Electric Vehicle Charger Placement Optimization in Michigan: Phase I – Highways (Supplement I: Full Tourism Analysis)

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Auto Companies

- Ford Motor Company
- General Motors
- Toyota

Transmission and Utility Companies

- American Transmission Company
- Cherryland Electric Cooperative
- Consumers Energy
- DTE Energy
- Great Lakes Energy Cooperative
- Indiana Michigan Power
- ITC Transmission Company
- Lansing Board of Water and Light
- Michigan Electric Cooperative Association
- Michigan Municipal Electric Association
- Wolverine Power Cooperative

Charging Station Companies

- ChargePoint
- Greenlots

Electric Vehicle Drivers & Owners

National Organizations

- Electrify America
- National Association of State Energy Officials

Other

- 5 Lakes Energy
- Center for Automotive Research
- City of Ann Arbor
- Clean Fuels Michigan
- Corrigan Oil
- Ecology Center
- Meijer
- Michigan Agency for Energy
- Michigan Department of Environmental Quality
- Michigan Department of Natural Resources
- Michigan Department of Transportation
- Michigan Economic Development Corporation
- Michigan Energy Innovation Business Council
- Michigan Environmental Council
- Michigan Public Service Commission
- NextEnergy
- Sierra Club

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Contents

List of Tables

List of Figures

Introduction

The first phase of EV Charger Placement project aims to locate DC fast charging stations in the state of Michigan to ensure feasibility of all long distance trips for electric vehicle (EV) users, within the state, and also to neighboring states and Canada. The project aims to minimize the total investment cost, as well as user delay. The former includes cost of charger equipment, land acquisition cost, and electricity provision cost, and the latter includes charging, waiting, and detour delays.

In the published report for the first phase of this project (Ghamami et al., 2019), the travel demand data for the state of Michigan was obtained from the Michigan Department of Transportation (MDOT). The data represents a normal weekday in fall. Due to the scenic nature of Michigan, consideration of tourism travel demand to the national and state parks in Michigan plays a vital role, which requires adjustment to consider tourism. The data from multiple continuous counting stations (collected 24 hours a day, 7 days a week) located across the state allows for calibrating demand factors that can capture the seasonal variations of the travel demand. Tourism travel demand (vehicle trips) is a part of this travel demand. This means that the bare-bone charging network suggested in the Phase I report is able to support the long distance trips of EV users to or from tourism attraction locations.

However, the modeling framework assumes that EV users begin their intercity (long-distance) trips preplanned with a fully charged battery. This requires charging infrastructure at tourism attraction locations to support the return trips of EV owners from tourism attraction locations, as home charging is no longer an option for the users return trips. Thus, the Michigan Department of Natural Resources (DNR), Parks and Recreation Division provided the number of visitors at each state park , and visitors' data for national parks was derived from the National Park Service website (National Park Service, 2018). The available data is limited to the number of visitors, lacking the travel patterns of each visitor. The annual tourism demand (visitors) is analyzed at each location and fast charging stations are located at each tourism destination to support the return trips of EV users.

Tourism Visitor Data and Analysis

The Michigan Department of Natural Resources and U.S. National Park Service collects annual visitor data for 86 state parks and 4 national parks, respectively. Moreover, based on the available average car occupancies of state parks obtained from Michigan Department of Natural Resources, an average value of 3.63 visitors per vehicle is used to convert the numbers of visitors to vehicle trips.

To enable investors to partially use investments made for the bare-bone DC fast charging network (i.e. electrical infrastructure, construction efforts, etc.), presented in the phase I report (Ghamami et al., 2019), in support of tourism demand, it is assumed that the charging stations are built at the closest candidate points in the road network. With this in mind, and based upon GPS coordinates, each park is associated with the closest candidate point in the network. It is noteworthy that if a park lies at a greater distance than the assumed distance of 25 miles from any candidate point, an additional node is considered for its service. Figure 1 shows parks assigned to each candidate point. The current assignment of parks to candidate nodes with additional tourism candidate points are listed in Table 2A to provide complete tourism coverage.

