 Meters

0 1,000 Feet

N



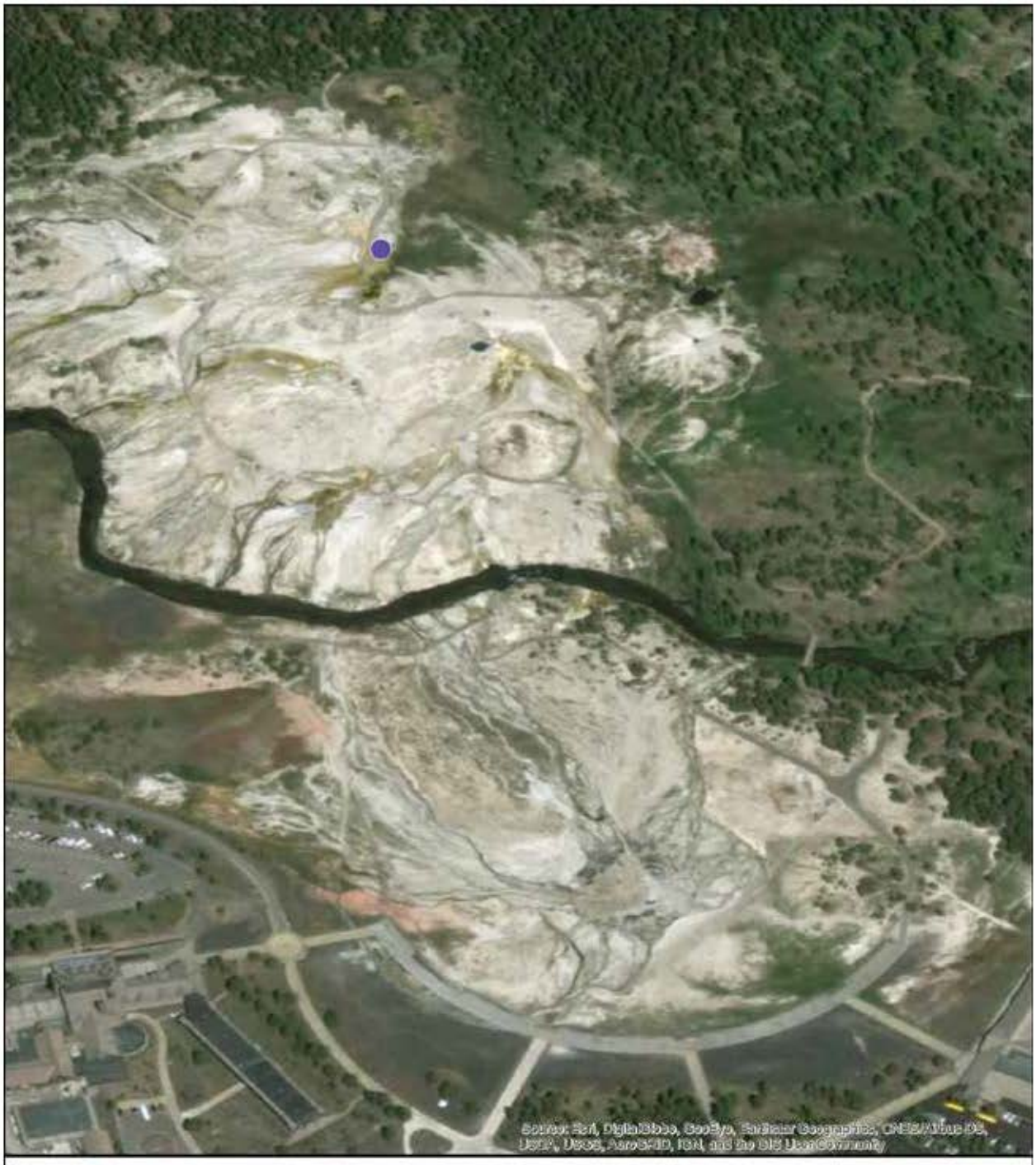
Old Faithful Visitor Behavior Impacts: Pet on Boardwalk

