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AN ANALYSIS OF TOUR BUS OPERATIONS WITHIN THE NATIONAL MALL AND MEMORIAL PARKS

**Phase 1: Off-Bus Data Collection and Photographic
Documentation at Loading and Unloading Zones**

January 2013

An Analysis of Tour Bus Operations within the National Mall and Memorial Parks

Phase I: Off-Bus Data Collection and Photographic Documentation at Loading and Unloading Zones

Technical Report Submitted to:

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EXECUTIVE SUMMARY

STUDY RATIONALE

The National Park Service (NPS), National Mall and Memorial Parks (National Mall), was awarded a grant through the Paul S. Sarbanes Transit in Parks Program to study and make recommendations for improving tour bus operations within the National Mall. The *National Mall Plan / Environmental Impact Statement* (NPS 2010) confirmed tour bus parking and traffic congestion problems and suggested that little has been done to address concerns that were previously identified in 2003. The 2010 plan reported that approximately 21-25 million visits occur in the 684-acre national icon each year. Approximately one-third of the visiting public arrives via tour bus: this can total as many as 1,200 buses a day operating in and around the National Mall during the spring-summer peak season.

The purpose of the current project is to quantitatively and qualitatively document existing conditions and set forth a plan of action for short-term and long-term improvements in operational efficiency. A series of studies is being completed that pertain to operational efficiency, congestion, visitor mobility, access, safety, education, recreation, health benefits and protection of sensitive natural, cultural and historical resources. The data collection is occurring in phases, as indicated in Table A. The current report summarizes the findings specific to Phase I, which is specific to off-bus data collection and photographic documentation at loading and unloading zones. Acronyms that will be used throughout the report include those for the National Park Service (NPS), George Mason University (GMU), District Department of Transportation (DDOT), Metropolitan Washington Council of Governments (COG), and American Bus Association (ABA).

Four days of observational data were collected during day-time periods in March and April of 2012 using a standardized instrument to systematically determine usage and associated operator and visitor behaviors at loading and unloading zones. Photographic documentation supplemented and validated observational findings. Nineteen zones were identified by NPS for possible inclusion in the phases of research identified above. Of these, 11 were selected for inclusion in the current study and a total of 626 buses were documented that had usable data.* Figure A indicates the locations of the zones specific to this study. The phase I findings and recommendations are summarized below by zone. During phase 3 of this study, supplemental data at loading and unloading zones will be collected at different times of the year to determine if the current findings are consistent during different months and during evening hours. Select dates will be identified in October 2012, May 2013, June 2013 and July 2013.

SUMMARY OF FINDINGS AND RECOMMENDATIONS

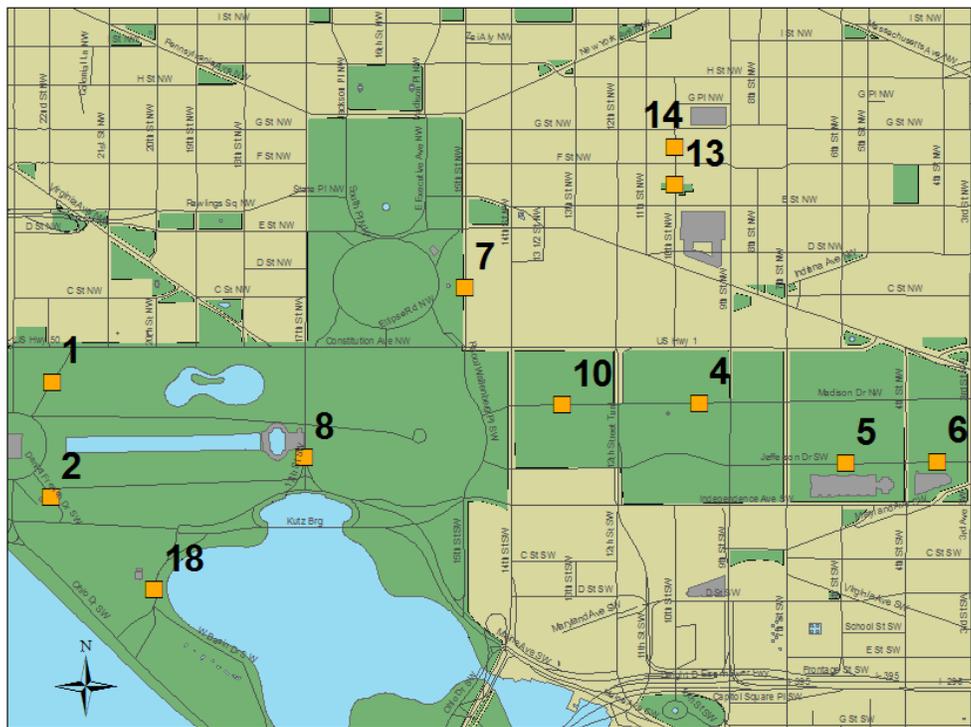
Zone 1 (Lincoln Memorial North)

Zone 1 (Lincoln Memorial, North on Henry Bacon Dr.) was found to be underutilized. Few buses were documented, not due to lack of time spent at the zone but due to lack of buses entering the zone. Infractions were almost nonexistent because there was always available space. The primary problems observed pertained to empty buses parking and private vehicles unloading in tour bus spaces. Additional data will be collected at this zone during the Phase 3 of this study to determine if the lack of use continues during different days of the week and times of day. Data should be collected on dates within the month of July, coinciding with the highest levels of visitation to the Lincoln Memorial. While eastbound traffic may have difficulty entering this zone due to the sharpness of the turn, westbound entry is easier. Lack of knowledge of this site was indicated as one potential cause for underuse. While restrictions do apply to this zone, they only apply during the rush hour period (4:00 p.m. – 6:30 p.m., Monday through Friday).

* Zones 3, 9, 11, 12, 15, 16, and 17 were dropped from analysis; however, the original zone numbers were maintained, so there are gaps in the numbering sequence.

TABLE A: PROJECT PHASES

Project Phase	Study (Note: Highlighted study is current report)	Details	Estimated / Completion Timeline (Chronological Based on End Date)
I	Off-Bus Data Collection and Photographic Documentation at Loading and Unloading Zones, Part 1	Data collected and analyzed by GMU that is specific to congestion, operational efficiency, mobility, access, safety, and resource protection at loading and unloading zones.	Data Collection Complete: March 2012 – April 2012 Data Analysis Complete: May 2012 – August 2012
II	Off-bus Data Collection at Gateway Points	Data collected by COG for DDOT specific to tour bus volume and carrying capacity; analyzed by COG and GMU.	Data Collection Complete: March 2012 GMU Data Analysis Estimate: October 2012 – January 2013
III	Off-Bus Data Collection and Photographic Documentation at Loading and Unloading Zones, Part 2	Data collected and analyzed by GMU that is specific to congestion, operational efficiency, mobility, access, safety, and resource protection at loading and unloading zones.	Data Collection Estimate: October 2012 (1 date) May 2013 (1 date) June-July 2013 (2 dates)
IV	Off-bus Data Collection at Parking Areas	Data collected and analyzed by GMU that is specific to turnover, stacking, user conflict, and carrying capacity at parking areas adjacent to major destinations as well as parking in peripheral locations.	Data Collection Estimate: Four dates between peak months of March 2013 – June 2013 Data Analysis Estimate: August 2013 – October 2013
V	On-Bus Data Collection and Photographic Documentation of Daily Bus Operations	Data collected and analyzed by GMU that is specific to congestion, operational efficiency, mobility, access, safety, education, recreation, health benefits and resource protection during the point-to-point experience	Estimate: Eight dates between January 2013 – January 2014 Data Analysis Estimate: Ongoing once data collection begins with completion by June 2014
VI	Operator Self-Reports	Data collected and analyzed by GMU that is specific to logs, itineraries, education, recreation, health, vehicle-miles-traveled, methods used to reduce pollution, safety, regulation, and suggestions for improving operational efficiency and energy conservation.	Estimate: Feedback from five tour bus companies between January 2013 to January 2014 Data Analysis Estimate: Ongoing once data collection begins, with completion by June 2014
VII	Client Self-Reports	Data collected and analyzed by GMU that is specific to itineraries, group needs, intermodal capabilities of diverse tour group markets and ways to maximize the on-bus and pedestrian experience.	Estimate: Feedback from clients associated with four distinct tour bus markets to be collected between January 2013 to January 2014 Data Analysis Estimate: Ongoing once data collection begins with completion by June 2014

Figure A. Zones Included in Off-Bus Data Collection

Additional standardized signage is recommended to route buses to Zone 2 as a drop-off area and Zone 1 as a pick-up area. New routing patterns can also be communicated to operators through goDCgo, the ABA Newsletter and Destination DC.

Zone 2 (Lincoln Memorial South)

Zone 2 (Lincoln Memorial, South on Daniel French Dr.) is bustling in comparison to Zone 1, with a consistent stream of tour buses evidenced during the exact same times when Zone 1 was empty. Despite the high volume of buses, few infractions were observed and designated spaces were almost always used. The qualitative findings suggest that many buses cruised through empty but did not stop or, if they did, did not stay for long. This suggests that they may be looking for a place to park but elect not to stay when they notice the consistent stream of buses that need to load or unload. There was also a consistent police presence witnessed in this zone, which most likely decreased operational violations. Overall, this is a high functioning area with no auto traffic permitted except for visitors with disabilities. Further, a Capital Bikeshare station has recently been completed in this zone. To increase the utility of Zone 1 and remove some congestion from Zone 2 in light of the addition of a bike share area, additional standardized signage is recommended to route buses to Zone 2 as a drop-off area and Zone 1 as a pick-up area. New routing patterns can also be communicated to operators through goDCgo, the ABA Newsletter and Destination DC.

Zone 4 (National Museum of Natural History)

Zone 4 (National Museum of Natural History, Madison Dr. at 9th St.) has a relatively high proportion of buses that are parking empty for long periods of time, leading other buses to double park and, in turn, consistent congestion. It is recommended that additional data be collected at this zone during dates that fall within other peak visitation months to this museum (June or July) to determine if parking at this zone is a consistent problem. Also problematic in this zone is the high likelihood of private vehicles to pull into

the zone for drop-off and pick-up. Additional regulatory signage for tour buses which address hours; purpose such as loading/unloading; and time limits for activity, increased information about alternative loading areas for drivers and greater enforcement are warranted in this zone. It is recommended that US Park Police increase their presence in this zone and/or give DDOT the ability to enforce. Enforcement is not necessarily ticketing, as an informational brochure regarding alternative parking areas can be distributed onsite.

Zone 5 (National Air and Space Museum)

Zone 5 (National Air and Space Museum, Jefferson Dr. at 7th St.) struggles with congestion due to the popularity of the site. Operational infractions were consistently documented at this zone with enforcement primarily limited to the occasional officer waving buses on. Only one ticket was documented as being written in over nine hours of data collection split between two days. Additional regulatory signage for tour buses which address hours, the purpose of the zone (loading/unloading only) and time limits for activity is needed. Further, increased information about alternative loading areas for drivers and greater enforcement is warranted in this zone. It is recommended that US Park Police increase their presence in this zone and/or give DDOT the ability to enforce. Enforcement is not necessarily ticketing, as an informational brochure regarding alternative parking areas can be distributed onsite. Additional loading and unloading options are also needed at this site, with new spaces located directly south of the museum on Independence Ave. recommended for development. Buses would have access to these spaces between 10:00 a.m. and 4:00 p.m. The availability of new spaces can be indicated through standardized signage and can be communicated to operators through goDCgo, the ABA Newsletter and Destination DC.

Zone 6 (National Museum of American Indian)

Zone 6 (National Museum of American Indian, Jefferson Drive between 3rd and 4th Streets) is essentially a parking area, even though it is clearly marked for loading and unloading only. It also acts as a social gathering place, with drivers consistently seen having conversations and occasionally approaching the researchers. Because Smithsonian counts indicate that the National Museum of American Indian has significantly lower rates of visitation than the adjacent National Air and Space Museum (1.4 million in comparison to 7.0 million visitors in 2011, respectively), greater initiatives should be taken to have drivers pull up to this zone to load and unload for the National Air and Space Museum, thus alleviating some of the congestion in Zone 5. It is recommended that US Park Police increase their presence in this zone and/or give DDOT the ability to enforce. Enforcement is not necessarily ticketing, as an informational brochure regarding alternative parking areas can be distributed onsite. Operators are encouraged to use the paid parking lots at Buzzard's Point (available 6:00 a.m. to 6:00 p.m.; \$20 / up to 3 hours; \$50 per day) and RFK Stadium (available Monday through Friday, 6:00 a.m. to 10:00 p.m., in and out privileges; \$30 per day; available Saturday and Sunday and during Events 6:00 a.m. to 10:00 p.m., in and out privileges, \$55 advance purchase or \$60 day of) as directed on goDCgo. However, initial anecdotal evidence based on overheard commentary from operators suggests a strong reluctance to pay for short-term parking.

Zone 7 (Ellipse)

Zone 7 (Ellipse, 15th Street between Pennsylvania Avenue and Constitution Avenue) has both bus parking and drop off areas as well as vendor parking; however, this mixed use is leading to a considerable amount of double parking and non-designated zone use with passenger cars and vendors seen in bus spaces. Buses were observed blocking traffic and pulling dangerously into traffic. In order to decrease confusion, it is recommended that the various uses are consolidated into distinct areas, with standardized signage utilized to set forth the distinctions.

Zone 8 (WW II Memorial)

Zone 8 (WW II Memorial, Homefront Dr.) only has four spaces for loading and unloading, yet very few infractions were documented. Data were collected in this zone for close to five hours and only 20 buses came through. Because data were only collected on one day in this zone, it is recommended that additional observations be made during Phase 3 of the study to determine if the relatively light use is consistent. Data should be collected on dates that fall during other high season months for this memorial (May, June, July or October) to determine if this zone is consistently underutilized.

Zone 10 (National Museum of American History)

Zone 10 (National Museum of American History, Madison Drive between 12th and 14th Streets) was not signed for tour bus loading/unloading during the study period; however, limited data were collected to determine the level of compliance. During the 90 minutes of data collection devoted to this zone, eight buses loaded, unloaded or stopped. Because loading and unloading spaces are being added to this zone, additional data should be collected during Phase 3 of the study on dates that coincide with the high season for this museum (April, May, June or July) and to address the newly added signage for loading/unloading west of the National Museum of American History entrance, allowing for three bus spaces.

Zone 13 (Ford's Theatre, 500 block 10th Street)

Zone 13 (Ford's Theatre, 500 block 10th Street) is located on a very narrow road in a highly congested area. The presence of a sightseeing company's operations coupled with the high season for visitation at Ford's Theatre created at times a sense of pandemonium within this zone, with stopping on the wrong side of the road, consistent blaring of vehicle horns, young students getting off in the middle of the road and double parking. The qualitative comments also illustrate that many buses are idling for long periods by default as they wait in the road to pull up to a space. It is recommended that additional observations be made during the Phase 3 of the study during dates that fall within off-peak months (August through February) to determine if the sense of chaos is limited to the high season (March through July) of Ford's Theatre. Rerouting should be considered for this zone to decrease the congestion and associated safety concerns. It is recommended that US Park Police increase their presence in this zone and/or give DDOT the ability to enforce, particularly during peak months.

Zone 14 (Ford's Theatre, 600 Block 10th Street)

Zone 14 (Ford's Theatre, 600 Block 10th Street), while just a block away from Zone 13, is off the main path of tour buses and used almost exclusively as a parking site. Very few observations were made in this zone due to the lack of use in comparison to Zone 13. This zone is located within an easy walking distance to Ford's Theatre; accordingly bus traffic should be rerouted to this block to lessen the congestion in Zone 13. It is recommended that US Park Police increase their presence in this zone and/or give DDOT the ability to enforce, particularly during peak months.

Zone 18 (Franklin Delano Roosevelt / Martin Luther King Jr. Memorials)

Zone 18 (FDR/MLK, West Basin Drive) was a subject to significant violations due to the temporary suspension of tour bus loading/unloading during the National Cherry Blossom Festival. The lack of enforcement was particularly noticeable in this area, as there was a strong police presence yet no ticketing was witnessed. Because the Martin Luther King Jr. Memorial is the latest addition to the National Mall holdings, this zone is likely to continue to have high visitation for years to come. It is recommended that additional observations be made during Phase 3 of the study to document tour bus operations when the zone is open for use.

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1. INTRODUCTION AND BACKGROUND

The National Park Service/National Mall and Memorial Parks (NPS/National Mall) management team completed a plan and environmental impact statement (*National Mall Plan*, 2010) to provide a long-term management framework for the future of the National Mall and Pennsylvania Avenue National Historic Site. As part of the larger plan, conditions pertaining to access and circulation were highlighted. The *National Mall Plan* proposed numerous recommendations in light of tour bus operations, including but not limited to: loading and unloading locations; parking; the management of large groups arriving by tour bus; creating multilingual educational opportunities for culturally diverse groups that arrive by tour bus; ready access to refreshments for tour bus arrivals and departures at select locations; information provision; and sustainable practices.

The background for the 2010 recommendations included findings from a 2003 study entitled the *District of Columbia Tour Bus Management Initiative* that was conducted by the Volpe National Transportation Systems Center for the District of Columbia Department of Transportation and other key stakeholders. The 2003 study highlighted numerous problems associated with tour bus operations in the District of Columbia, including traffic congestion, residential neighborhood disruption, air pollution, excessive noise, obstruction of view corridors and major landmarks and negative impacts on local infrastructure. The 2003 study recommended specific changes as well as on-site data collection and counts for monitoring purposes. However, the concerns raised and recommendations set forth in the *National Mall Plan*, completed in 2010, suggested that little progress had been made in the interim period.

In 2011, NPS contracted with GMU to conduct scoping study to determine the perceptions of the current state of tour bus operations in Washington DC from key stakeholders. The study was conducted to better understand tour bus operations, in general, and specifically to determine the constraints to making improvements to current tour bus operations on the National Mall.

The GMU research team worked collaboratively with NPS to identify agencies for participation in the scoping interviews. Feedback was also received through meetings, e-mail communication and webinar participation. The following stakeholders were represented in the 2011 study: Academy Bus / New World Tours, Destination DC, DDOT, Guild of Professional Tour Guides, National Tour Association, United Motorcoach Association, U.S. Capitol Police, US Park Police and U.S. Travel Association. The primary goal of the scoping questions was to determine perceptions of the progress that has been made in terms of addressing the problems identified and the recommendations made in the 2003 study. Results from operators indicated perceptions of little progress, with an overall sense of increased enforcement being accompanied by a decrease in available parking, resulting in increased congestion and cruising. A disconnect between operator and enforcement personnel was evidenced, with operators indicating that parking and loading spaces near key visitor sites on the National Mall are inadequate for current demand while enforcement agencies indicated concerns regarding a lack of knowledge of and/or unwillingness to use available sites.