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Figure 1. National and State Parks in Michigan, Grouped with the Closest Candidate Points Based on Shortest Travel Distances

Methodology

The bare-bone network presented in phase I report provides access to the tourism attraction places for EV users (Ghamami et al., 2019). However, it assumes that all EVs depart fully charged. Thus, for trips originated from the tourism attraction we need to provide additional chargers. In order to calculate the number of charging outlets needed to support returning trips of tourism visitors, the hourly charging demand needs to be derived from annual demand data (D_a). Based on the favorable climate and accessibility of parks, it is assumed that the total annual vehicle trips with tourism purposes occur over seven months of the year, with an average of thirty days a month. Using the predicted EV market growth factor of 6% for the state of Michigan in 2030 (*Electric Vehicle Cost-Benefit Analysis Plug-in Electric Vehicle Cost-Benefit Analysis: Michigan*, 2017), and the average car occupancy (O) reported by Michigan Department of Natural Resources, the number of EV trips is calculated. Next, it is assumed that tourism charging demand is spread over fourteen hours of a day. This is a proper assumption considering infrequent charging events at night and the rather flexible nature of tourism travel. This information can be used for calculating the hourly tourism charging demand.

The next step in the calculation of the number of needed charging outlets is to determine charging time. As the details of the trips (including origin) for the visitors of the state and national parks is not available, conservatively, it is assumed that batteries are depleted to 20% of their capacity (minimum level due to the range anxiety), and will charge up to 80% of their capacity at each charging event, due to the considerable slower charging speed after the 80%. In other words, 60% of battery capacity is assumed to be charged at each recharging event. This helps covering stochasticity of demand and lack of data using a conservative assumption. The charging time (in hours) is calculated using the following equation:

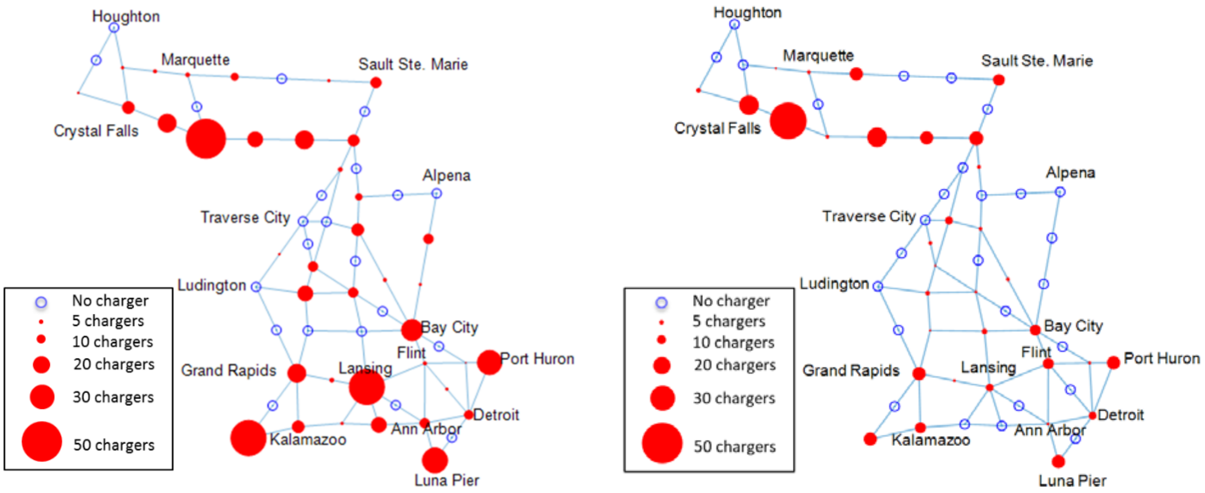
$$t = \alpha \frac{0.6\,E}{P}$$

In which, E denotes battery capacity (kWh), P denotes charging power (kW), and α is a dimensionless loss factor representing the loss of power when transferred to energy (α=1.3) (Nie and Ghamami, 2013). With use of charging time and hourly tourism charging demand, the number of needed charging outlets to serve the tourism charging demand is derived. It is worth noting that a minimum of two charging outlets are proposed where tourism charging demand exists. The rationale is to guarantee there is always at least one charging outlet available, in cases of regular and incidental maintenance. This will improve the reliability of the system and allows for redundancy. Thus, the total number of chargers needed at each tourism site would be, a function of the number of annual visitors to that station (D_a), average car occupancy (O) and the charging time (t):

$$N = \max\left(\left\lceil \frac{0.06\,\frac{D_a}{O}}{7 \times 30 \times 14} t \right\rceil, 2\right)$$