Pet on Boardwalk

0 100 200 Meters

0 1,000 Feet

N



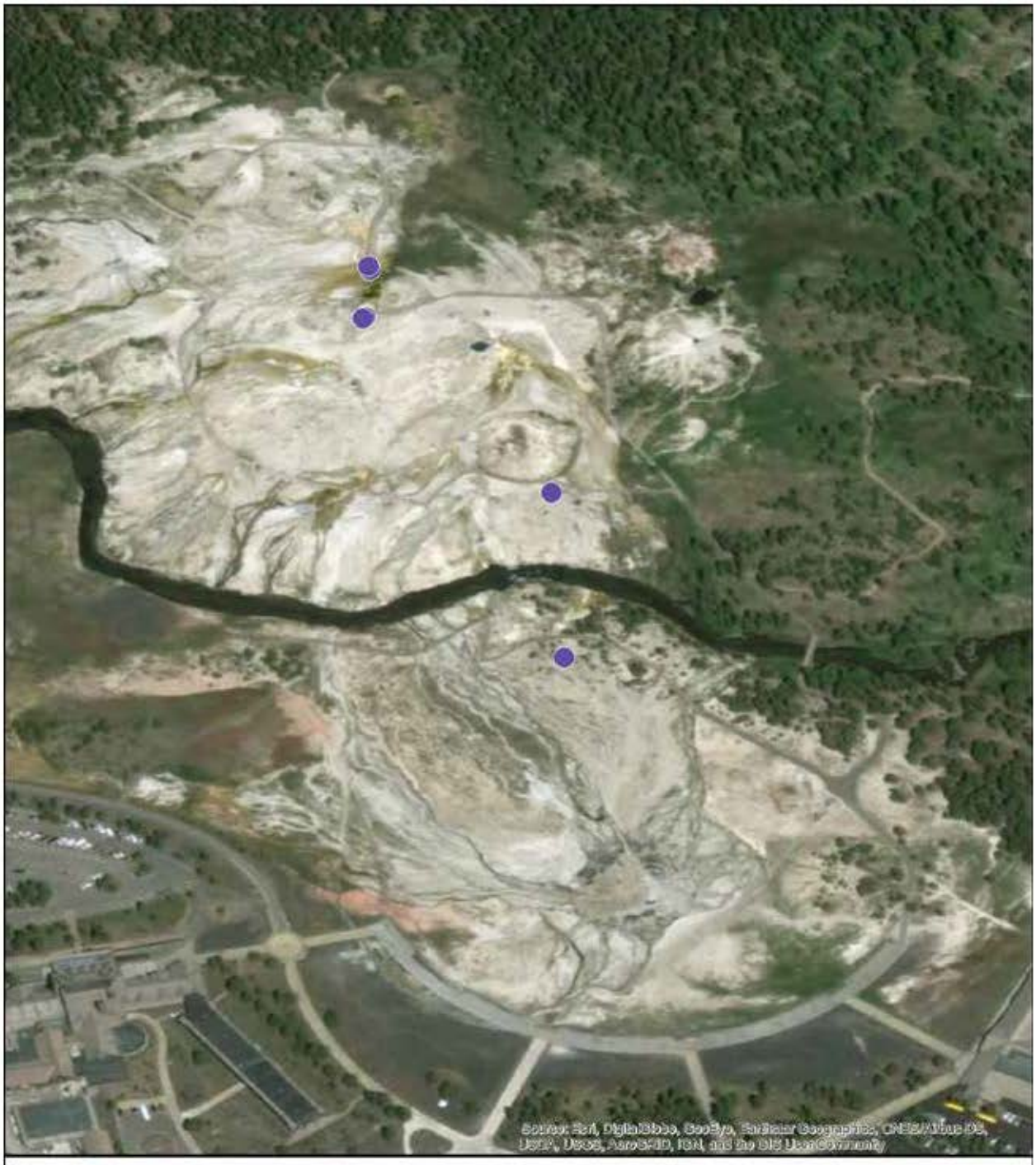
Old Faithful Visitor Behavior Impacts: Graffiti Observed in Thermal Mat