The current study builds upon the background knowledge provided in the 2003, 2010 and 2011 reports by beginning the process of systematically documenting existing conditions related to tour bus operations. This is the first phase of the seven-phase study that will ultimately be integrated into a comprehensive plan of action for short-term and long-term improvements in tour bus operational efficiency within the National Mall. For this first phase, data specific to congestion, operational efficiency, mobility, access, safety, and resource protection at loading and unloading zones were collected and analyzed.

2. METHODS

2.1 ZONE DETERMINATION

The research team worked collaboratively with the NPS to identify potential data collection sites. Because the data collection period coincided with the 2012 National Cherry Blossom Festival, zone modifications specific to this event are noted. Table 3.1 illustrates the observed zones and the associated data collection schedule while Figure 2.1 offers a visual representation of the zones.

For the purposes of this study, no information was collected for Zones 3, 9, 11, 12, 15, 16, and 17. These spaces are either marked as parking only (Zone 3), were impacted by the 2012 National Cherry Blossom Festival zone modifications (Zone 9 and Zone 19), are not signed for tour bus loading and unloading (Zone 11 and Zone 12), overlapped with other zones (Zone 15), or are peripheral to the National Mall (Zones 16 and 17). Zone 10 was not signed for tour bus loading and unloading at the time of the study but minimal data were collected there to determine policy adherence. Since the completion of data collection, three spaces have been designated for Zone 10. Zone 18 was intended to be blocked off to tour buses during the National Cherry Blossom Festival; however, checks for policy adherence revealed that tour buses continued to utilize this zone during the festival so data were collected.

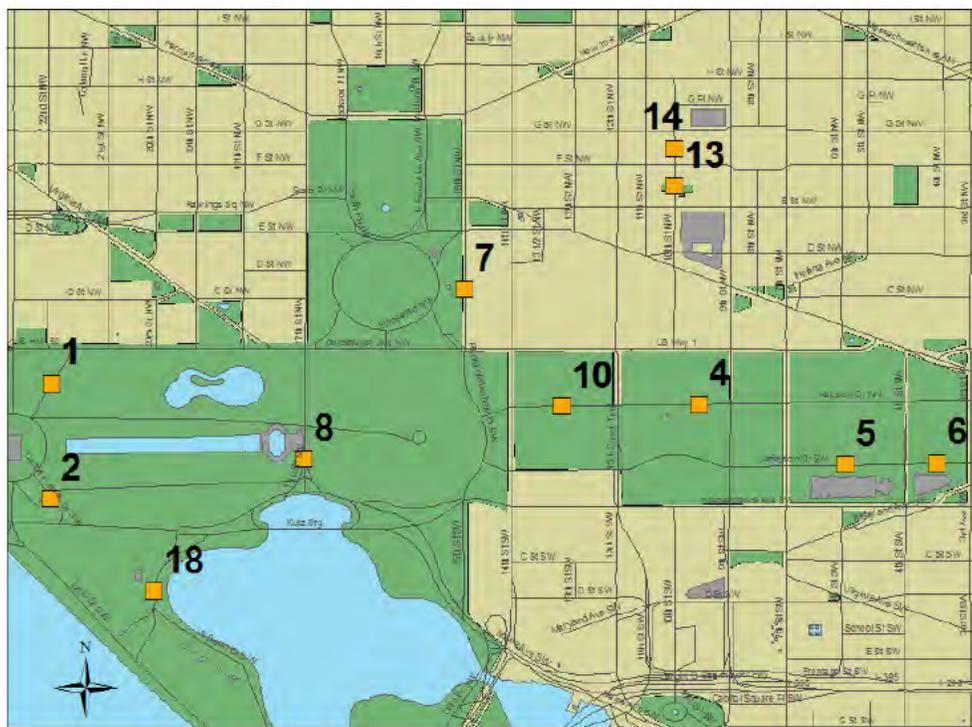
TABLE 2.1. DATA COLLECTION SCHEDULE

Zone	Location	Estimated Number of Spaces (Based on 60 Feet per Bus)	Data Collection Dates / Times
1	Lincoln Memorial North — Henry Bacon Dr. between Constitution Avenue and Lincoln Circle	6	Sat., 03/24/12, 8:30 a.m. – 11:00 a.m. Fri., 04/06/12, 11:45 a.m. – 1:15 p.m.
2	Lincoln Memorial South — Daniel French Dr. between Lincoln Circle and Independence	6	Sat., 03/24/12, 8:30 a.m. – 2:30 p.m. Fri., 04/06/12, 1:20 p.m. – 3:45 p.m.
3	Washington Monument — 1500 Block Independence Avenue (Note: Bus PARKING only; no loading/unloading)	8	N/A
4	National Museum of Natural History — Madison Dr. at 9th Street	8	Sat., 03/31/12, 11:15 a.m. – 2:15 p.m. Fri., 04/06/12, 11:30 a.m. – 4:00 p.m.
5	National Air and Space Museum — Jefferson Dr. at 7th Street	9	Wed., 04/04/12, 10:45 a.m. – 3:00 p.m. Fri., 04/06/12, 11:00 a.m. – 4:00 p.m.
6	National Museum of American Indian — Jefferson Drive between 3rd and 4th Streets	9	Wed., 04/04/12, 10:30 a.m. – 3:00 p.m.
7	Ellipse — 15th Street between Pennsylvania Avenue and Constitution Avenue	5	Sat., 03/31/12, 11:15 a.m. – 2:00 p.m.
8	WW II Memorial — Homefront Dr.	4	Fri., 04/06/12, 11:15 a.m. – 4:00 p.m.
9	Jefferson Memorial — East Basin Dr. (Note: No loading and unloading for Cherry Blossom Festival)	7	N/A
10	National Museum of American History — Madison Drive between 12th and 14th Streets (Note: Not signed for tour bus loading/unloading)	0 during study period. 3 added after study period	Sat., 03/31/12, 9:30 a.m. – 11:05 a.m.
11	White House Visitor Center — Pennsylvania Avenue between 14th and 15th Streets (Note: Not signed for tour bus loading/unloading)	0	N/A

Zone	Location	Estimated Number of Spaces (Based on 60 Feet per Bus)	Data Collection Dates / Times
12	Old Post Office Pavilion — Pennsylvania Avenue between 11th and 12th Streets (Note: Not signed for tour bus loading/unloading)	0	N/A
13	Ford's Theatre 500 block 10th Street	1	Sat., 03/31/12, 9:45 a.m. – 2:00 p.m. Fri., 04/06/12, 11:15 a.m. – 4:00 p.m.
14	Ford's Theatre 600 Block 10th Street	2	Fri., 04/06/12, 11:15 a.m. – 4:00 p.m.
15	Ford's Theatre 1000 block F Street	1	N/A
16	Maine Avenue 700-900 block	6	N/A
17	Maine Avenue 900-1200 block	4	N/A
18	FDR/MLK West Basin Drive (Note: No loading and unloading for Cherry Blossom)	8	Sat., 03/24/12, 11:15 a.m. – 1:00 p.m. Sat., 03/31/12, 9:30 a.m. – 2:00 p.m.
19	Ohio Drive between Inlet Bridge and West Basin Drive right hand side (Note: During Cherry Blossom Festival only)	N/A	N/A

NOTE: No information was collected for the zones highlighted in the shaded rows.

FIGURE 2.1. Zones Included in Off-Bus Data Collection



2.2 OFF-BUS INSTRUMENT

The off-bus instrument was constructed with significant input from NPS, the DC Department of Transportation (DDOT) and Destination DC. Variables pertained to bus style, bus information including company name, DOT number, last three digits of the license plate, loading information, pull-in/pull-out time, idling time, passenger information, activities that took place at the zone and operational issues. Space was also designated for researchers to add qualitative comments and observations. Researchers photographed each bus that was documented using disposable cameras. Each researcher filled out one cover sheet per day to indicate researcher name, date, data collection start and end time, day of week, weather conditions, weather comments and zone. A total of 36 variables were indicated for each bus documented. The full instrument and cover sheet can be found in Appendix 1 and Appendix 2.

2.3 DATA COLLECTION: TRAINING AND IMPLEMENTATION

All researchers went through a 1-hour offsite training session to become familiar with the instrument and protocol. Once onsite, research teams were positioned at the zones, as indicated in Table 1. Researchers did not wear any NPS identifiers on their clothing and stayed at least six feet away from the buses at all times so as not to draw attention to the study in such a way that would influence driver or visitor behaviors. The consistent movement of visitors close to the zones of interest allowed for data collection to occur somewhat unobtrusively. However, because researchers were holding clipboards and taking photographs, they did receive some inquiries regarding the study. All researchers carried a letter signed by the Superintendent of the National Mall and Memorial Parks, describing the study should any concerns be raised. When researchers did receive questions, they noted it on the instrument in the space designated for comments and observations.

Researchers attempted to document all buses that entered the designated zones during the systematically selected time periods. In zones where there was only one entry point, independent tallies were taken by a separate researcher to assist in the determination of the percentage of buses that were captured. Data for each bus that was documented would take between 1 and 10 minutes to collect, based on whether the bus was full or empty and the time needed for visitors to load or unload, if applicable.

2.4 SAMPLE SIZE

Using the methods outlined above, a total of 626 buses were documented that had usable data. Not all buses had applicable information to all variables or data was “missed” due to short stops or researcher error; accordingly, the sample size is indicated by variable in the findings.

2.5 DATA ANALYSIS

Quantitative data were analyzed using SPSS statistical package software. Data files were converted into Arc GIS format for spatial analysis. Each data point was geocoded by zone before creating graphical illustrations of each key variable. Google Earth and Street View technologies were also utilized to better understand the peculiar spatial makeup of each location. Qualitative data were analyzed by determining response frequencies and, as needed, using constant comparative analysis to inductively create themes.

3. QUANTITATIVE RESULTS

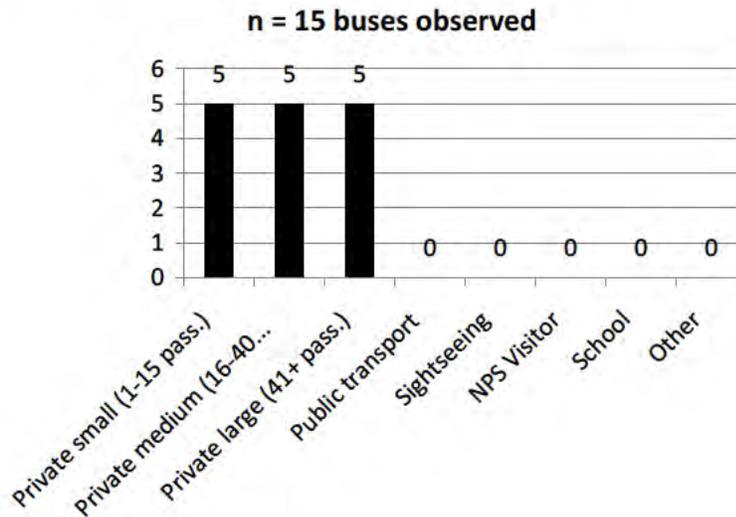
3.1 BUS STYLE

A variety of bus styles (Variable 1) were observed during the data collection period (Table 3.1). Private large buses or those which carried more than 40 passengers (n=386) were most frequently observed. Other bus types observed included sightseeing buses (n=113), small tour buses carrying 1-15 passengers (n=48), medium tour buses carrying 16-40 passengers (n=37), NPS visitor buses (n=9), school buses (n=9), and public transportation buses (n=2). A visual overview of the distribution of bus type, by zone, is offered in Figure 3.1 through Figure 3.12, followed by photos of each bus type.

TABLE 3.1: TOTAL NUMBER OF EACH TOUR BUS STYLE OBSERVED BY ZONE

Zone	Private small tour bus: 1-15 passengers (n)	Private medium tour bus: 16-40 passengers (n)	Private large tour bus: 41+ passengers (n)	Public transport bus (n)	Sightseeing bus: open-top, 2-deck trolleys (n)	NPS visitor bus (n)	School bus (n)	Other (n)	Total
1	5	5	5	-	-	-	-	-	15
2	18	11	43	1	39	4	-	-	116
4	5	5	55	-	-	-	6	-	71
5	6	9	114	-	-	-	1	-	130
6	2	3	29	-	-	-	-	-	34
7	3	1	30	-	1	-	-	-	35
8	1	-	10	-	6	3	-	-	20
10	-	-	5	-	-	-	2	1	8
13	1	1	34	1	56	2	-	-	95
14	-	-	8	-	-	-	-	-	8
18	7	7	53	-	6	-	-	-	73
Total	48	37	386	2	113	9	9	1	605

FIGURE 3.1. DISTRIBUTION OF BUS TYPE: ZONE 1 (LINCOLN MEMORIAL NORTH)



Key for Loading / Unloading Zones

1 Lincoln Memorial North	6 American Indian Museum	13 Ford's Theatre (500 block)
2 Lincoln Memorial South	7 Ellipse	14 Ford's Theatre (600 block)
4 Natural History Museum	8 World War II Memorial	18 Franklin Delano Roosevelt /
5 Air and Space Museum	10 American History Museum	Martin Luther King Jr. Memorials

FIGURE 3.2. DISTRIBUTION OF BUS TYPE: ZONE 2 (LINCOLN MEMORIAL SOUTH)

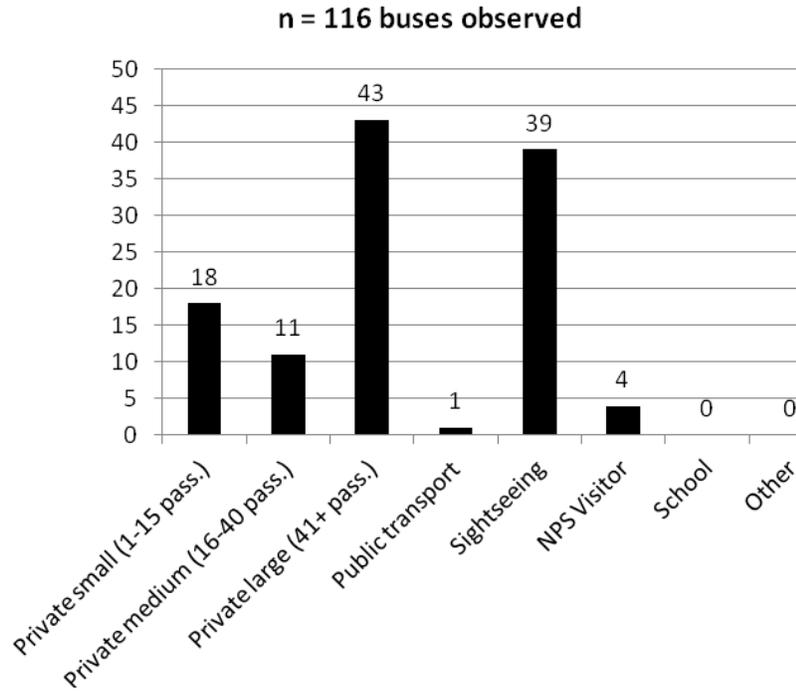
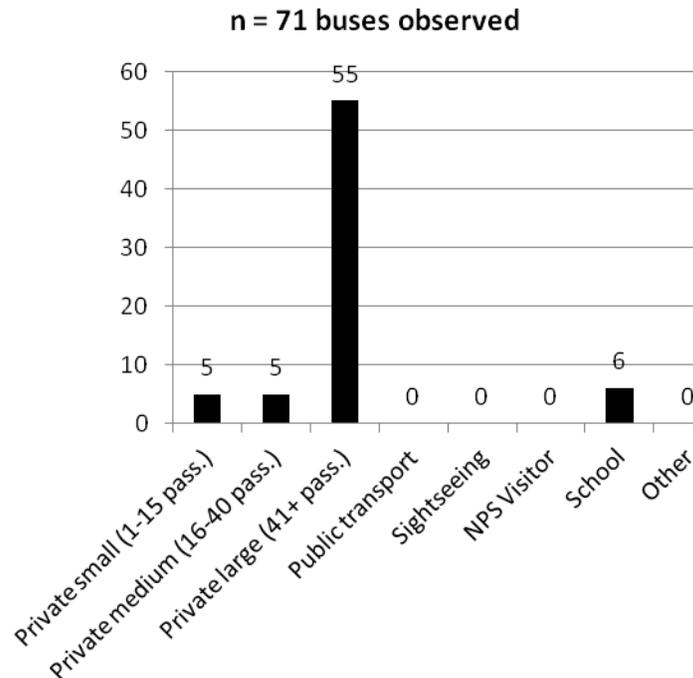


FIGURE 3.3. DISTRIBUTION OF BUS TYPE: ZONE 4 (NATIONAL MUSEUM OF NATURAL HISTORY)



Key for Loading / Unloading Zones		
1	Lincoln Memorial North	6
2	Lincoln Memorial South	7
4	Natural History Museum	8
5	Air and Space Museum	10
6	American Indian Museum	13
7	Ellipse	14
8	World War II Memorial	18
10	American History Museum	
13	Ford's Theatre (500 block)	
14	Ford's Theatre (600 block)	
18	Franklin Delano Roosevelt / Martin Luther King Jr. Memorials	

FIGURE 3.4. DISTRIBUTION OF BUS TYPE: ZONE 5 (NATIONAL AIR AND SPACE MUSEUM)