Seasonal Variation of Travel Demand

Extreme weather conditions affect the destination and the frequency of trips in transportation networks. In cold weather, recreational facilities such as lakes and parks are not visited as frequently as in summer. Therefore, the travel pattern is directly affected by seasonal impacts. Furthermore, cold temperature significantly reduces EV's battery performance down to 70 percent of its capacity (US Department of Energy, 2018). Thus, a feasible path for an EV during summer may become infeasible in winter due to the reduced performance of the battery in cold temperatures. This affects the route choice and travel pattern of EV users. As seen in Figure 2, although the travel demand decreases during colder months of the year in Michigan, the reduced battery performance leads to more required charging stations and charging outlets to enable intercity EV trips.



(a) Charger placement to support smaller winter demand with lower battery performance

(b) Charger placement to support larger summer demand with higher battery performance

Figure 2. Charger Placement (Charging Stations and Outlets Numbers) for 2030 with 70 kWh Battery and 50 kW DC Fast Charger

As only one configuration of charging stations can be selected, the winter demand configuration with larger number of charging stations and outlets is suggested, and the feasibility of summer demand trips for EV is tested with this configuration. To this end, a traffic assignment model is used that gets the summer travel demand and the battery performance of EVs as inputs, and generates the users travel pattern, route choice, and charging needs. This traffic assignment model concluded that the winter charging network configuration supports the summer demand, although charging locations may be different from the summer configuration.

Extra Supply from the Bare-Bone Charging System

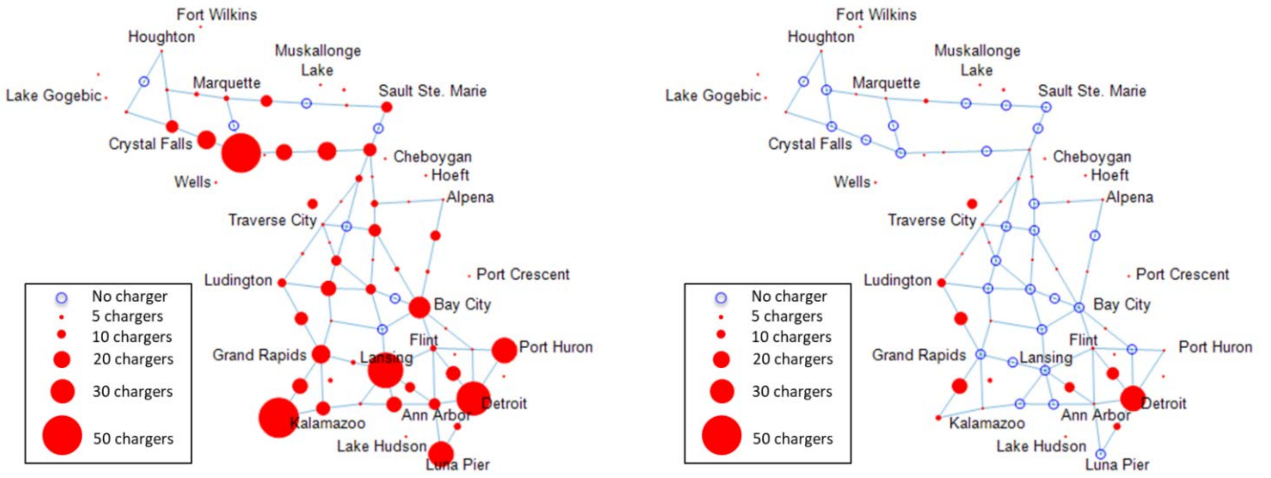
Comparing the charging demand for the winter scenario and summer scenario, the excessive available capacity for each charging station during the summer due to the better battery performance can be used to support the additional tourism travel. This value is calculated by comparing the required energy at each station in winter and summer times. Using the bare-bone charging stations configuration for winter, the energy required at each charging station during summer is calculated considering the battery performance and travel demand of summer. Then, the difference between each station's energy demand in winter and summer provides the extra energy supply that is available to support tourism charging needs. The equivalent number of charging outlets for this available energy level is the redundant charging outlet supply that can be used in summer to serve the tourism demand.