Graffiti

0 100 200 Meters

0 1,000 Feet

N



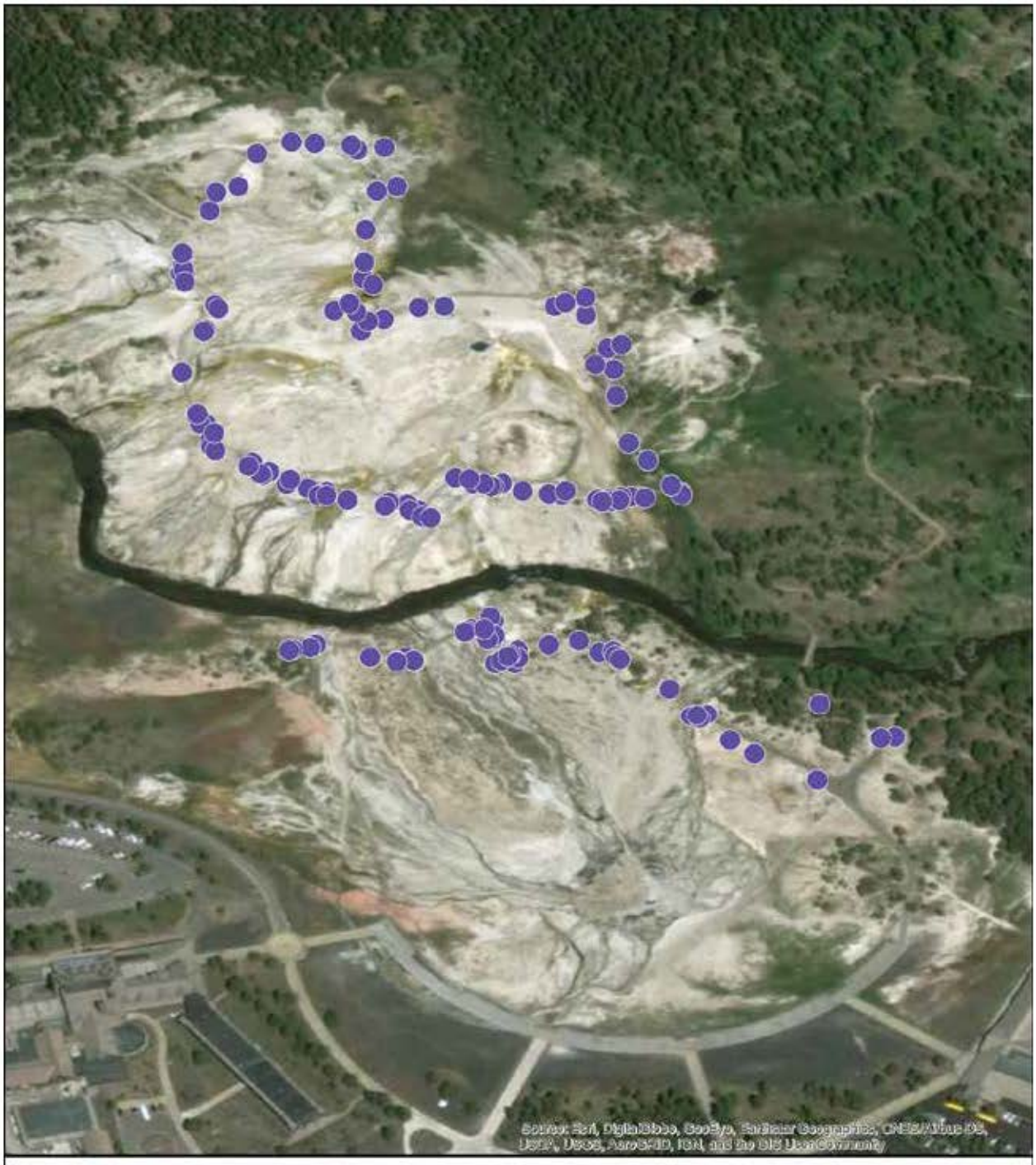
Old Faithful Visitor Behavior Impacts: Visitor Littering in Thermal Area

Littering

0 100 200 Meters

0 1,000 Feet

N



Old Faithful Visitor Behavior Impacts: Litter Observed in Thermal Area

Litter

0 100 200 Meters

0 1,000 Feet

N

Old Faithful Visitor Behavior Impacts: Visitor Less Than 5 Meters From Wildlife

● Visitor Near Wildlife

0 100 200 Meters

0 1,000 Feet

N