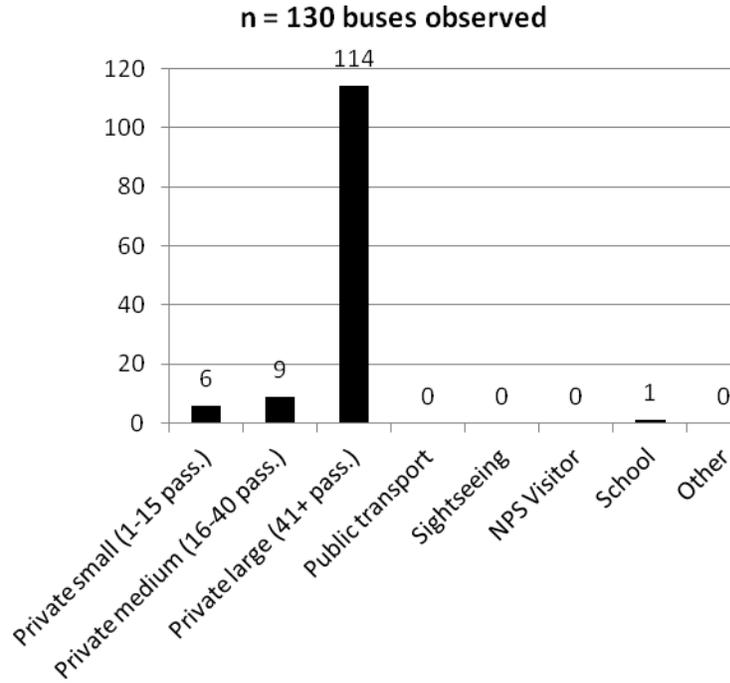
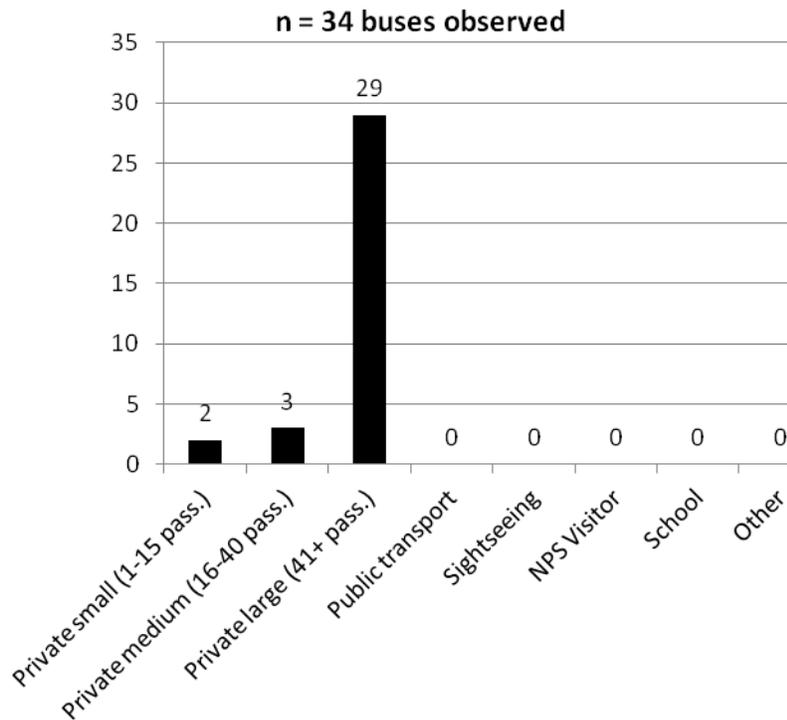


FIGURE 3.5. DISTRIBUTION OF BUS TYPE: ZONE 6 (NATIONAL MUSEUM OF THE AMERICAN INDIAN)



Key for Loading / Unloading Zones

1	Lincoln Memorial North	6	American Indian Museum	13	Ford's Theatre (500 block)
2	Lincoln Memorial South	7	Ellipse	14	Ford's Theatre (600 block)
4	Natural History Museum	8	World War II Memorial	18	Franklin Delano Roosevelt /
5	Air and Space Museum	10	American History Museum		Martin Luther King Jr. Memorials

FIGURE 3.6. DISTRIBUTION OF BUS TYPE: ZONE 7 (ELLIPSE)

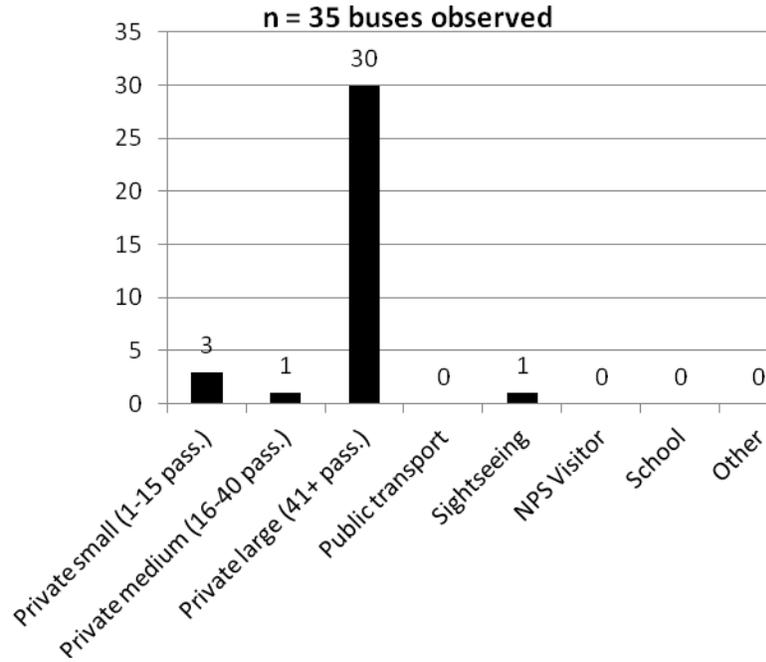
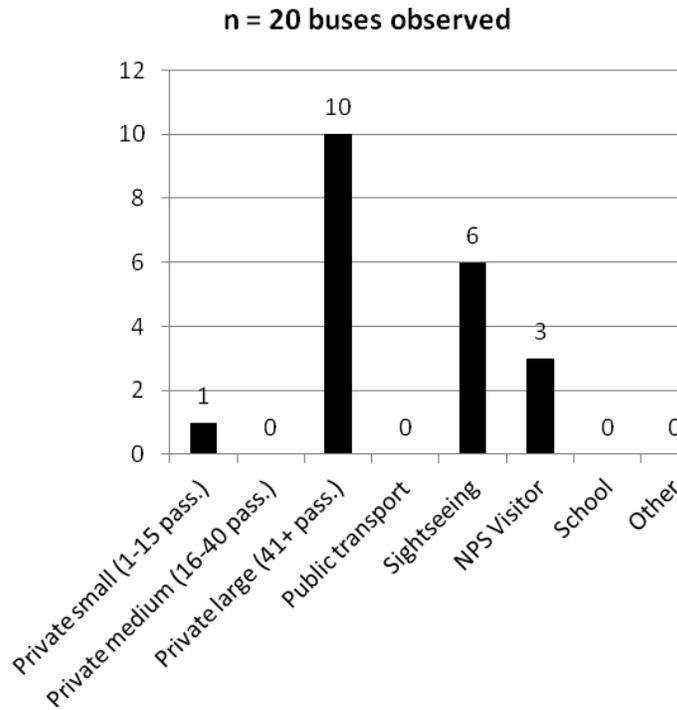


FIGURE 3.7. DISTRIBUTION OF BUS TYPE: ZONE 8 (WORLD WAR II MEMORIAL)



Key for Loading / Unloading Zones			
1	Lincoln Memorial North	6	American Indian Museum
2	Lincoln Memorial South	7	Ellipse
4	Natural History Museum	8	World War II Memorial
5	Air and Space Museum	10	American History Museum
13	Ford's Theatre (500 block)		
14	Ford's Theatre (600 block)		
18	Franklin Delano Roosevelt / Martin Luther King Jr. Memorials		

FIGURE 3.8. DISTRIBUTION OF BUS TYPE: ZONE 10 (NATIONAL MUSEUM OF AMERICAN HISTORY)

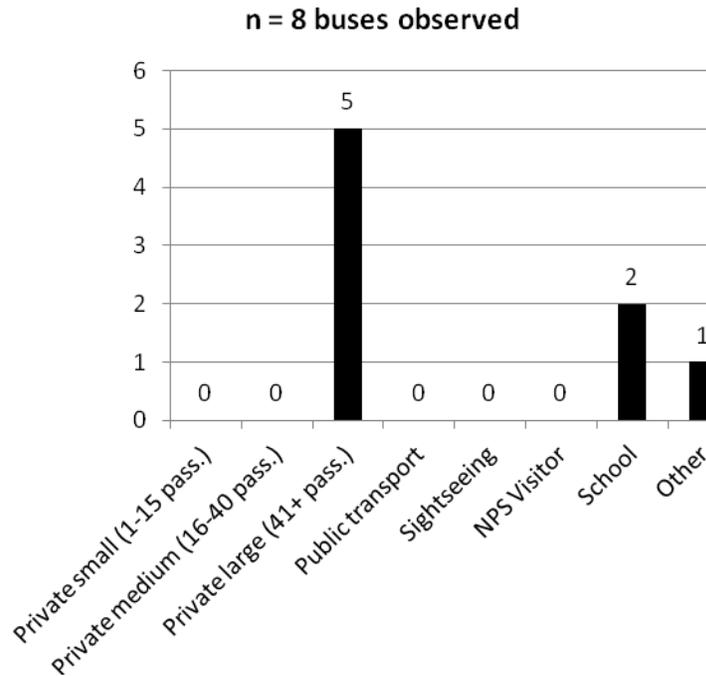
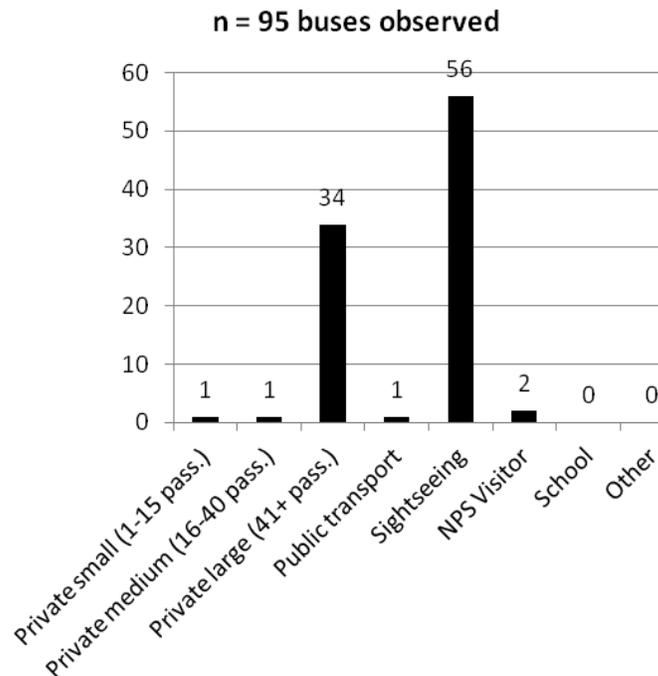


FIGURE 3.9. DISTRIBUTION OF BUS TYPE: ZONE 13 (FORD’S THEATRE, 500 BLOCK 10TH STREET)



Key for Loading / Unloading Zones

1 Lincoln Memorial North	6 American Indian Museum	13 Ford's Theatre (500 block)
2 Lincoln Memorial South	7 Ellipse	14 Ford's Theatre (600 block)
4 Natural History Museum	8 World War II Memorial	18 Franklin Delano Roosevelt /
5 Air and Space Museum	10 American History Museum	Martin Luther King Jr. Memorials

FIGURE 3.10. DISTRIBUTION OF BUS TYPE: ZONE 14 (FORD’S THEATRE, 600 BLOCK 10TH STREET)

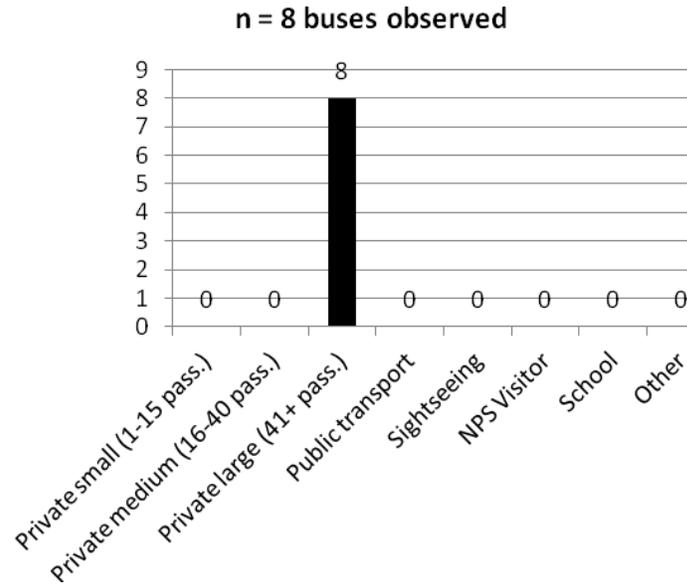
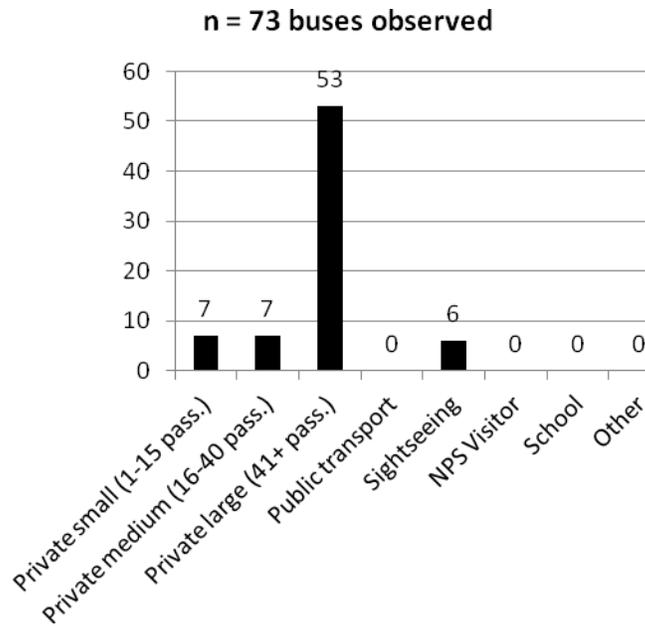


FIGURE 3.11. DISTRIBUTION OF BUS TYPE: ZONE 18 (FRANKLIN DELANO ROOSEVELT / MARTIN LUTHER KING JR. MEMORIALS)



Key for Loading / Unloading Zones			
1	Lincoln Memorial North	13	Ford’s Theatre (500 block)
2	Lincoln Memorial South	14	Ford’s Theatre (600 block)
4	Natural History Museum	18	Franklin Delano Roosevelt /
5	Air and Space Museum		Martin Luther King Jr. Memorials
6	American Indian Museum		
7	Ellipse		
8	World War II Memorial		
10	American History Museum		

FIGURE 3.12. DISTRIBUTION OF BUS TYPE: ALL ZONES

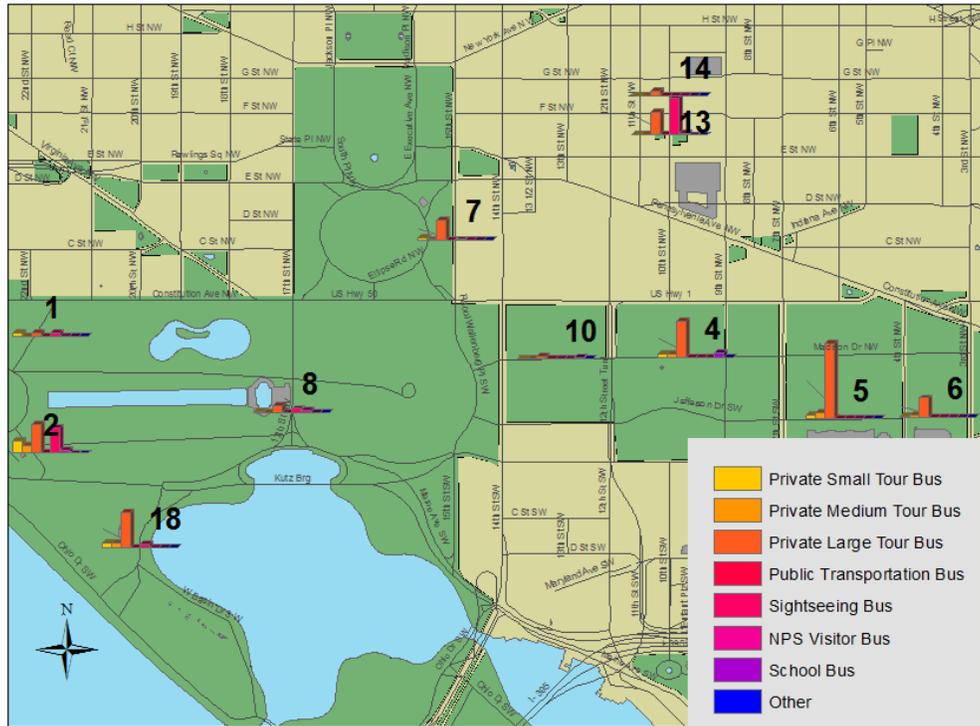


PHOTO 3.1. PRIVATE SMALL TOUR BUS



Key for Loading / Unloading Zones

1 Lincoln Memorial North	6 American Indian Museum	13 Ford's Theatre (500 block)
2 Lincoln Memorial South	7 Ellipse	14 Ford's Theatre (600 block)
4 Natural History Museum	8 World War II Memorial	18 Franklin Delano Roosevelt /
5 Air and Space Museum	10 American History Museum	Martin Luther King Jr. Memorials

PHOTO 3.2. PRIVATE MEDIUM TOUR BUS



PHOTO 3.3. PRIVATE LARGE TOUR BUS



PHOTO 3.4. PUBLIC TRANSPORT BUS



Key for Loading / Unloading Zones					
1	Lincoln Memorial North	6	American Indian Museum	13	Ford's Theatre (500 block)
2	Lincoln Memorial South	7	Ellipse	14	Ford's Theatre (600 block)
4	Natural History Museum	8	World War II Memorial	18	Franklin Delano Roosevelt /
5	Air and Space Museum	10	American History Museum		Martin Luther King Jr. Memorials

PHOTO 3.5. TROLLEY



PHOTO 3.6. SIGHTSEEING BUS



PHOTO 3.7. NPS VISITOR BUS



Key for Loading / Unloading Zones

1 Lincoln Memorial North	6 American Indian Museum	13 Ford's Theatre (500 block)
2 Lincoln Memorial South	7 Ellipse	14 Ford's Theatre (600 block)
4 Natural History Museum	8 World War II Memorial	18 Franklin Delano Roosevelt /
5 Air and Space Museum	10 American History Museum	Martin Luther King Jr. Memorials

PHOTO 3.8. SCHOOL BUS



3.2 AVERAGE TIME SPENT IN ZONE

Among 601 buses where the range of time buses spent in place was documented (the difference between Variables 8 & 9), the average varied greatly with each bus remaining in place from 1 to 157 minutes. Collectively, the average time buses spent in a zone was 13.05 minutes (s.d. = 21.54). However, this differed greatly by zone (Table 3.2, Figure 3.13). Specifically, buses in Zone 6 stayed the longest (average time = 35.2 minutes) while buses in Zone 10 stayed the shortest time in place (average time = 3.8 minutes).

Zone 6 (Jefferson Drive between 3rd and 4th Streets in front of the National Museum of the American Indian) was a popular area for buses to wait, with 50% of buses in Zone 6 waiting for 15 minutes or more and 17.6% waiting for more than an hour. In all cases of observation, it should be noted that buses may actually be waiting longer than observed since in multiple cases, buses which recognized they were being observed, opted to relocate to a different area (i.e. they perceived data were being gathered specific to potentially violating the time constraints on remaining in the zone).