The annual number of visitors to each park dictates the required number of charging outlets to support the returning trips from these parks. In this research, it is assumed that if there is a charging station in a 25-mile radius of a park, additional charging outlets can be added to that charging station. Otherwise, a new charging station is required. Of note, a shared charging station would be provided for parks within 25 miles of one another.

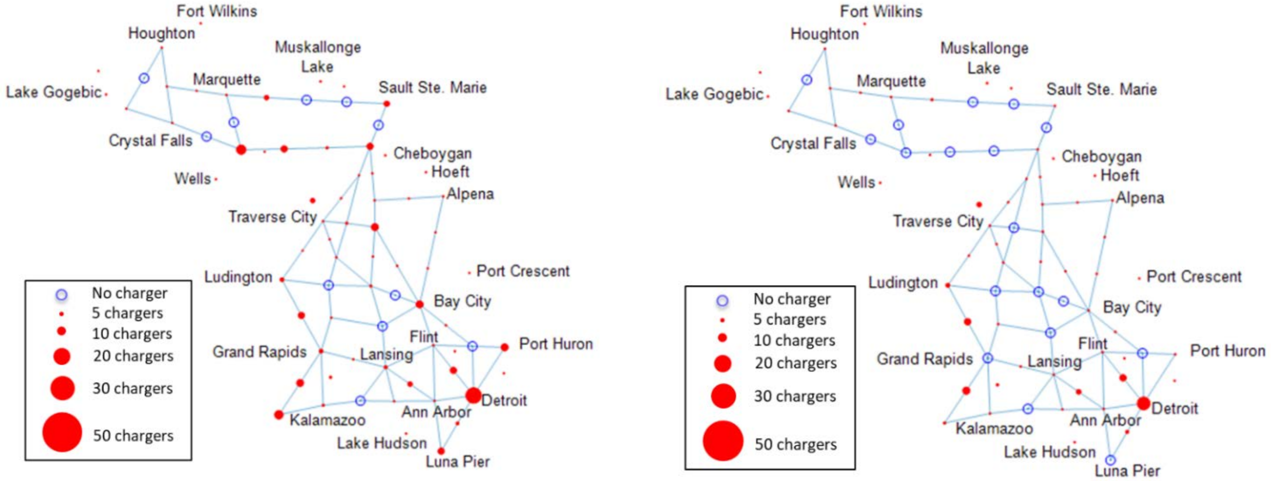
There is potential for underused capacity of charging stations in summer, due to the better performance of the batteries. Accordingly, the unused capacity in the bare-bone network (selected based on the winter scenario configuration) located at 25-mile distance of a park, would be used to serve the charging needs of that park visitors. Therefore, the equivalent number of excessive charging outlets are deducted from the required number of outlets to provide the additional charging outlets to serve the tourism demand.

Charging Outlet Placement to Support Tourism Demand

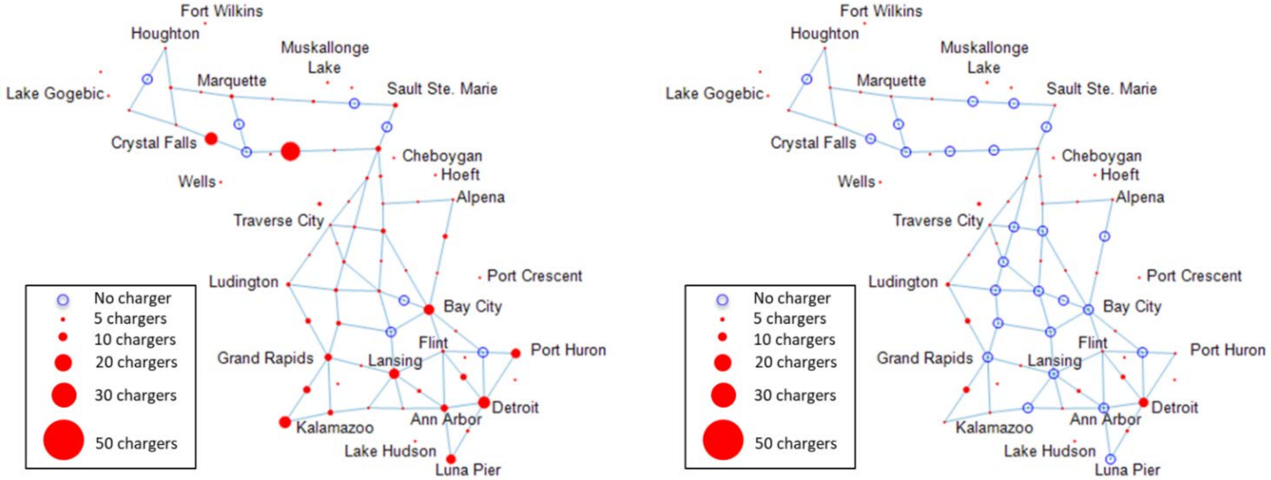
A total of three scenarios for the demand projection of year 2030 and different technological configurations were examined: 1) low technology advancement scenario with 70kWh batteries and 50kW chargers (low-tech), 2) high technology advancement scenario with 100kWh batteries and 150kW chargers (high-tech), and 3) mixed technology scenario with 70 kWh batteries and 150 kW chargers (mixed-tech). The mixed technology aims to capture the variety of vehicles from different generations anticipated to function on roads, in 2030. Figure 3 portrays the required locations and capacities of charging stations across Michigan under the considered technological scenarios. This figure presents both the location of charging stations to support the tourism demand only (Figure 3 b, d, f), as well as the charging network to support both tourism demand and the general intercity trips of EV drivers (bare-bone network) (Figure 3 a, c, e).



(a) Low-tech, 2030 EV demand, Bare-Bone and Tourism (b) Low-tech, 2030 EV demand, Tourism only



(c) High-tech, 2030 EV demand, Bare-Bone and Tourism (d) High-tech, 2030 EV demand, Tourism only



(e) Mixed-tech, 2030 EV demand, Bare-Bone and Tourism (f) Mixed-tech, 2030 EV demand, Tourism only

Figure 3. Visualized Location of Charging Stations and Number of Charging Outlets under Different Technology and Demand Scenarios

In Figure 3, as the technology advances from low-tech to high-tech, fewer charging stations and charging outlets are required in the bare-bone and tourism network. This observation is due to the fact that the high technology configuration considers larger batteries that provide longer driving ranges and less recharging needs, as compared to the low technology configuration and the higher charging power provides higher charging speed and a better throughput for each charger. In the tourism only charging network, mixed-tech scenario requires fewer charging outlets compared to both low-tech and high-tech tourism only scenarios. Note that it is assumed that all batteries are fully depleted upon arrival at tourism sites to the minimum acceptable level (20%). This depletion increases the charging time for larger batteries, while higher power charging stations with higher throughput require less number of charging outlets to provide the same level of service.

Total Cost

The modeling framework considers the total system cost including the investment cost for charging stations and charging outlets, as well as the monetary values of EV travelers' detour time to access charging stations, waiting time in queue, and recharging time, to build the bare-bone charging network. The charging stations to support tourism travel demand are located based on tourism destinations (state and national parks) and the number of charging outlets is defined by avoiding delay for a well-distributed tourism demand during the day. The charging station cost includes land acquisition cost, electricity provisions cost, and cost of charging infrastructure with supporting facilities.

Table 1- Number of Charging Stations, Charging Outlets and Required Investment for each Scenario along with the Provided Levels of Service

	Scenarios					
	Low-tech		High-tech		Mixed-tech	
	Bare-Bone and Tourism	Tourism Only	Bare-Bone and Tourism	Tourism Only	Bare-Bone and Tourism	Tourism Only
Scenarios' Specification						
Market Share (%)	6	6	6	6	6	6
Charging Station Power (kw)	50	50	150	150	150	150
Battery size (kwh)	70	70	100	100	70	70
Charger Placement						
Number of charging stations	68	30	64	44	67	36
Number of charging outlets	760	216	255	163	296	128
Investment cost						
Charging station cost (Million dollar)	10.42	4.49	11.83	8.15	12.39	6.55
Land cost (Million dollar)	1.44	0.42	0.48	0.31	0.56	0.24
Charging outlet cost (Million dollar)	25.65	7.29	19.44	12.43	22.57	9.76
Total cost (Million dollar)	37.51	12.19	31.76	20.89	33.52	16.55
Delay time						
Refueling Time (hr)	6,267	2,625	1,755	1,250	2,054	875
Average Delay (min)	39.4	65.5	21.7	31.2	13	21.8