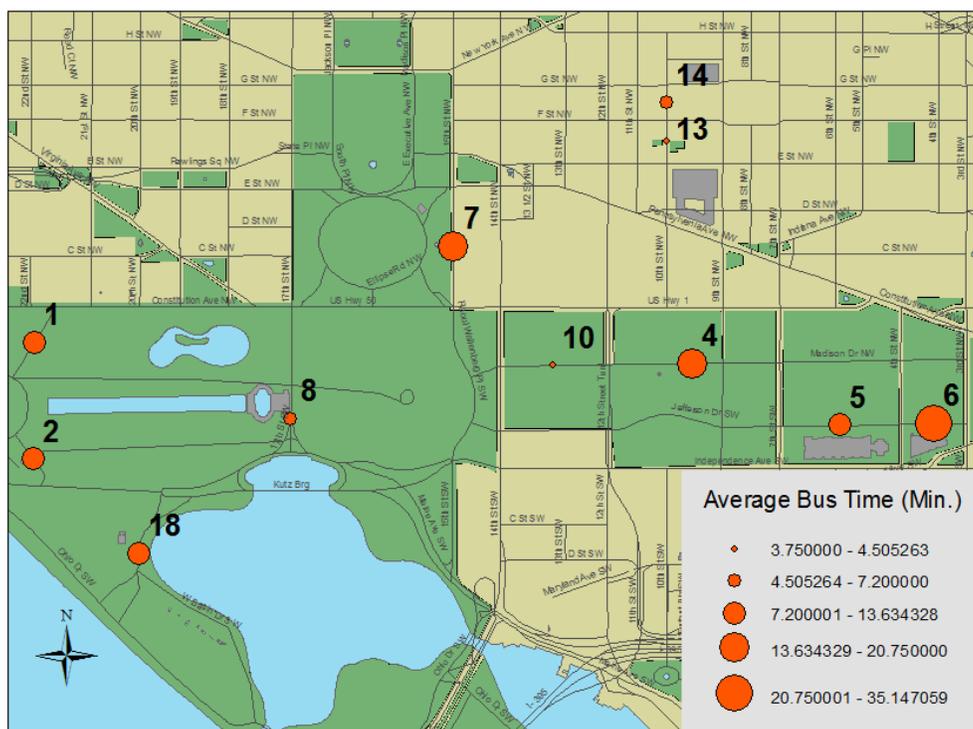
The waiting times were lowest in Zone 10 and Zone 13. Zone 10 was not signed for loading and unloading during the study period, explaining the finding. Zone 13 can be attributed to the high percentage of open-top sightseeing buses in the area which follow a fixed-stop schedule and therefore do not generally stand empty or make long, unscheduled stops. Overall, 48.3% of buses stayed 4 minutes or less in place, 41.9% stayed in place from 5 – 34 minutes, and 9.8% of buses remained in place for 35 minutes or more.

TABLE 3.2. AVERAGE TIME BUSES SPENT IN LOADING / UNLOADING ZONE

Zone	Average Time Spent in Zone (mean)	Standard Deviation	Minimum – Maximum Time Spent in Zone
1	12.3 minutes	12.5	0 – 39 minutes
2	11.3 minutes	18.5	0 – 121 minutes
4	17.3 minutes	23.8	1 – 93 minutes
5	13.6 minutes	22.6	1 – 143 minutes
6	35.2 minutes	44.4	1 – 157 minutes
7	20.8 minutes	25.2	1 – 85 minutes
8	7.2 minutes	10.1	1 – 32 minutes
10	3.8 minutes	3.3	1 – 11 minutes
13	4.5 minutes	4.6	1 – 30 minutes
14	6.8 minutes	5.4	1 – 17 minutes
18	11.2 minutes	12.4	0 – 52 minutes
Total	13.1 minutes	21.5	0 – 157 minutes

1	Lincoln Memorial North	6	American Indian Museum	13	Ford's Theatre (500 block)
2	Lincoln Memorial South	7	Ellipse	14	Ford's Theatre (600 block)
4	Natural History Museum	8	World War II Memorial	18	Franklin Delano Roosevelt /
5	Air and Space Museum	10	American History Museum		Martin Luther King Jr. Memorials

FIGURE 3.13. AVERAGE TIME BUSES SPENT IN LOADING/UNLOADING ZONE, SPATIAL GRAPH



3.3 EMPTY BUSES

A contributing factor to congestion at loading and unloading zones is the fact that many buses stand empty rather than vacating the zones, causing other buses to circulate while trying to find a spot to drop off or pick up passengers (Table 3.3, Figure 3.14, Figure 3.15). Cases of empty buses were more likely to be reported in Zone 4 (National Museum of Natural History), Zone 6 (American Indian Museum), Zone 14 (Ford’s Theatre) and Zone 18 (FDR/MLK Tidal Basin). The worst offenses took place in Zone 6, which is treated as a parking area rather than a drop-off zone. Similarly, Zone 14 is somewhat peripheral to the main point of interest in the area (Ford’s Theatre) and is often treated as a parking area. However, the adjacent Zone 13 was most likely to have passengers. Although only a block away, Zone 13 is located by the offices of a sightseeing company and is a popular hop-on / hop-off location for those doing retail shopping or going to the close by Hard Rock Café and other restaurants in the area.

Zone 18 was clogged during the National Cherry Blossom Festival. For passengers who were only stopping at MLK and not going around the Tidal Basin, drivers may have been unwilling to give up a spot, in particular on March 24, when the blossoms were in peak and there was a rain shower during the data collection period. In terms of Zone 4, while the visitation numbers at National Museum of Natural History are second only to those of the National Air and Space Museum, with visitation at 6.6 million in 2011 according to Smithsonian Institution data, the months of March and April are historically slow for the museum, perhaps allowing buses to stand empty for longer periods than would be feasible in the peak summer and fall months.

Not surprisingly, buses in Zone 4 and 6 were also likely to have a higher average amount of time spent in the zone (see Figure 3.14), once again suggesting that these areas are being used for parking.

Key for Loading / Unloading Zones

1 Lincoln Memorial North	6 American Indian Museum	13 Ford’s Theatre (500 block)
2 Lincoln Memorial South	7 Ellipse	14 Ford’s Theatre (600 block)
4 Natural History Museum	8 World War II Memorial	18 Franklin Delano Roosevelt /
5 Air and Space Museum	10 American History Museum	Martin Luther King Jr. Memorials

TABLE 3.3. NUMBER AND PERCENTAGE OF EMPTY BUSES IN LOADING/UNLOADING AREAS, BY ZONE

Zone	Number of Buses Observed	Number of Empty Buses	Percentage (%) of Empty Buses
1	15	3	20.0
2	110	22	20.0
4	72	29	40.3
5	124	41	33.1
6	29	26	89.7
7	31	10	32.3
8	20	6	30.0
10	8	2	25.0
13	96	7	7.3
14	8	3	37.5
18	71	24	33.8
Total	584	173	29.6

FIGURE 3.14. NUMBER OF EMPTY AND OCCUPIED BUSES IN LOADING/UNLOADING AREAS, BY ZONE

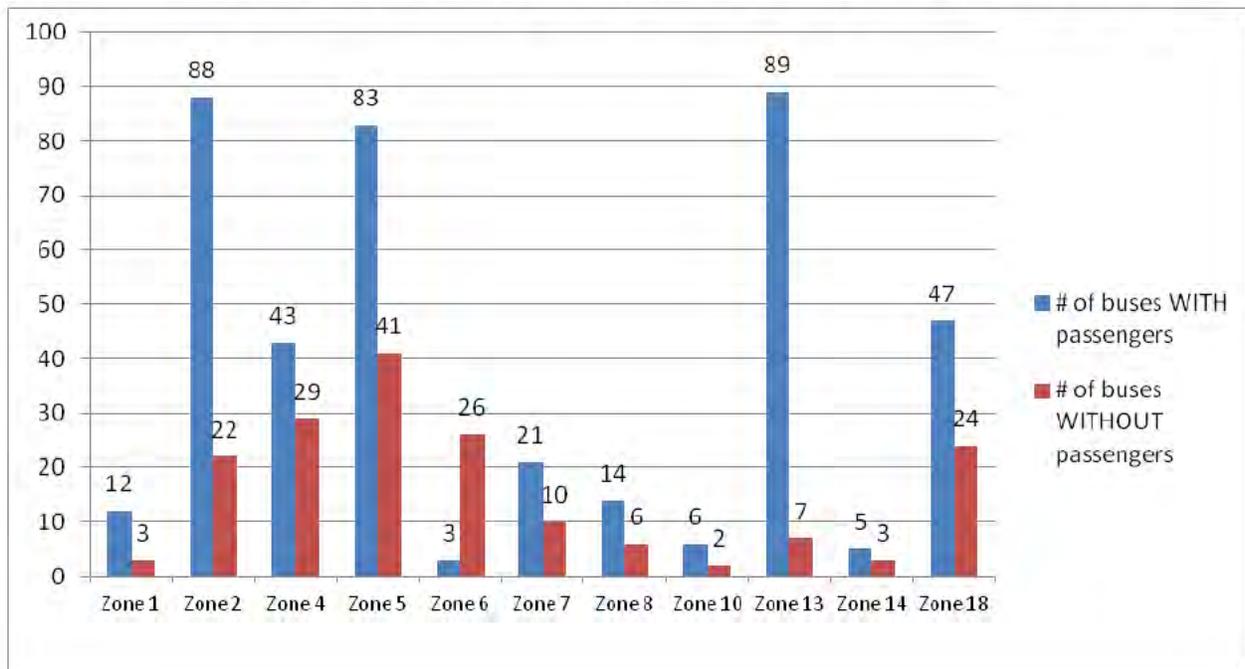
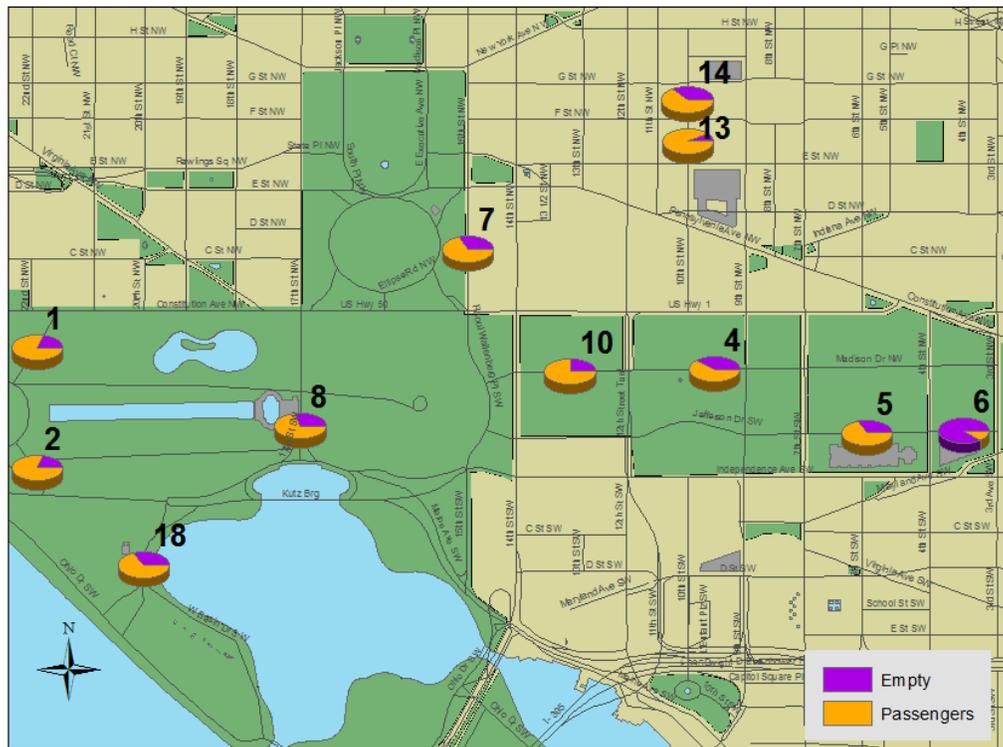


FIGURE 3.15. PERCENTAGE OF EMPTY VERSUS OCCUPIED BUSES



3.4 ENGINE IDLING

Once stopped, a total of 25.3% of buses did not follow the Washington D.C. regulations on engine idling time of less than 3 minutes. More specifically, 74.7% of buses idled for less than 3 minutes ($n=438$), 20.8% ($n=122$) idled for 3-10 minutes and 4.5% (26) idled for more than 10 minutes (Figure 3.16). The weather was relatively comfortable during the data collection period, with temperatures ranging from 48°F – 68°F. During periods of extreme heat or cold, it is likely the idling time of buses will differ from the data collected during this period.

Zone 13 and Zone 18 were more likely to have buses idling. In Zone 13, the many sightseeing buses observed in this zone were often loading and unloading simultaneously and therefore unlikely to turn off their engines as they were heading out to the next stop. Further, many buses were forced to wait for a spot to pull up in this congested area, resulting in buses that were stopped but not pulled in to a designated area. The issues with Zone 18 are attributable to the National Cherry Blossom Festival (Table 3.4, Figure 3.17, Figure 3.18).

Key for Loading / Unloading Zones

1 Lincoln Memorial North	6 American Indian Museum	13 Ford's Theatre (500 block)
2 Lincoln Memorial South	7 Ellipse	14 Ford's Theatre (600 block)
4 Natural History Museum	8 World War II Memorial	18 Franklin Delano Roosevelt /
5 Air and Space Museum	10 American History Museum	Martin Luther King Jr. Memorials

FIGURE 3.16. ENGINE IDLING TIME, TOTALS

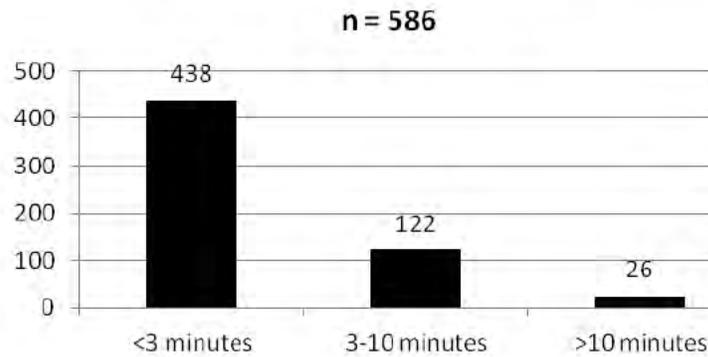


TABLE 3.4. ENGINE IDLING TIME, BY ZONE

Zone	Engine Idled <3 Minutes (n)	Engine Idled 3-10 Minutes (n)	Engine Idled More than 10 Minutes (n)	Total Number of Buses
1	10	2	2	14
2	88	20	4	112
4	57	12	3	72
5	90	25	7	122
6	28	0	0	28
7	26	6	3	35
8	18	2	0	20
10	6	2	0	8
13	67	29	0	96
14	7	1	0	8
18	41	23	7	71
Total	438	122	26	586

FIGURE 3.17. ENGINE IDLING TIME, NUMBER GRAPHED BY ZONE

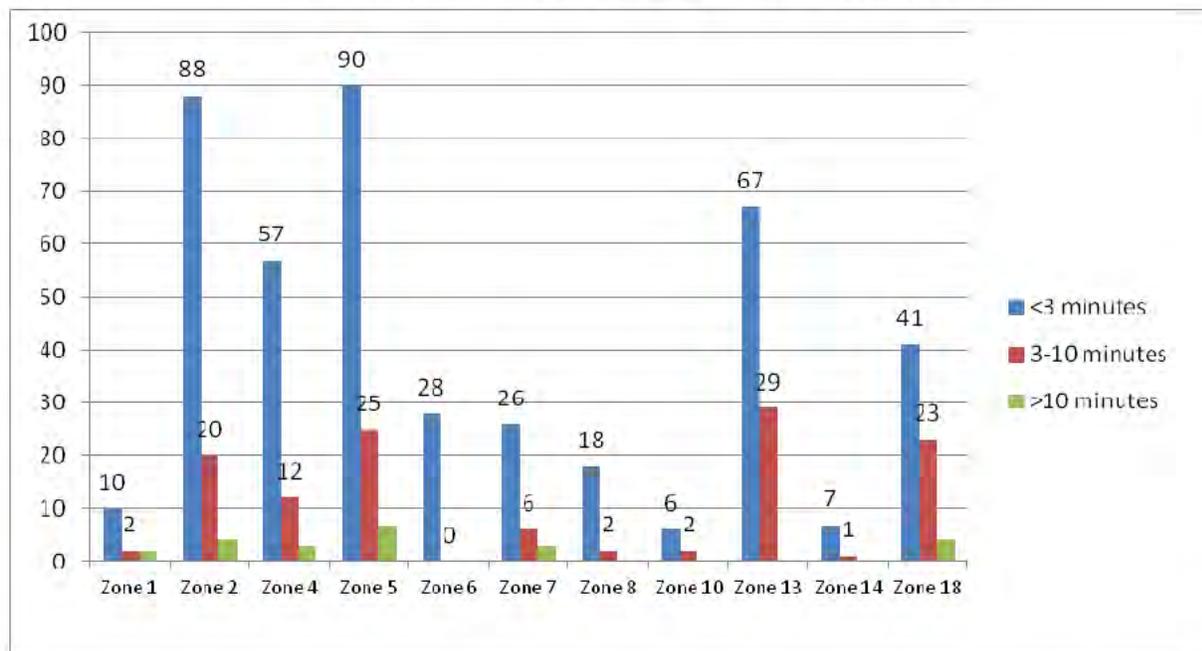
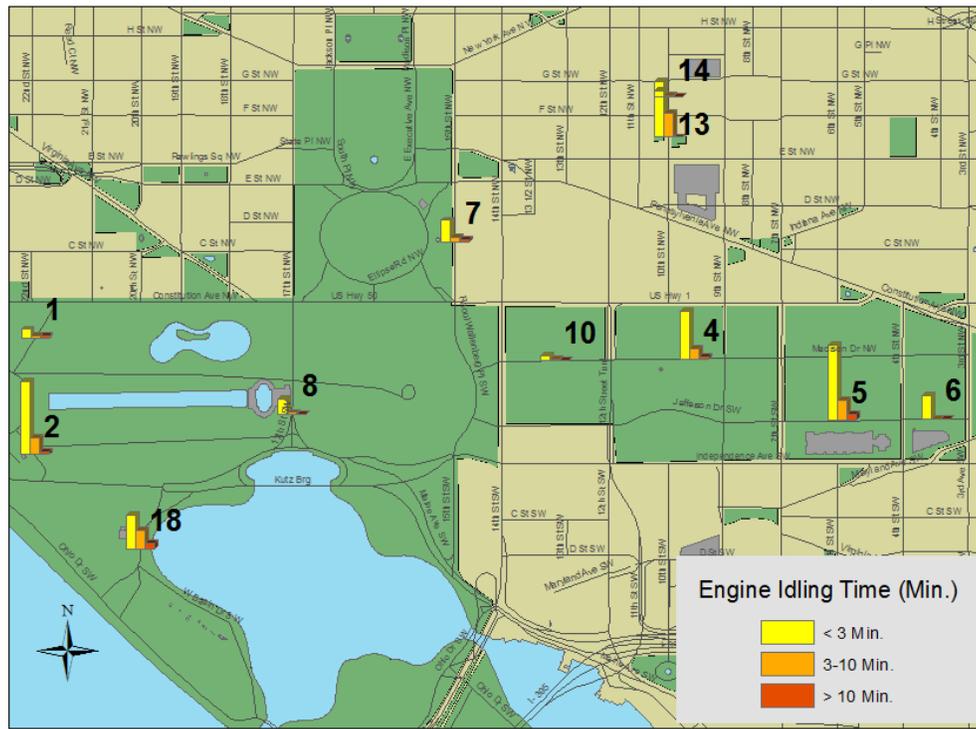


FIGURE 3.18. ENGINE IDLING TIME, SPATIALLY GRAPHED BY ZONE

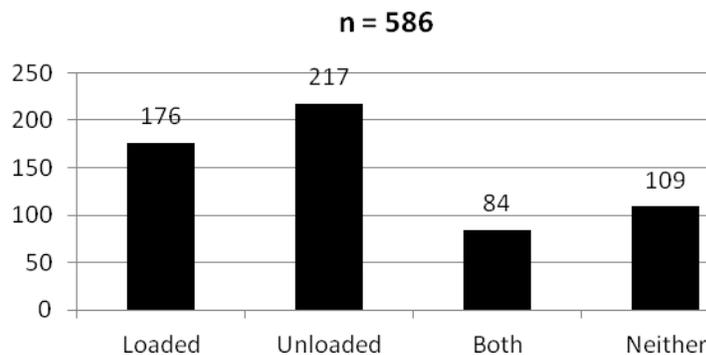


3.5 BUS PULL-IN, LOADING AND UNLOADING

Among the 609 buses where pull-in activity was documented, 70.6% pulled into loading zones, while 29.4% observed buses pulled into non-loading zone areas (Variable 5).