Table 1 suggests that high-tech scenarios are less costly than the corresponding low-tech scenarios. The reason is the need for less charging stations and charging outlets in the high-tech scenarios. Regarding the mixed-tech scenarios, the bare-bone with tourism scenario is less costly compared to that of the low-tech configuration, but pricier than that of the high-tech configuration. This observation pertains to the comparison of charging stations and charging outlet counts. On the other hand, for the tourism only results, mixed-tech scenario is costlier than that of the low-tech configuration, which is due to the less expensive charging technology in the low-tech configuration. Comparing mixed–tech and high-tech tourism-only scenarios shows that a mixed-tech configuration includes a lower cost, since it requires a smaller number of charging stations and charging outlets. It is noteworthy that in each configuration, the cost of supporting only the bare-bone system is greater than simply subtracting tourism only scenario cost from the general scenario (supporting both tourism and the bare-bone system). This is due to the fact that the excessive available supply of the bare-bone system in the summer is being partially used to support the tourism demand, and thus the tourism only scenario shares costs (such as station set-up, and even the extra charging outlet infrastructure) with the bare-bone system.

Conclusion

The EV Charger Placement project (Phase I) focuses on DC fast charging station locations across Michigan to assure that intercity EV trips within, and passing through, Michigan are feasible. Because of the scenic attractions in Michigan, the tourism demand attracted to national and state parks must be considered exclusively. The bare-bone charging network in this project is capable of serving EV users' intercity trips to tourism locations. However, to enable return trips, DC charging stations are required at tourism locations as we assume EV trips start with fully charged batteries. To lower investors' costs, we assume that charging stations are placed at their closest candidate location, if they are within 25 miles of the tourism locations. Otherwise, an additional node is considered. Hourly charging demand during favorable weather conditions and the number of required charging outlets for the tourism locations are derived from annual visitor data. On the other hand, the bare-bone charging network is designed on account of the winter demand configuration with degraded battery performance. Hence, the bare-bone network provides excessive available capacity during favorable weather conditions during which the tourism deman takes place. We assume that the system uses the excessive charging outlet supply during these favorable weather conditions to support the tourism demand.

For the purpose of this project, the projected EV demand into the target year of 2030 is examined under three technological configurations of low-tech, high-tech and mixed-tech. It is shown that fewer charging stations and charging outlets are required as the technology advances and EV ranges increase from low-tech to high-tech. Also, it is noticed that the tourism only charging network under mixed-tech configuration requires fewer charging outlets compared to both low-tech and high-tech tourism only scenarios. This pertains to the assumption of fully depleted batteries upon arrival at tourism sites, which increases the charging time for larger batteries, as well as higher power charging stations with less throughput, which require fewer charging stations and charging outlets to maintain the same level of service. In terms of investment cost, the mixed-tech tourism only scenario is estimated to be costlier than the low-tech configuration, which is due to the less expensive charging technology in the low-tech configuration. On the other hand, the mixed-tech tourism only scenario is shown to impose less investment cost as compared to the high-tech counterpart, resulting from fewer required charging stations and charging outlets.

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APPENDIX A: Charging Station Location and Number by Zip Code

Table 1A- Distribution of Charging Outlets in Considering Optimized Placement in Bare-Bone Charging network Plus Tourism Support Charging Stations, Compared with Tourism Support Only Charging Stations in 2030

			Scenarios					
Node	Zip Code	City	Low-Tech		High-Tech		Mixed-Tech	
			Bare-Bone and Tourism	Tourism Only	Bare-Bone and Tourism	Tourism Only	Bare-Bone and Tourism	Tourism Only
1	49931	Houghton	2	2	2	2	2	2
2	49855	Marquette	6	2	2	2	4	2
3	49724	Sault Saint Marie	13	0	7	2	5	2
4	49912	Bruce Crossing	3	2	2	2	2	2
5	49920	Crystal Falls	15	0	2	2	2	2
6	49878	Rapid River	50	0	12	0	0	0
7	49781/ 49781	Mackinaw City/St. Ignace	16	2	8	2	6	2
8	49684	Traverse City	3	3	2	2	2	2
9	49738	Grayling	15	0	9	2	5	0
10	49738	Alpena	2	2	2	2	2	2
11	49431	Ludington	10	10	5	5	4	4
12	48617	Clare	12	0	3	0	3	0
13	48706	Bay City	27	0	9	2	12	0
14	49503	Grand Rapids	23	0	5	0	8	0
15	48906	Lansing	45	0	4	2	12	0
16	48504	Flint	7	3	2	2	3	2
17	48060	Port Huron	32	2	9	2	11	2
18	49022	Benton Harbor	51	6	11	3	14	2
19	49024	Portage	17	2	3	2	6	2
20	49068	Marshall	3	0	0	0	2	0
21	48104	Ann Arbor	14	2	2	2	8	0
22	48216	Detroit	43	32	20	16	14	11
23	48133	Luna Pier	32	0	8	0	11	0
24	49919	Covington	3	0	2	2	3	2
25	49770	Petoskey	8	3	2	2	3	2
26	49735	Gaylord	8	0	2	2	2	2
27	49646	Kalkaska	0	0	3	0	3	0
28	49601	Cadillac	12	0	2	2	3	0
29	49677	Reed City	19	0	0	0	4	0
30	49329	Howard City	2	2	2	2	5	0
31	48847	Ithaca	0	0	0	0	0	0
32	48444	Imlay City	2	0	0	0	0	0
33	49201	Jackson	19	0	2	2	2	2
34	49948	Mass City	0	0	0	0	0	0

35	49862	Munising	14	5	6	3	2	2
36	49883	Seney	0	0	0	0	3	0
37	49728	Eckerman	3	0	0	0	0	0
38	49880	Rock	0	0	0	0	0	0
39	49814	Champion	5	2	2	2	2	2
40	49780	Rudyard	0	0	0	0	0	0
41	49892	Vulcan	23	0	0	0	15	0
42	49854	Manistique	20	2	8	0	23	0
43	49827	Engadine	23	0	3	0	2	0
44	49749	Indian River	2	2	2	2	3	2
45	49614	Bear Lake	3	2	2	2	2	2
46	49622	Central Lake	2	2	2	2	2	2
47	49668	Mesick	2	2	2	2	2	2
48	48629	Houghton Lake	2	2	2	2	2	2
49	48661	West Branch	5	2	2	2	2	2
50	48738	Greenbush	12	0	2	2	5	0
51	48703	Au Gres	4	2	2	2	2	2
52	49709	Atlanta	2	2	2	2	2	2
53	49445	Muskegon	16	16	8	8	6	6
54	48657	Sanford	0	0	0	0	0	0
55	48741	Kingston	2	2	2	2	2	2
56	48881	Saranac	5	0	2	2	2	2
57	49453	Saugatuck	19	19	9	9	8	7
58	48114	Brighton	12	12	6	6	4	4
59	48326	Auburn Hills	18	15	8	8	7	5
60	48166	Newport	8	8	4	4	3	3
61	49918	Cooper Harbor	2	2	2	2	2	2
62	49974	Marenisco	2	2	2	2	2	2
63	49721	Cheboyang	2	2	2	2	2	2
64	49654	Leland	12	12	6	6	4	4
65	49779	Rogers City	2	2	2	2	2	2
66	48455	Metamora	2	2	2	2	2	2
67	48001	Algonac	2	2	2	2	2	2
68	49333	Middleville	5	5	3	3	2	2
69	49235	Clayton	2	2	2	2	2	2
70	49953	Ontonagon	2	2	2	2	2	2
71	49868	Newberry	2	2	2	2	2	2
72	49768	Paradise	3	3	2	2	2	2
73	49887	Stephenson	2	2	2	2	2	2
74	49835	Fairbanks	2	2	2	2	2	2
75	48467	Port Austin	2	2	2	2	2	2

Table 2A-Assigned Nodes to Cover Tourism Demand of National and State Parks in the State of Michigan