When considering the 586 buses where pull-in activity was documented (Variable 6), 176 (30.0%) buses loaded passengers, 217 (37.0%) unloaded passengers, 84 (14.4%) both loaded and unloaded and 109 (18.6%) neither loaded nor unloaded passengers, meaning that they pulled up empty or, in the case of hop-on / hop-off buses, pulled up to the zone and no passengers got on or off (Figure 3.19).

FIGURE 3.19. BUS LOADING AND UNLOADING ACTIVITY



Key for Loading / Unloading Zones

1 Lincoln Memorial North	6 American Indian Museum	13 Ford's Theatre (500 block)
2 Lincoln Memorial South	7 Ellipse	14 Ford's Theatre (600 block)
4 Natural History Museum	8 World War II Memorial	18 Franklin Delano Roosevelt /
5 Air and Space Museum	10 American History Museum	Martin Luther King Jr. Memorials

Among the buses which loaded or unloaded passengers, 84.3% of those buses did so at the curb while 15.7% did not (Variable 7).

For those buses which did not load or unload at the curb, researchers were asked to descriptively note the location (Variable 8). Alternative locations included: in the street without pulling over to the curb, 4-6 feet from the curb, half on and half off the street, in front of a museum, near orange cones, or in media parking areas.

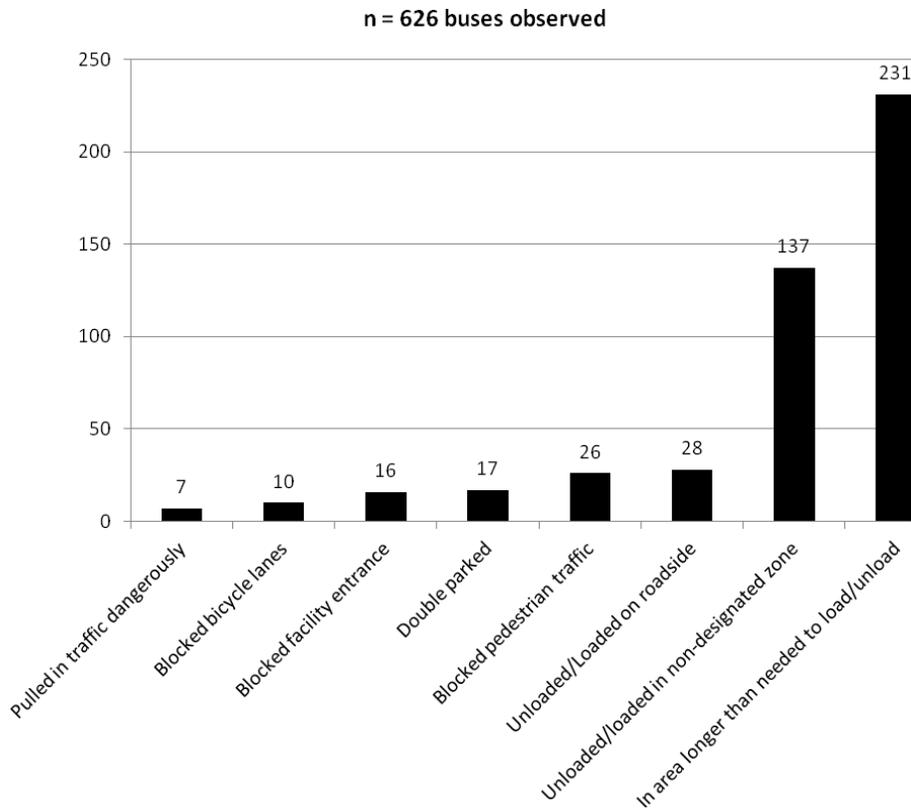
Problems associated with loading and unloading in unidentified locations include compromising passenger safety, blocking traffic and/or blocking access to visitor sites.

3.6 OPERATIONAL ISSUES OBSERVED

Researchers were asked to indicate all observed operational issues that can be deemed problematic, from a list of 8 predetermined options (Variable 23). Buses could be guilty of more than one infraction, so percentages do not total 100%.

A variety of bus actions were observed that can be categorized as unsafe or illegal in that they are counter to legal policies in the District of Columbia. The most common operational issue was remaining in the zone longer than the time needed to load or unload (231 cases, 36.9%), followed by loading or unloading in a non-designated loading zone (137 cases, 21.9%), unloading/loading on the roadside (28 cases, 4.5%), blocking pedestrian traffic (26 cases, 4.2%), double parking (17 cases, 2.7%), blocking a facility entrance (16 cases, 2.6%), blocking a bicycle lane (10 cases, 1.6%) and pulling into traffic in a dangerous way (7 cases, 1.1%). See Figure 3.20.

FIGURE 3.20. OPERATIONAL ISSUES OBSERVED, TOTALS

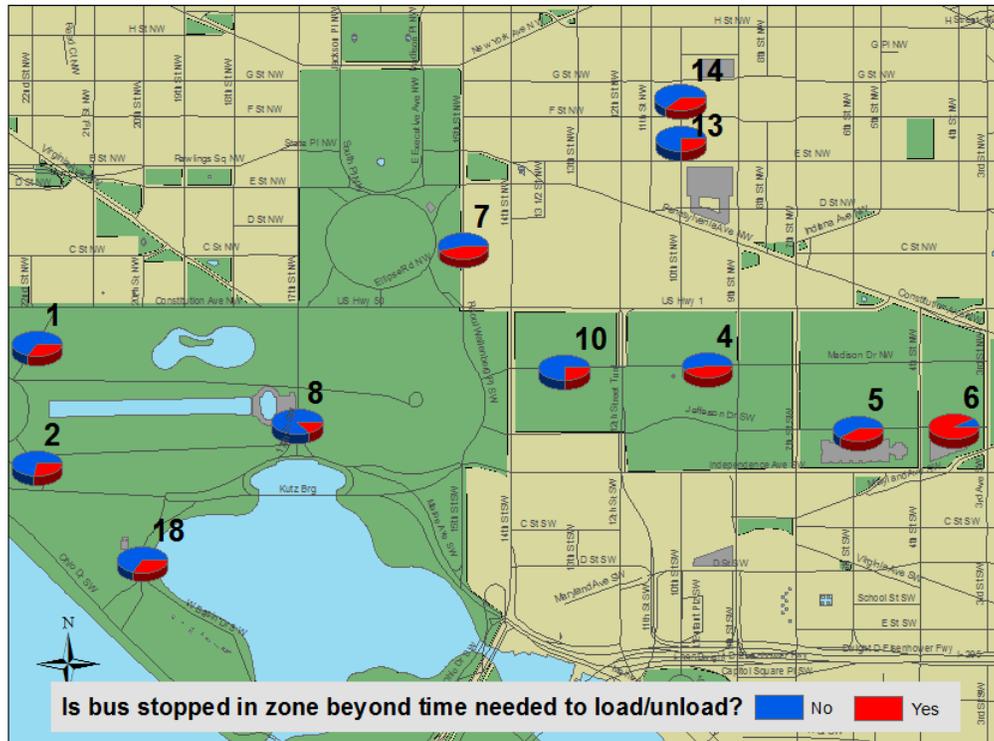


Key for Loading / Unloading Zones					
1	Lincoln Memorial North	6	American Indian Museum	13	Ford's Theatre (500 block)
2	Lincoln Memorial South	7	Ellipse	14	Ford's Theatre (600 block)
4	Natural History Museum	8	World War II Memorial	18	Franklin Delano Roosevelt /
5	Air and Space Museum	10	American History Museum		Martin Luther King Jr. Memorials

3.6.1 Buses Staying in Zones beyond the Time Needed to Load or Unload

Operational issues are responsible for much of the disruption in the parking system around the National Mall. The most prevalent issue is specific to buses staying in zones beyond the time needed to load or unload (Variable 23a). Validating the data specific to wait time and empty buses, buses in Zone 4 and Zone 6 were most likely to stay beyond the time needed (Figure 3.21).

FIGURE 3.21. DID THE BUS STOP IN THE ZONE BEYOND TIME NEEDED TO LOAD / UNLOAD?



Key for Loading / Unloading Zones

1 Lincoln Memorial North	6 American Indian Museum	13 Ford's Theatre (500 block)
2 Lincoln Memorial South	7 Ellipse	14 Ford's Theatre (600 block)
4 Natural History Museum	8 World War II Memorial	18 Franklin Delano Roosevelt /
5 Air and Space Museum	10 American History Museum	Martin Luther King Jr. Memorials

3.6.2 Buses Blocking Pedestrian Traffic and Facility Entrances

Cases of buses blocking pedestrian traffic (Variable 23c) and facility entrances (Variable 23e) were rare, and were most likely to occur in front of the Smithsonian holdings and Ford’s Theatre (Figure 3.22 and Figure 3.23).

FIGURE 3.22. DID THE BUS BLOCK PEDESTRIAN TRAFFIC?

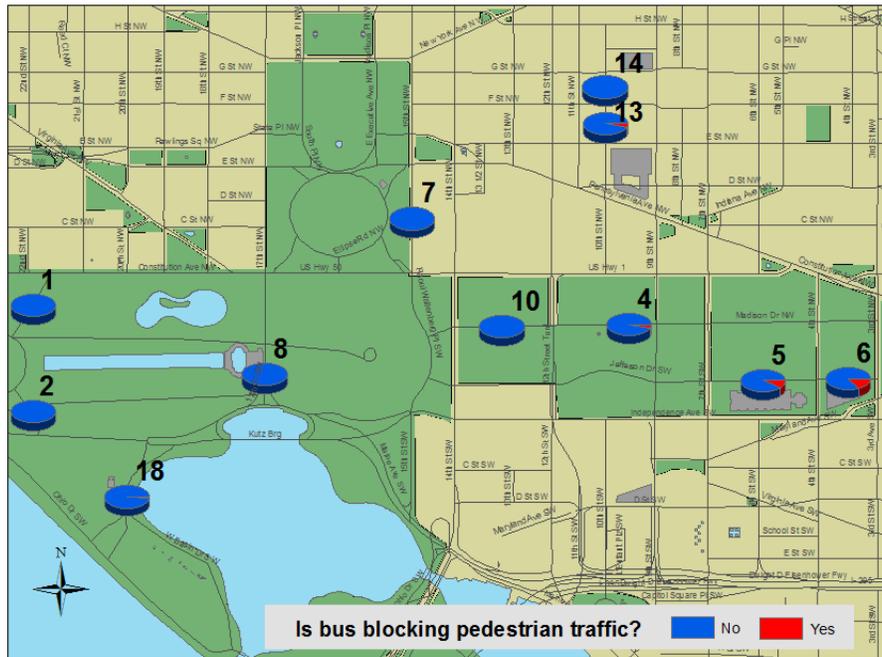
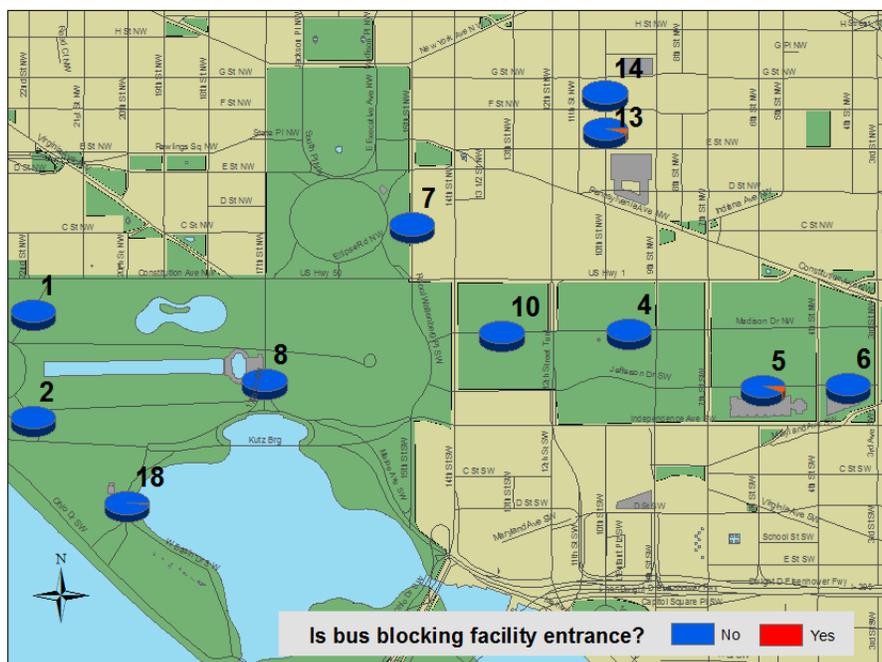


FIGURE 3.23. DID THE BUS BLOCK A FACILITY ENTRANCE?

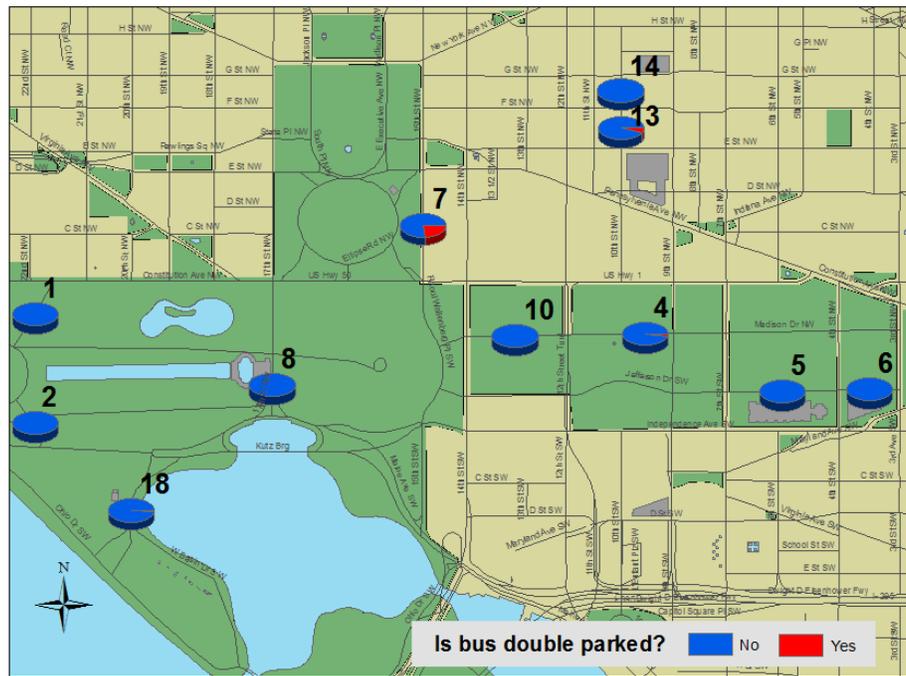


Key for Loading / Unloading Zones					
1	Lincoln Memorial North	6	American Indian Museum	13	Ford’s Theatre (500 block)
2	Lincoln Memorial South	7	Ellipse	14	Ford’s Theatre (600 block)
4	Natural History Museum	8	World War II Memorial	18	Franklin Delano Roosevelt / Martin Luther King Jr. Memorials
5	Air and Space Museum	10	American History Museum		

3.6.3 Double Parking

Double parking (Variable 23f) occurred primarily in Zone 7 and Zone 13, both of which are outside the National Park Service jurisdiction (Figure 3.24). Zone 7 has designated parking areas that are also used for loading and unloading due to the proximity to the White House. Zone 13 has too few loading and unloading spaces, in particular during the high season of student group visitation, and double parking exacerbates the problems.

FIGURE 3.24. DID THE BUS DOUBLE PARK?



Due partly to the varying sizes of motor coaches and partly to poor parking practices, such as when buses did not pull up far enough into the zone to allow room for another bus, some parking spaces were not quite big enough for a bus to use without blocking the traffic lane. Partial spaces were often used as passenger marshaling areas for buses that double-parked within the zone (Photo 3.9).

PHOTO 3.9. DOUBLE PARKING (ZONE 13)



Key for Loading / Unloading Zones

1 Lincoln Memorial North	6 American Indian Museum	13 Ford's Theatre (500 block)
2 Lincoln Memorial South	7 Ellipse	14 Ford's Theatre (600 block)
4 Natural History Museum	8 World War II Memorial	18 Franklin Delano Roosevelt /
5 Air and Space Museum	10 American History Museum	Martin Luther King Jr. Memorials

An ‘almost big enough’ loading space seemed to encourage double parking for loading and unloading. (Photo 3.10 and Photo 3.11).

PHOTO 3.10. DOUBLE PARKING (ZONE 7)



PHOTO 3.11. DOUBLE PARKING (ZONE 7)



Key for Loading / Unloading Zones					
1	Lincoln Memorial North	6	American Indian Museum	13	Ford's Theatre (500 block)
2	Lincoln Memorial South	7	Ellipse	14	Ford's Theatre (600 block)
4	Natural History Museum	8	World War II Memorial	18	Franklin Delano Roosevelt /
5	Air and Space Museum	10	American History Museum		Martin Luther King Jr. Memorials

Hop on-Hop off buses and others that quickly unload or load only a few passengers often double parked, even when a proper space was available (Photo 3.12).

PHOTO 3.12. DOUBLE PARKING (ZONE 13)



For some tour bus drivers, unloading or loading in close proximity to the main entrance to a site/building was evidenced, even if it meant blocking another stopped bus or infringing on a crosswalk (Photo 3.13).

PHOTO 3.13. DOUBLE PARKING (ZONE 4)



Not all of the observed double-parking for loading/unloading was observed in designated zones. It often occurred slightly beyond the zone (Photo 3.14), near the entrance to a destination (Photo 3.15), or at a remote meeting place designated by an accompanying tour guide.

Double-parking for loading/unloading was not always a hurried process. Several buses were observed lingering in a double-parked state beyond the time needed for unloading passengers, especially if other traffic had a way to go around the double-parked bus.

Key for Loading / Unloading Zones

1	Lincoln Memorial North	6	American Indian Museum	13	Ford's Theatre (500 block)
2	Lincoln Memorial South	7	Ellipse	14	Ford's Theatre (600 block)
4	Natural History Museum	8	World War II Memorial	18	Franklin Delano Roosevelt /
5	Air and Space Museum	10	American History Museum		Martin Luther King Jr. Memorials

PHOTO 3.14. DOUBLE PARKING (NEAR ZONE 5)



PHOTO 3.15. DOUBLE PARKING (NEAR ZONE 4)



Double-parking for loading/unloading was not always necessary. In some situations, passengers were loaded or unloaded without the bus pulling into an available designated space, potentially because the space was tight and difficult to navigate (Photo 3.16).

PHOTO 3.16. DOUBLE PARKING (ZONE 7)



Key for Loading / Unloading Zones					
1	Lincoln Memorial North	6	American Indian Museum	13	Ford's Theatre (500 block)
2	Lincoln Memorial South	7	Ellipse	14	Ford's Theatre (600 block)
4	Natural History Museum	8	World War II Memorial	18	Franklin Delano Roosevelt /
5	Air and Space Museum	10	American History Museum		Martin Luther King Jr. Memorials

3.6.4 Loading / Unloading in a Non-designated Loading Zone

Loading and unloading in non-designated loading zone (Variable 23g) was a prevalent problem with violations reported across the National Mall, often contributing to congestion in and around these areas. In most cases, out-of-zone loading/unloading was done adjacent to a designated zone rather than in an area far from it. Out-of-zone loading and unloading was typically in response to lack of available or navigable space within the designated zones at the time the bus arrived.

When examined by zone, the area which experienced the highest number of loadings/unloading in a non-designated area was Zone 5. However, in terms of percentage, all observed buses in Zone 10 loaded/unloaded in non-designated area while a significant percentage of buses in Zone 4 (40.8%), Zone 5 (33.8%), and Zone 18 (31.5%) were also observed loading or unloading in non-designated areas (Table 3.5, Figure 3.25).

There are multiple possibilities for why particular zones incurred more loading/unloading challenges. Zone 4, i.e. the National Museum of Natural History had a high proportion of drivers that would stop for long periods of time with an empty bus, leaving other buses no space to pull in and drivers opting to double park rather than circle back. Zone 5, the National Air and Space Museum, historically has the highest level of visitation of the Smithsonian holdings (approximately 7 million in 2011 according to Smithsonian records) meaning that a steady stream of buses come through searching for one of the nine spaces to unload directly in front of the museum. Exacerbating the problems is that some drivers prefer remaining while their passengers visit the museum rather than negotiating travel to the more distant RFK Stadium. The travel time to/from the stadium coupled with frequent construction reroutes and a less than direct route were noted by several drivers as deterrents to relocating during the period of time their passengers remain at the museum. Further complicating the matter is that drivers are unwilling or unable to load/unload in the spaces found in front of the adjacent National Museum of the American Indian (Zone 6), which also has nine spaces yet had 1.4 million visitors in 2011, according to Smithsonian records. Two facts lead to the conclusion that Zone 6 is being treated as a parking area rather than a loading / unloading zone: 1) 89.7% of observed buses in Zone 6 were empty; 2) this zone experienced the longest wait time of all zones (see Table 3.2). With the exception of buses carrying passengers with specialized needs, drivers should be encouraged to load / unload at Zone 6 and allow their passengers to make the short walk to the National Air and Space Museum.

Zone 13, the area near Ford's Theatre, also experienced a relatively high frequency of non-designated zone loading and unloading. The primary passengers were students in the K-12 system visiting for school field experiences. It appears this problem is seasonal in that it occurs primarily during the spring months, coinciding with the data collection period, when there is a spike in visitation because schools are engaging in year-end field experiences.

Notable violations took place at Zone 18, the FDR & MLK Memorial area, which was temporarily closed to loading and unloading due to the National Cherry Blossom Festival, a change in policy which drivers either did not notice or elected to ignore. During the festival, this zone was clearly marked as a media only area and was frequently populated by security vehicles. At other times of the year, this area is identified as a legal loading/unloading zone, but was not identified as such during the festival. Therefore, drivers who traditionally used this zone to load/unload passengers during legal times chose to continue using the location during the Festival rather than attempting to determine a different locale. Drivers tended to stop before the marked out zone, rather than beyond it (Photo 3.17), or stopped in the traffic lanes, thereby slowing down or blocking other vehicles, including other tour buses (Photo 3.18). Tour bus drivers who could not find available stopping places and had passengers waiting curbside sometimes chose to stop in slower traffic lanes (e.g. turning lanes) for loading (Photo 3.19). Alternatively, to reduce the difficulties confronting seniors and passengers using assistive devices, tour bus drivers sometimes stopped close to site entrances, even if there was no designated loading/unloading zone. In so doing, they impeded traffic flow (Photo 3.20).

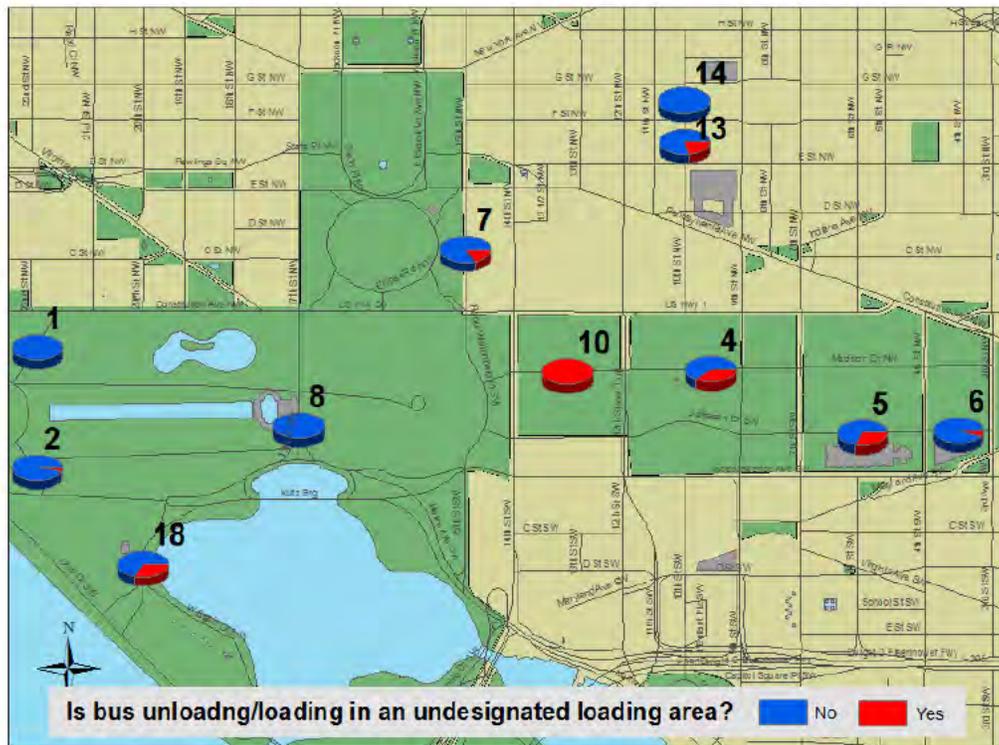
Key for Loading / Unloading Zones

1	Lincoln Memorial North	6	American Indian Museum	13	Ford's Theatre (500 block)
2	Lincoln Memorial South	7	Ellipse	14	Ford's Theatre (600 block)
4	Natural History Museum	8	World War II Memorial	18	Franklin Delano Roosevelt /
5	Air and Space Museum	10	American History Museum		Martin Luther King Jr. Memorials

TABLE 3.5. LOADING / UNLOADING IN NON-DESIGNATED AREAS

Zone	Total Number of Buses Observed Loading/Unloading in Zone	Number of Buses Observed Loading/Unloading in Non-Designated Area within Zone	Percentage of Buses Observed Loading/Unloading In Non-designated Area within Zone
1	15	0	0.0%
2	116	5	4.3%
4	71	29	40.8%
5	130	44	33.8%
6	34	2	5.9%
7	35	6	17.1%
8	20	0	0.0%
10	8	8	100%
13	95	20	21.1%
14	8	0	0.0%
18	73	23	31.5%
Total	605	137	22.6%

FIGURE 3.25. DID THE BUS LOAD OR UNLOAD IN A NON-DESIGNATED AREA?



Key for Loading / Unloading Zones					
1	Lincoln Memorial North	6	American Indian Museum	13	Ford's Theatre (500 block)
2	Lincoln Memorial South	7	Ellipse	14	Ford's Theatre (600 block)
4	Natural History Museum	8	World War II Memorial	18	Franklin Delano Roosevelt / Martin Luther King Jr. Memorials
5	Air and Space Museum	10	American History Museum		

PHOTO 3.17. LOADING IN NON-DESIGNATED ZONE (ZONE 18)



PHOTO 3.18. LOADING IN NON-DESIGNATED ZONE (ZONE 18)



PHOTO 3.19. LOADING IN NON-DESIGNATED ZONE



Key for Loading / Unloading Zones

1 Lincoln Memorial North	6 American Indian Museum	13 Ford's Theatre (500 block)
2 Lincoln Memorial South	7 Ellipse	14 Ford's Theatre (600 block)
4 Natural History Museum	8 World War II Memorial	18 Franklin Delano Roosevelt /
5 Air and Space Museum	10 American History Museum	Martin Luther King Jr. Memorials

PHOTO 3.20. LOADING IN NON-DESIGNATED ZONE (ZONE 4)



3.6.5 Incomplete Pull-up and View Disturbances

Even parked tour buses that were essentially properly in place created challenges for traffic and the visitor experience at the National Mall. A common issue that was observed was traffic flow restriction due to buses that were not parked ‘tightly’ in the designated loading/unloading zones (Photo 3.21). If a large bus was not parallel to or several feet away from the curb, then part of the vehicle protruded into and constricted the passing traffic lanes. Buses were also seen pulling close to the zone but not into the designated space (Photo 3.22).

PHOTO 3.21. INCOMPLETE PULL-UP (ZONE 5)



Key for Loading / Unloading Zones					
1	Lincoln Memorial North	6	American Indian Museum	13	Ford's Theatre (500 block)
2	Lincoln Memorial South	7	Ellipse	14	Ford's Theatre (600 block)
4	Natural History Museum	8	World War II Memorial	18	Franklin Delano Roosevelt /
5	Air and Space Museum	10	American History Museum		Martin Luther King Jr. Memorials

PHOTO 3.22. INCOMPLETE PULL-UP (ZONE 13)



In some designated loading/unloading or parking zones, long lines of tall, tightly parked buses created visual barriers between pedestrians and the heritage vista. Walking along sections of Madison Drive or Jefferson Drive, for example, provided pedestrians with close up views of tour buses rather than the greenspace (Photo 3.23). Parked or stopped buses also block the views of motorists who often cannot see permanent or temporary traffic signs or signals (Photo 3.24).

PHOTO 3.23. WALL OF BUSES (ZONE 4)



PHOTO 3.24. SIGN BLOCKAGE (ZONE 7)



Key for Loading / Unloading Zones

1 Lincoln Memorial North	6 American Indian Museum	13 Ford's Theatre (500 block)
2 Lincoln Memorial South	7 Ellipse	14 Ford's Theatre (600 block)
4 Natural History Museum	8 World War II Memorial	18 Franklin Delano Roosevelt /
5 Air and Space Museum	10 American History Museum	Martin Luther King Jr. Memorials

3.7 GROUPS OF BUSES FROM THE SAME COMPANY

The vast majority of buses were not identified as part of a group of buses travelling with the same company (Variable 25). The accuracy of this assessment is limited by the fact that as part of this methodology, researchers were not able to approach and speak to drivers to ascertain this information; therefore, it was based on bus company name only as indicated on the buses. Among the buses in groups, the predominant group size appeared to be two (Table 3.6).

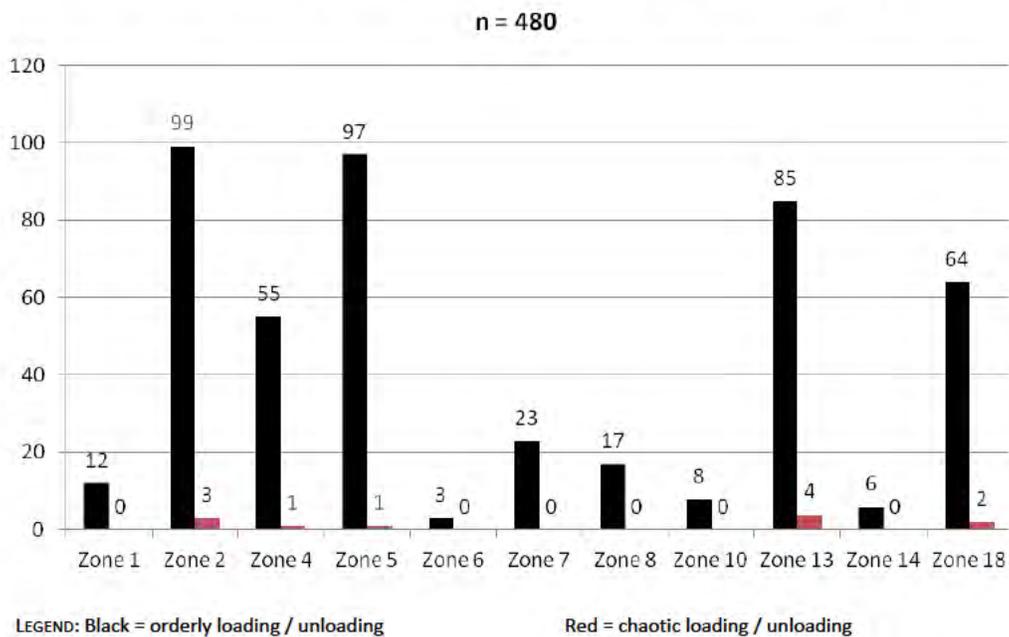
TABLE 3.6. BUS GROUP SIZE DISTRIBUTION

Bus Group Size	Number of Buses Identified in this Group Size	Percentage
1	555	88.7%
2	63	10.1%
3	3	0.5%
4	4	0.6%
5	1	0.2%
Total	626	100%

3.8 ORDERLINESS OF PASSENGER LOADING AND UNLOADING

Among those buses that loaded or unloaded passengers, the majority (n=469, 97.7%) did so in an orderly manner (Variable 14). Only 11 instances (203%) were observed in which buses loaded or unloaded in a chaotic manner. A chaotic manner was indicated if the loading or unloading was done in such a way that might compromise the safety of the passenger or any other individual. For instance, when buses would unload in the middle of the road, passengers were likely to disperse in a variety of directions to get safely to the sidewalk, often running in front of other moving vehicles. These cases occurred in Zones 2, 4, 5, 13, and 18 (Figure 3.26). Chaotic behaviors were most likely to be witnessed in Zone 13, by Ford’s Theatre, attributable to the lack of loading and unloading spaces combined with the yearly peak in student visitation to the site.

FIGURE 3.26. ORDERLINESS OF PASSENGER LOADING AND UNLOADING, BY ZONE



Key for Loading / Unloading Zones			
1	Lincoln Memorial North	6	American Indian Museum
2	Lincoln Memorial South	7	Ellipse
4	Natural History Museum	8	World War II Memorial
5	Air and Space Museum	10	American History Museum
13	Ford's Theatre (500 block)	13	Ford's Theatre (500 block)
14	Ford's Theatre (600 block)	14	Ford's Theatre (600 block)
18	Franklin Delano Roosevelt / Martin Luther King Jr. Memorials	18	Franklin Delano Roosevelt / Martin Luther King Jr. Memorials

3.9 USE OF ASSISTIVE DEVICES

In 51 cases (8.1%), passengers were observed using assistive devices such as crutches, canes or wheelchairs (Variable 16; see Figure 3.27, Table 3.7, Figure 3.28). Qualitative comments such as: “The wheelchair caused a traffic jam. There were honks and verbal complaints from other bus drivers” (Zone 4); “Person on walker took an extended amount of time to get off the bus” (Zone 5); “Multiple people with canes, mostly elderly group who move slowly” (Zone 13); and “Took out strollers from luggage area” (Zone 18) support an assumed relationship between the presence of assistive devices and the need for increased loading/unloading time.