Node	Zip Code	City	Parks
1	49931	Houghton	Keweenaw National Histrical Park; F. J. McLain State Park
2	49855	Marquette	Little Presque Isle
3	49724	Sault Saint Marie	Brimley State Park
4	49912	Bruce Crossing	Bond Falls Scenic Site
5	49920	Crystal Falls	Bewabic State Park
6	49878	Rapid River	-
7	49781/ 49781	Mackinaw City/St. Ignace	Straits State Park; Wilderness State Park
8	49684	Traverse City	Interlochen State Park; Keith J. Charters Traverse City State Park
9	49738	Grayling	Hartwick Pines State Park; North Higgins Lake State Park
10	49738	Alpena	Negwegon State Park
11	49431	Ludington	Charles Mears State Park; Ludington State Park; Silver Lake ORV Area
12	48617	Clare	-
13	48706	Bay City	Bay City State Park
14	49503	Grand Rapids	-
15	48906	Lansing	Sleepy Hollow State Park
16	48504	Flint	Ortonville Recreation Area; Seven Lakes State Park
17	48060	Port Huron	Lakeport State Park
18	49022	Benton Harbor	Van Buren State Park; Warren Dunes State Park
19	49024	Portage	Fort Custer Recreation Area
20	49068	Marshall	-
21	48104	Ann Arbor	Maybury State Park
22	48216	Detroit	Belle Isle Park; Outdoor Adventure Center; William G. Milliken State Park & Harbor
23	48133	Luna Pier	-
24	49919	Covington	Baraga State Park
25	49770	Petoskey	Petoskey State Park; Young State Park
26	49735	Gaylord	Otsego Lake State Park
27	49646	Kalkaska	-
28	49601	Cadillac	William Mitchell State Park
29	49677	Reed City	-
30	49329	Howard City	Newaygo State Park
31	48847	Ithaca	-
32	48444	Imlay City	-
33	49201	Jackson	Waterloo Recreation Area
34	49948	Mass City	-
35	49862	Munising	-

36	49883	Seney	-
37	49728	Eckerman	-
38	49880	Rock	-
39	49814	Champion	Craig Lake State Park; Van Riper State Park
40	49780	Rudyard	-
41	49892	Vulcan	-
42	49854	Manistique	Palms Book State Park
43	49827	Engadine	-
44	49749	Indian River	Aloha State Park; Burt Lake State Park; Onaway State Park
45	49614	Bear Lake	Orchard Beach State Park
46	49622	Central Lake	Fisherman's Island State Park
47	49668	Mesick	Tippy Dam Recreation Area
48	48629	Houghton Lake	South Higgins Lake State Park; Wilson State Park
49	48661	West Branch	Rifle River Recreation Area
50	48738	Greenbush	Harrisville State Park
51	48703	Au Gres	Tawas Point State Park
52	49709	Atlanta	Clear Lake State Park
53	49445	Muskegon	Duck Lake State Park; Grand Haven State Park; Muskegon State Park; P. J. Hoffmaster State Park; Twin Lakes State Park
54	48657	Sanford	-
55	48741	Kingston	-
56	48881	Saranac	Ionia Recreation Area
57	49453	Saugatuck	Holland State Park; Saugatuck Dunes State Park
58	48114	Brighton	Proud Lake Recreation Area; Island Lake Recreation Area; Brighton Recreation Area; Pinckney Recreation Area
59	48326	Auburn Hills	Highland Recreation Area; Holly Recreation Area; Pontiac Lake Recreation Area; Bald Mountain Recreation Area; Dodge #4 State Park
60	48166	Newport	River Raisin National Battlefield Park; William C. Sterling State Park
61	49918	Cooper Harbor	Fort Wilkins State Historic Park
62	49974	Marenisco	Lake Gogebic State Park
63	49721	Cheboyang	Cheboygan State Park
64	49654	Leland	Sleeping Bear Dunes National Lakeshore; Leelanau State Park
65	49779	Rogers City	P. H. Hoeft State Park; Thompson's Harbor State Park
66	48455	Metamora	Metamora-Hadley Recreation Area
67	48001	Algonac	Algonac State Park
68	49333	Middleville	Yankee Springs Recreation Area
69	49235	Clayton	Lake Hudson Recreation Area; W. J. Hayes State Park
70	49953	Ontonagon	Porcupine Mountains Wilderness State Park
71	49868	Newberry	Pictured Rocks National Lakeshore; Muskallonge Lake State Park
72	49768	Paradise	Tahquamenon Falls State Park
73	49887	Stephenson	J. W. Wells State Park; Menominee River State Recreation Area
74	49835	Fairbanks	Fayette Historic State Park
75	48467	Port Austin	Albert E. Sleeper State Park; Port Crescent State Park