FIGURE 3.27. OBSERVED USE OF ASSISTIVE DEVICES

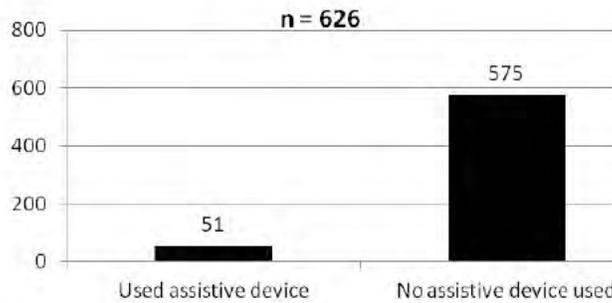
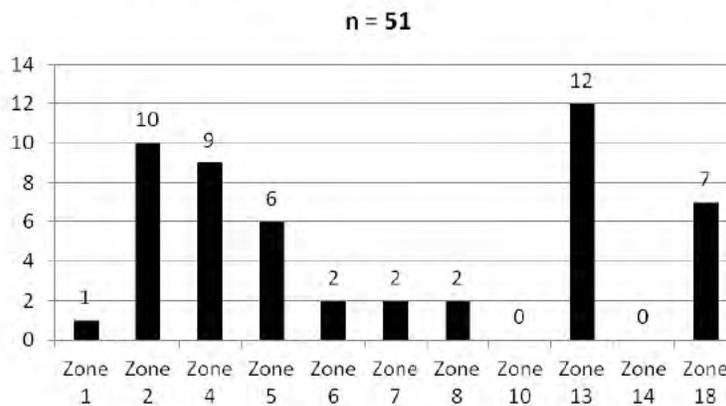


TABLE 3.7. OBSERVED USE OF ASSISTIVE DEVICES, BY ZONE

Zone	Number of Assistive Devices Observed in Zone
1	1
2	10
4	9
5	6
6	2
7	2
8	2
10	0
13	12
14	0
18	7
Total	51

FIGURE 3.28. OBSERVED USE OF ASSISTIVE DEVICES, BY ZONE



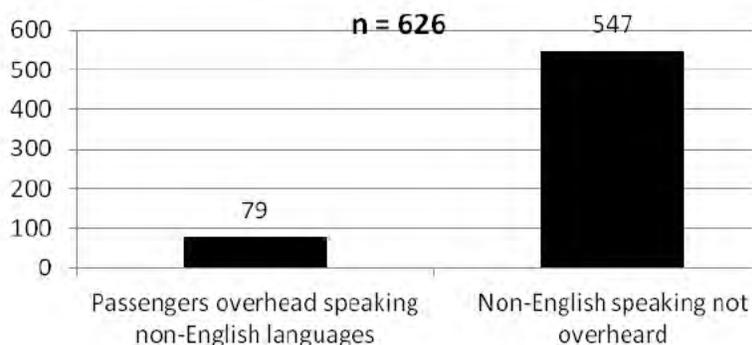
Key for Loading / Unloading Zones

1 Lincoln Memorial North	6 American Indian Museum	13 Ford's Theatre (500 block)
2 Lincoln Memorial South	7 Ellipse	14 Ford's Theatre (600 block)
4 Natural History Museum	8 World War II Memorial	18 Franklin Delano Roosevelt /
5 Air and Space Museum	10 American History Museum	Martin Luther King Jr. Memorials

3.10 PASSENGERS SPEAKING IN A LANGUAGE OTHER THAN ENGLISH

In 79 cases (12.6%), a language other than English was overheard (Variable 17, Figure 3.29). However, no attempt was made to determine dominant language or country of origin or any group, as researchers were instructed not to interact with visitors.

FIGURE 3.29. PASSENGERS SPEAKING IN A LANGUAGE OTHER THAN ENGLISH



3.11 APPROXIMATE NUMBER OF PASSENGERS BY AGE GROUP

In assessing approximate age of passengers (Variable 15), four groups were identified: Pre-teens (individuals under 13 years old), Teens (individuals 13-18 years old), Adults (individuals 19-65 years old), and Seniors (individuals older than 65 years). Because the data were collected via observation only, assessment of individual passenger ages was approximate.

While the predominant passenger age group observed was adults, individuals from each age group were identified among all passengers (Table 3.8).

TABLE 3.8. APPROXIMATE NUMBER OF PASSENGERS BY AGE GROUP

Passenger Type	Average Number of Passenger Type (mean)	Standard Deviation	Minimum – Maximum of Passenger Type in Groups*	Number of Buses with Passenger Type
Pre-teens	11/group	12.6	1 – 50 people	159 buses
Teens	17/group	14.7	1 – 60 people	218 buses
Adults	13/group	11.9	1 – 60 people	424 buses
Seniors	10/group	11.5	1 – 50 people	170 buses
Overall	27/group	17.4	1-95 people**	466 buses

* Only groups containing passengers of the type noted were included in this analysis. If no passengers of the type described were on a bus, it was not included in the average, standard deviation or minimum/maximum analysis.

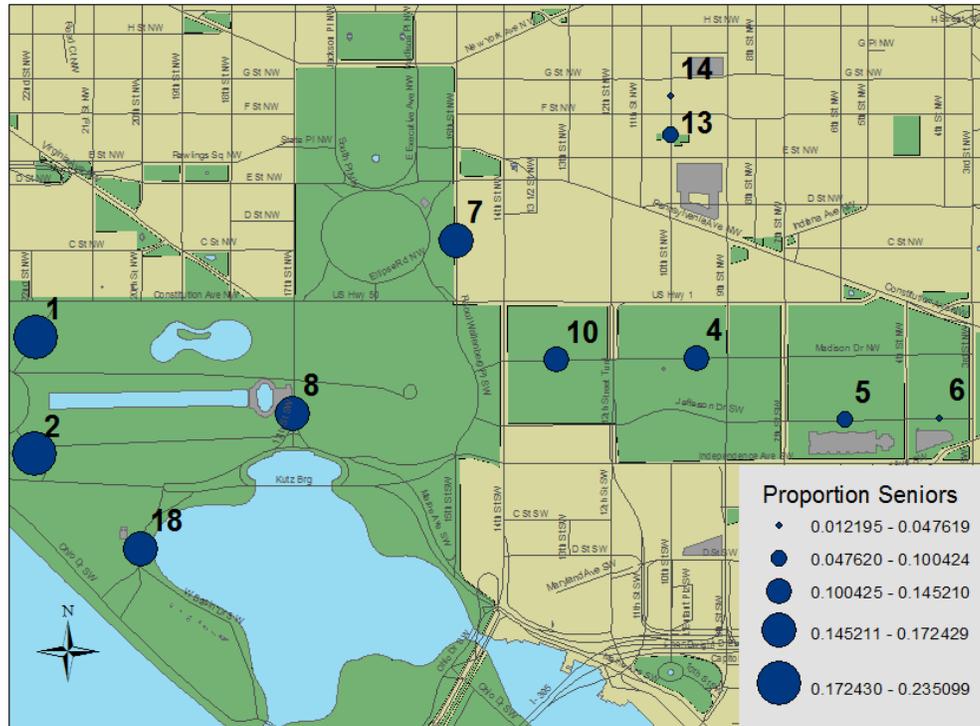
**Total group sizes were calculated by summing the number in each age group. For large groups, numbers of individuals in each age group were approximated quickly. Therefore, several instances (1.4% of the sample) occurred in which overall group size exceeded the size likely to be on the bus. The effect on overall assessment is negligible and these groups were treated as outliers.

The proportion of certain interest groups within the tourist population (including seniors and individuals requiring assistive devices) may offer a reliable indicator of differentiating factors between zones based on interest and accessibility. Figure 3.30 offers an indication of the proportion of seniors on the buses, by zone.

Key for Loading / Unloading Zones					
1	Lincoln Memorial North	6	American Indian Museum	13	Ford's Theatre (500 block)
2	Lincoln Memorial South	7	Ellipse	14	Ford's Theatre (600 block)
4	Natural History Museum	8	World War II Memorial	18	Franklin Delano Roosevelt /
5	Air and Space Museum	10	American History Museum		Martin Luther King Jr. Memorials

The west side of the National Mall (Zones 1, 2, 8 and 18) had buses with higher proportions of seniors. This suggests that seniors may be more interested in the monuments that are concentrated in this area than the museums found along Jefferson Drive and Madison Drive. Seniors were unlikely to be seen in the comparatively outlying Zone 6 and Zone 14, both of which require a longer walking distance to the main sites of interest in the area. From a policy standpoint, laws related to idling may need to be considered in light of increased time needed for those with assistive devices and slower movement patterns, particularly during periods of very hot and very cold weather.

FIGURE 3.30. PROPORTION OF SENIORS ON BUS



3.12 TRASH DISPOSAL

Occurrences and location of trash and other waste disposal by both the drivers of the buses and the passengers were noted with Variables 19, 20, 21 and 22. Of the 626 buses observed, only 4 instances of trash disposal of any kind were noted. Specifically, one drink was poured on the ground and the cup disposed of in a trash bin, one person threw trash on the sidewalk, one distributed trash in an adjacent trash can and one driver threw cigarette butts on the ground. Overall, bus driver and bus passenger behaviors associated with trash disposal were very minimal during this data collection period.

Key for Loading / Unloading Zones

1 Lincoln Memorial North	6 American Indian Museum	13 Ford's Theatre (500 block)
2 Lincoln Memorial South	7 Ellipse	14 Ford's Theatre (600 block)
4 Natural History Museum	8 World War II Memorial	18 Franklin Delano Roosevelt /
5 Air and Space Museum	10 American History Museum	Martin Luther King Jr. Memorials

4. QUALITATIVE RESULTS: RESEARCHER OBSERVATIONS AND OVERHEARD COMMENTARY

4.1 NUMBER OF WRITTEN OBSERVATIONS, BY ZONE

Researchers were given space in three places on the data collection instrument (Variables 12, 18 and 26) to note observations and overheard comments. These variables are indistinguishable in that researchers could note any comment or observation in any of the available space; thus the findings from these three variables are combined for analysis. Researchers were not required to fill in these spaces and only made notations as deemed relevant. A total of 513 written observations were analyzed (Table 4.1).

TABLE 4.1. NUMBER OF WRITTEN OBSERVATIONS MADE, BY ZONE

Zone	Number of Written Observations
1	25
2	79
4	59
5	123
6	32
7	32
8	6
10	8
13	104
14	6
18	39
Total	513

4.2 PRIMARY THEMES

Observations and notes were recorded in terms of operator behaviors and passenger behaviors that have not identified or instructed in other categories in the observation instrument. Three columns were designated to capture additional observable behaviors. Observed comments and notes on these three columns were not significantly distinctive each other, therefore, they were combined for the qualitative analysis purpose. From the 513 observations that were analyzed, 14 primary themes were identified, as summarized by frequency and percentage in Table 4.2.

TABLE 4.2. THEMES: FREQUENCY AND PERCENTAGE OF OBSERVATIONS

Theme	Frequency	Percentage
Parking/standing in loading/unloading zone	102	19.9%
Other	83	16.2%
Passenger behavior	48	9.4%
Idling	42	8.2%
Passenger information	39	7.6%
Driver/tour operator behaviors	36	7.0%
Impact of police/researcher/park ranger existence	34	6.6%
Blocking/double parking	31	6.0%
Loading/unloading in road	29	5.7%
Coming through (no loading/unloading) / Circulating	19	3.7%
Loading/unloading in undesignated areas	17	3.3%
Special assistance needed	16	3.1%
Private car/taxi	12	2.3%
DOT number or license number	5	1.0%
Total	513	100.0%

Key for Loading / Unloading Zones

1 Lincoln Memorial North	6 American Indian Museum	13 Ford's Theatre (500 block)
2 Lincoln Memorial South	7 Ellipse	14 Ford's Theatre (600 block)
4 Natural History Museum	8 World War II Memorial	18 Franklin Delano Roosevelt /
5 Air and Space Museum	10 American History Museum	Martin Luther King Jr. Memorials

As Table 4.2 demonstrates (excluding “Other”), parking and standing in a loading/unloading zone was the most frequently observed behavior of tour bus operations in the studied areas, followed by passenger behavior and idling. Parking and standing in loading/unloading zones have direct and ripple impacts on tour bus operations, leading other buses to double park or load/unload in the road or other undesignated areas.

Some observational notes indicated that elongated standing or blocking is caused by passenger behaviors, and that passengers put themselves in dangerous situations such as crossing into oncoming traffic. It is noteworthy that the presence of an enforcement officer or a researcher was observed to change driver behavior. Several notes indicated that police intervened and cleared out all standing/parking buses intermittently but there was no ticketing observed. Comments overheard from police versus drivers portray opposing perspectives: police consider their actions as very lenient while drivers feel that DC enforcement is very punitive.

Comments included in “Other” were those that may have informed data entry (e.g., Bus left too quickly to get picture) but that were not relevant to study recommendations.

4.3 OBSERVATIONS BY THEME

In order to clarify the nature of each theme, sample observations are presented in Table 4.3.

TABLE 4.3. OBSERVATIONS BY THEME

Theme 1. Parking/standing in loading/unloading zone	
Parked for a minute then left	
Has parked behind another bus	
He did not load or unload. Just parked and left 40 minutes later	
Standing with no passenger, not idling, turn off engine	
Parked in 2 hour bus parking	
NPS should open the loading/unloading. They are doing at anyway.	
Theme 2. Other	
Zone 2 not 1	
We accidently documented this bus twice	
Air and Space museum	
Bus left too quickly to get picture	
Theme 3. Passenger behavior	
Took forever to load bus	
Waiting for people to get food and beverage	
Not a good crosswalk from Vietnam to loading	
Exit was orderly but they went into the street to cross into oncoming traffic	
Passengers loaded sporadically over about an hour's time	
Theme 4. Idling	
Turn off the engine after stop	
Turn off the engine right away	
Idle complete time	
Engine still running	
Theme 5. Passenger information	
All of Asian descent	
Preteen group	
Spanish overheard	
School age	
Student group	
Mostly elderly group	
Penn State University group	
Theme 6. Driver/tour operator behaviors	
Driver got out for lunch/parked	
Driver came out to smoke but turned off engine	
Driver left bus unattended	
Bus drivers talking to each other to move out. One driver said "I parked here for hours."	
Bus drivers talking, "See those people taking pictures of us?"	
Driver asked what we are doing	

Key for Loading / Unloading Zones

1	Lincoln Memorial North	6	American Indian Museum	13	Ford's Theatre (500 block)
2	Lincoln Memorial South	7	Ellipse	14	Ford's Theatre (600 block)
4	Natural History Museum	8	World War II Memorial	18	Franklin Delano Roosevelt /
5	Air and Space Museum	10	American History Museum		Martin Luther King Jr. Memorials

Tour operator moved passengers from top tier to lower tier because of overcrowding on top
Driver yelling "Hurry, watch out, get on!"
Theme 7. Impact of police/researcher/park ranger existence
Police passed and sounded his alarm; buses pulled out at police insistence
Stopped but left soon after researcher arrived
Saw police and us and left
Park employee greeted driver while idling. No attempt to control, even though very congested
Theme 8. Loading/unloading in road
Stopped in street
Unloaded in middle of road
In the middle of the road, the bus unloaded passengers
Theme 9. Coming through (no loading/unloading) / Circulating
No passenger off just stop by and pull out immediately
Did not load or unload; no passengers
Did not stop; just came through and left
Theme 10. Blocking/double parking
Parked in front blocking crosswalk and traffic
Everyone beeping at him
Because of the wheelchair person it caused a traffic jam and then was honks and verbal complaints from other buses (bus driver)
At 12:16 tried to leave but was blocked in
Tried to leave blocked by two buses ahead of them in regular traffic
Bus idling in a non-loading zone in front of them. Had trouble getting out
Was blocked by another bus
Other buses parked in land/zones full, nowhere to unload
Theme 11. Loading/unloading in undesignated areas
Private vehicle blocked zone then bus pulled up beyond loading zone
Stopped past loading zone in front of hydrant on curb
Stopped in handicapped zone
Theme 12. Special assistance needed
Took out strollers from luggage area
Girl on crutches
Had to lower wheelchair equipment at 2 different times
Multiple strollers were loaded
Cane observed
Theme 13. Private cars/taxi
Private vehicle pulled up to unload
Private SUV pulled up
Taxi van pulled up – buses beeped at it to move
Theme 14. No DOT number or license number
No DOT number; no license plate number, very strange
No photo or DOT – too fast

4.4 OBSERVATIONS BY ZONE

So that issues in specific zones can be noted, all relevant observations are presented in Table 4.4 by zone.

TABLE 4.4. OBSERVATIONS BY ZONE

Zone 1: Lincoln Memorial North Observations	
Just loaded after being parked a long time	
No passengers dropped off; just stopped by and pulled out immediately	
Started to leave but pulled over at the top of the loading zone and parked	
Driver left vehicle for few minutes unattended	
There is not a good cross walk from Vietnam to loading area	
Took forever to load bus	
Parked and waiting for people to get food and beverage	
No passengers were dropped off or got in	
Asian tour group	
Lots of buses are unloading or stopping on Constitution and 22nd at a Metro Bus Stop. It was very slow at this zone. With multiple data collectors, it was close to an hour before I documented my first bus.	
Noticed several buses that appear to be circling on Constitution	
Wanted to park. The driver asked us if he could park. We are influencing behavior here.	
Lots of private cars were parking here. A bus driver beeped his horn to make them move.	

Key for Loading / Unloading Zones			
1	Lincoln Memorial North	6	American Indian Museum
2	Lincoln Memorial South	7	Ellipse
4	Natural History Museum	8	World War II Memorial
5	Air and Space Museum	10	American History Museum
13	Ford's Theatre (500 block)		
14	Ford's Theatre (600 block)		
18	Franklin Delano Roosevelt / Martin Luther King Jr. Memorials		

Private vehicles are loading and unloading this this zone
Private vehicles and taxis load and unload here
Private vehicles unloading
This zone is severely under utilized
Zone 2: Lincoln Memorial South Observations
Bus is idling but not loading
Police officer seen in this zone
A bus not moving caused traffic problems and delays for others
The bus idled the whole time in the zone
Passengers stayed for 5 minutes in the bus and then got off
The bus parked empty for a minute then left
Bus stopped for 2 minutes with engine off. No passengers.
Bus did not stop; it just came through and left
Turned off engine when unloading people but then turned it back on
Bus parked behind another bus
Engine off stayed parked behind another bus for 12 minutes
Driver left vehicle with group, but then moved when directed by police
One cane observed
Police officer stopped by
Quick stop and go. Did not stay long enough for anyone to load/unload
All passengers of Asian descent
The bus is holding up traffic because it is not moving
Blocking traffic. Moved up to provide more space.
Pull in at 11:37 observed King Coal still parked in loading zone. 11:50 -left
Bus driver refused to load passengers. Caused confusion. Driver is just waiting.
Bus made a loop – circling
Directed by police to move on. Began idling
One cane observed
Only one bus parked on curb. The others stopped in the street
Van parked after passengers got off. Not causing any traffic congestion.
Police came by and cleared out all buses
Stroller taken off the bus. Spanish overheard
Cane observed
Unloaded into another old town trolley bus
All passengers are Asian
One cane observed
More elderly than young adults on this bus
Majority of passengers are 13-18
Passengers seemed rushed
Asian tour, orderly but a little rushed/rush to cross street
The bus circled and returned
Pulled up and stopped (parked)
One cane observed
Parked. Police officer moved buses along
Bus did not stop. Just came through
Passenger got on to ask a question then got off again
Pulled up to loading zone just to park
Parked
Driver left bus unattended
Two police on horseback came up, did not say anything to driver. Driver said to customer the bus was just a ticket bus
Did not cause congestion (at first)
Unloaded the moved forward to park
Pulled in backed up to park
Drove through loading area twice then parked
Parked while unloading moved up and parked again
All buses stopped on curb to load
A private vehicle is idling
Zone 4: Natural History Museum Observations
Driver did not load or unload. Just parked and left 40 minutes later
Driver came out to smoke but turned off engine
Some of group returned at 1.15
Engine still running / still here when left at 2 p.m.
Pulled up and parked with flashers
It took a while for all passengers to exit but bus left right way
Pulled forward at about 12:10

Key for Loading / Unloading Zones

1	Lincoln Memorial North	6	American Indian Museum	13	Ford's Theatre (500 block)
2	Lincoln Memorial South	7	Ellipse	14	Ford's Theatre (600 block)
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There were 5 buses standing when we arrived
Standing without running engines. They didn't pick up passengers. Just parking
Standing forever. No idling. No pick up. Just standing for an hour
Standing without idling
The bus unloaded passengers in the middle of the road
Just left without loading or unloading. Saw bus in front of the road, close to the Natural History museum in a non-designated loading zone.
Standing and left without loading people
Standing and just left without loading people
Moved up to a non-designated loading zone
Stopped a little in front of loading zone
College age kids
Unloaded food boxes
One child got on 12:00
Asian passengers with previous Abbott bus
Mega busy with lots of traffic. Private cars parking in the spot. There is bicycle traffic too
The wheelchair caused a traffic jam. There were honks and verbal complaints from other bus drivers
Korean passengers
Passengers had snack time at unloading zone
Parked in the loading zone and main road
Never loaded or unloaded
Stopped in street in cross walk to pick up 2 people
Drivers approached the researcher and asked question about ticket. They commented on more parking spaces needed.
Standing without idling. Wait passenger to come back
Loading/unloading zone is not clear. Zone must be clearly designated with better signage. Lot of private cars (families) load, unload or stand
One bus was standing all morning until 2.00. Finally they loaded passengers (teenagers) & left
Just parking for about 20 minutes
Just pick-up one person (seemed to be tour operator) and left. Maybe because of researcher presence.
Dumped coffee out looked around to make sure no one saw
Bus drivers talked to each other noticed me and left
Penn State University group
Stopped in front of fire hydrant
Zone 5: Air and Space Museum Observations
Pulled up no passengers
Idled the whole time
Idled the whole time. Took picture with police officer
Driver eating lunch in bus
Relocated to spot closer to entrance from 12.21-12.24 then headed out
Bus started idling again at 1 p.m.
Bus started idling at 2 p.m. (perhaps cooling bus for passengers?)
No DOT number; no license plate number, very strange
Just stopped then moved to another site
Didn't do anything. Just parked
Left engine on the whole time
Chatted with us and left engine on
5 buses parked in loading and unloading zone when we arrived
Did not load or unload; no passengers
Driver asked what we are doing
Near the zone but slightly out of the zone
Just standing, no idling
Driver standing after unloading people. Waited for tour operator to come back
Stopped but left soon after researchers arrived
Engine was off during the unloading after unloading. Bus is parked
5 buses were parked; undesignated when we arrived
Police pulled up behind and sounded siren. Bus moved immediately
Bus in no standing lane for 2 hours
Parked in front blocking crosswalk and traffic
Driver left bus unattended
Unloaded half in and half out of zone
A people to people tour was using the bus
Some passengers got on, got stuff and left
Small slide open door
Backed up to get into loading zone
Adjusted and parked

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Korean passengers
One girl on crutches
Police told drivers to move
Student aged group
Unloaded in crosswalk
Bus moved forward and parked
Police told drivers to leave
Bus stayed in cross walk
Police officer is ticketing bus at 2.25, took license plate information
Police assisted to move bus promptly
Bus stopped in crosswalk, opened door, single passenger entered then bus left.
Almost impossible to assess language differences in this crowd by Air and Space
Passengers loaded sporadically over about an hour's time
No people loaded/unloaded
One passenger used a walker
Some passengers seem to finish their itinerary here and were picked up by someone
No unloading/loading. Just parked
Student group
Student group
No loading people for a long time. Began to load 2:32
People began to load at 2:25 but student group headed to Air and Space museum again
Police observed on bike. Everyone cleared out
6 people sitting on bus on arrival. Sat then loading started at 12.55
Started loading at 1:35 pm; kids observed running wild
Person on walker took an extended amount of time to get off the bus
Passengers were going into luggage stored underneath bus
Passengers were slowly arriving
Driver passed loading zone so backed up to get to curb
Passengers stayed on bus for a time before getting off
Bus just came and sat for 15 minutes
Multiple strollers were loaded
Unloaded stroller, moved up while waiting
Bus in a no standing zone
Bus blocked traffic
Driver left bus unattended
Passengers in no rush; took their time
Once one bus pulls into the unauthorized zone others follow
This bus returned at a later time
Bus stopped in no stopping/standing area
Driver appeared to leave because we were watching
Emptied luggage for about 8 people
Narrow space because taxi was double parked on other side
Stopped then left shortly after
Bus blocking traffic then turning from the wrong lane
Bus is working like a base camp students stop by and leave for other places
Primarily parking in this zone - some loading and unloading witnessed
We documented the parked buses
We may have influenced behavior, driver seemed to be looking for somewhere to park
It may make sense to turn this zone into a parking zone or 30 minute zone
It is unclear what this area is, but appears to be non-designated
Bus just pulled up. I spoke to another researcher - this bus had just moved from previous zone to park here
The bus is parking
Drivers asked what we were doing. They are parked along no standing zone.
No standing zone; cut engine off @ 12.10; Driver standing outside of bus
Stepped out to check the outside of the bus
Driver exited bus in order to get walker stored under bus and driver talked to passengers
Driver had to wait for passengers to arrive, who were not waiting
Passengers were not waiting to board so long loading
Bus parked and then finally left after unloading an extra 2 passengers
Sat for a half an hour and didn't load or unload
Zone 6: National Museum of the American Indian Observations
Pulled away at 11.39 and then parked again
Bus drivers talking to each other to move out. One driver said "I parked here for hours."
Pulled up and stopped again
2.14 - Bus drivers talking to each other from other companies; still parked at 2.45

Key for Loading / Unloading Zones

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Bus drivers talking, "See those people taking pictures of us?"
Parallel parked; still parked at 2.45
Still parked
Idle
Still parked
Still parked
Police passed and sounded his alarm; buses pulled out at police insistence
Bus parked. At 1.34, one woman got on the bus. Bus stayed parked.
7 buses pulled up at same time
Police officer came and noticed us taking notes
Driver saw us, decided to move out
Driver saw police and us and left
Bus pulled up and re-parked
Tae kwon Do van pulled up
Driver asked what we were doing
No one is moving
Police pulled up - a whole bunch left
This spot is used for parking even though it is loading and unloading only
Drivers talking to each other about police
Taxi van pulled up - buses beeped at it to move
12.42 moved out of violation zone (curb cut)
Bus still parked
Everyone is parking and hanging out
We have seen this bus circle around multiple times and for the most part not stopping after the first time
Driver remarked about police: "They have been chasing us. I have been going around the block"; as of 12.15 we have seen no passengers load or unload off a large tour bus
Drivers all complaining about police
Close to 10 buses pulled up at same time; still parked at 2.45
At curb cut; why is a curb cut in the middle of a loading/unloading zone?
Zone 7: Ellipse Observations
Parked
Parked
Driver got out to buy lunch/parked
Parked
Parked
Parked in 2 hour bus parking
Parked in 2 hour bus parking
Parked in 2 hour bus parking
Stopped in street
Parked in 2 hour bus parking
Parked
Pulled out then went down further & pulled out at 10 a.m. Idled 3-10 minutes then turned off engine
Bus double parked for approx. 3 minutes- then pulled into parking spot
Unloaded in road, then parked open parking space available when unloaded
Cars parked in bus lane, street vendors too
Signs state 2 hour tour bus parking from 7 a.m. - 6:30 p.m.
Officer approached driver and notified him to be careful while unloading
Turned engine on at 12.32 and left at 12.44
Could not tell if they were passengers
Asian passengers. Not sure what language
Other buses parked in lane. The zone is full and there is nowhere to unload
Driver threw cigarette butts on ground
Bus parked
Bus tried to park but moved. Blocked road. Pulled out into traffic
Bus cut out in front of vehicle
Bus stopped in street. Car rolling-unloaded lunches. Blocking traffic
Moved vehicle up blocking space for bus to park
Parked
Zone 8: WWII Memorial Observations
No bus name or DOT number. Just a plain private bus
Mercedes (private car) pulled up
Bus parked in a non-parking area

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		14	Ford's Theatre (600 block)
		18	Franklin Delano Roosevelt / Martin Luther King Jr. Memorials

Zone 10: National Museum of American History Observations	
Parked with no passengers	
9.56 started to load kids	
One of the coordinators asked if he was going to get fined and mentioned that the driver knew he was not supposed to unload in this area	
Dropped passengers off here earlier today, come back to load	
Zone 13: Ford's Theatre 500 Block of 10th St. Observations	
Private vehicle blocked zone then bus pulled up beyond loading zone	
Stopped on the wrong side of the road	
At 12:16 the bus tried to leave but was blocked in	
Bus blocked by two buses ahead of them in regular traffic	
12.54 -1.07 parked in loading zone with engine off. It was appropriate time for the passengers' ability. 1.07-1.15 idling again.	
Honking at car blocking him from behind. Driver stopped idling when pulled in to park. The driver unloaded in the zone. A private van then pulled up & unloaded in road.	
Bus idling in a non-loading zone in front of them. Had trouble getting out.	
Was blocked by another bus	
Passengers unloaded in middle of road	
Took longer because of passenger paying	
Dot on other side (drivers)	
Stopped past loading zone in front of hydrant on curb	
Started to move away then stopped for another minute	
Turning engine off right after pulling in	
Loaded on E St. by 10th St. Turned off engine soon after pulling in.	
Turned off engine upon stopping	
Turned off engine right away	
Stopped for passenger after leaving	
Promotional vehicle	
Bus pulled half in	
Bus stopped in the middle of road; everyone beeping	
Bus seemed to be waiting. Pulled away after a while. May have seen researchers	
Bus in the middle of the road	
Driver moved to find passengers	
Hop on in front is blocked in and cannot pull out	
Unloaded in middle of road	
Illegally parked but put down cone	
Unloaded one passenger	
Turned off ignition. Having mechanical issues	
Stopped and picked up employee at company office	
Driver standing outside bus	
Cut ignition at 2:43 p.m. Group leader told group to be back on bus at 3 p.m.	
When pulling in loading zone, the bus hit the curb hard with tire.	
Tour operator moved passengers from top tier to lower tier because of overcrowding on top	
School group	
Didn't load or unload. Stopped, opened doors and then left	
Exit was orderly but they went into the street to cross into oncoming traffic	
Looked like the bus was coming back to pick up more 1 person who loaded from the street side	
Two people with wheel chairs are at different points in the line	
Multiple people with canes, mostly elderly group who move slowly	
Kid with crutches, bus turned off but was also blocked by bus idling in road	
Two families with strollers	
Teens and preteens	
Bus stopped longer than needed	
Onsite workers of company were running and coordinating in and around bus	
Parked in Trolley loading area - driver exited vehicle	
Driver got off and got back on - after 11 min turned on vehicle again and let sit on for 2 min	
Man with cane	
Looks like a mess/spill needs to be taken care of on the bus. Man entered bus with trash bag and paper towels.	
Guide on bus continued to talk while parked so people did not unload right away	
Driver on cell phone	
Mixed ages	
Private vehicle pulled up to unload	
School group	
Private SUV pulled up	
Two private vehicles stopped	
Passengers walking out for a few minutes. Driver seems unsure what to do	

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Pulled in then went down to next block by comes pulled in again illegally and loaded
Loaded right under the stop light
Cane observed. Mostly elderly group
Bus completely blocking traffic
Wheelchair observed
Started loading at 2:30 pm
Bus blocked part of street
Bus blocked part of road because other buses were blocking loading zone, passengers exited bus & crossed directly into the street
Just idled in loading zone
Had to lower wheelchair equipment at two different times
Bus pulled past zone/ right next to zone but in the street
Bus was blocked in, engine off
At 1.07 police stopped to talk to bus driver but left & bus driver turned on engine
Unsure of where unloading and loading blocks
Pulled halfway in zone and halfway in street
Two buses pulled up at same time
Bus stopped in middle of road
Passengers got off in middle of road
Bus partially in middle of road
Unloaded in middle of road until 12.02, then moved curbside until 12.04
Middle of road- unloaded/loaded. Stayed in road the whole time
Just sat in loading zone and passengers trickled in
Sign says "No Parking 9 am-7 pm daily. Old Town Trolley Tour Only"
Parked in own "parking area" -sat and waited for passengers to pay and got on
Turned on engine again for 4 min
Even with talking they made it out quickly
Parked in unloading zone
Bus did not fully pull in
Pedestrian asked what we are doing
Private car in the way moved over bus came up
Blocked by first bus
Kid observed running to middle of street
Bus stopped in middle of road
A child with a disability on this bus
Back of bus blocked traffic
Zone 14: Ford's Theatre 600 Block 10th St. Observations
Began idling at 12.10
Bus moved to F street and unloaded
Bus just parked
Bus stopped six feet into roadway
Bus parked
Zone 18: Franklin Delano Roosevelt / Martin Luther King Jr, Memorials / West Basin Drive Observations
Bus parking in media only area
It started to rain at 11.15
Bus at media only parking
Driver yelling, "Hurry. Watch out get on!"
Driver turned off the engine right away
Driver left bus unattended
Dropped off then pulled up to park
Took out strollers from luggage area
Bus stopped in handicapped zone
Sticking out in roadway
Moved to regular loading, then parked
Began idling at 1.34
Bus hanging out, waiting
Passengers around bus for a long trip
Preteen group
Crutches observed
Cars pulling up to Segway
School age group
Turned off the engine at 11:56 then turned on the engine again at 12.
Driver told car parking behind him he needed to move – no parking
First round of passengers get off – few minutes go by and more come off
Cane used by one passenger. Driver taking pictures for passenger getting on bus.
Stopped in handicapped zone

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Circled around, then parked
Directed by NPS employee
Just parked. No loading or unloading
Left without re-loading
Unloading at Tidal Basin is all over the place.
Everyone is parking in media parking only spots
Police do not care
NPS should open the loading / unloading they are doing at anyway
Bus parked in middle of road
Park ranger told bus driver that he cannot stop at that location
Park ranger asked a driver to move twice. He moved after being asked 2nd time
Traffic blocked when pulling out
Park employee greeted driver while idling. No attempt to control even though very congested
Stopped 4 feet from curb

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APPENDIX: SAMPLE DATA COLLECTION FORMS

Cover Sheet for Off-Bus Data Collection
(Please be sure to hand this in with completed data sheets)

Researcher Name: _____

Date: _____

Start Time: _____ am/pm End Time: _____ am/pm

Approximate Temperature: _____ °F

Day of Week: Sunday Monday Tuesday Wednesday Thursday Friday Saturday

Weather Conditions: Sunny Partly Sunny Cloudy Light Precip (rain/snow) Heavy Precip (rain/snow)

Weather Comments:

Research Zone (please circle one)

- 1 = Lincoln Memorial North - Henry Bacon Dr. between Constitution Avenue and Lincoln Circle
- 2 = Lincoln Memorial South - Daniel French Dr. between Lincoln Circle and Independence
- 3 = Washington Monument - 1500 Block Independence Avenue (Bus PARKING only not loading/unloading)
- 4 = Natural History Museum - Madison Dr. at 9th Street
- 5 = Air and Space Museum - Jefferson Dr. at 7th Street
- 6= National Museum of American Indian - Jefferson Drive between 3rd and 4th Streets
- 7 = Ellipse - 15th Street between Pennsylvania Avenue and Constitution Avenue
- 8 = WW II Memorial - Homefront Dr.
- 9 = Jefferson Memorial - East Basin Dr. (No loading and unloading for Cherry Blossom)
- 10= National Museum of American History Madison Drive between 12th and 14th Street (note: not signed for tour bus loading/unloading)
- 11 = White House Visitors Center on Pennsylvania Avenue between 14th and 15th (note: not signed for tour bus loading/unloading)
- 12= Old Post Office Pavilion on Pennsylvania Avenue between 11th and 12th Street (note: not signed for tour bus loading/unloading)
- 13= Ford's Theatre 500 block 10th Street
- 14= Ford's Theatre 600 Block 10th Street
- 15= Ford's Theatre 1000 block F Street
- 16= Maine Avenue 700-900 block
- 17= Maine Avenue 900-1200 block
- 18 = FDR/MLK West Basin Drive) (No loading and unloading for Cherry Blossom)
- 19= Ohio Drive between Inlet Bridge and West Basin Drive right hand side (Cherry Blossom Festival only)

Off-Vehicle Information

Questionnaire # _____

1. Circle the style of bus which best represents the bus you are observing:



If other, please take a photo & indicate the photograph # here

Private small tour bus
(1-15 passengers)

Private medium tour bus
(16-40 passengers)

Private large tour bus
(41+ passengers)

Public transport bus

Sightseeing bus (e.g. open-top, 2-deck, trolleys, etc)

NPS visitor bus

School bus of any size

Other type of bus: _____

BUS INFORMATION

2	3	4	5	6	7	8	9	10	11	12
Bus Company OR School bus/group name	Full DOT #	Last 3 digits of LICENSE PLATE	Did bus <u>pull in</u> within the loading zone? (circle one)	Did bus load or unload? (circle ALL that apply)	Did bus unload at the curb? (circle one)	If NO to #7, please describe where bus unloaded or loaded...	Bus Pull-in Time (e.g. 9:15 a.m.)	Bus Pull-out Time (e.g. 9:30 a.m.)	Engine Idling Time (circle one)	Notes : Additional observations not collected in other columns
			No Yes	Loaded Unloaded Neither	No Yes n/a				< 3 min. 3-10 min. > 10 min.	

PASSENGER INFORMATION

13	14	15	16	17	18
Are there passengers on the bus? (circle one)	Orderliness of passenger entrance/exit to bus (circle one)	Approx # of passengers in each age group	Did any group members use an assistive device? (e.g. wheelchair, walker)	Did you overhear any language besides English spoken?	Notes: Additional observations not collected in other columns
No Yes	Orderly Chaotic	___ Pre-teens (0-12 yrs) ___ Teens (13-18 yrs) ___ Adults (19-60 yrs) ___ Seniors (60+ yrs)	No Yes	No Yes	

LOADING/UNLOADING ZONE ACTIVITIES

19	20	21	22	23	24	25	26
Was trash dumped at the site? (circle one)	If yes to #19, where was trash dumped?	Was any other waste dumped at the site? (circle one)	If yes to #21, what was dumped & where was material dumped?	ALL operational issues observed (circle all that apply)	General direction where the group headed after leaving the bus (briefly describe target monument, memorial, or museum)	IF multiple buses in the group from the same company, indicate how many	Notes: Additional observations not collected in other columns
No Yes		No Yes		a. Bus stopped in zone beyond time needed to load/unload b. Bus pulling into traffic in dangerous way c. Bus blocking pedestrian traffic d. Bus blocking bicycle lane e. Bus blocking facility entrance f. Double parking g. Unloading/loading in a non-designated loading zone h. Unloading/loading on roadside (rather than curbside) i. Other-please describe in 26			