Attachment 5

SAUVIE ISLAND WILDLIFE AREA:

Traffic, Access, and Parking Study

January 2025, *Revised June 2025*

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EXECUTIVE SUMMARY

This report outlines the existing traffic and parking management challenges the Oregon Department of Fish and Wildlife (ODFW) faces within the Sauvie Island Wildlife Area (SIWA) during peak times in the summer months. Some key findings including the following:

Background

- The Sauvie Island Wildlife Area (SIWA) is a wetland-focused wildlife area managed by the Oregon Department of Fish and Wildlife (ODFW) and is located within Columbia and Multnomah Counties.
- Specifically related to the beaches of the SIWA, Goal 4 of the 2012 Sauvie Island Wildlife Area Management Plan was established as the following:
    - *To control other public uses to minimize impacts on fish and wildlife, their habitats, and fish and wildlife related recreation and to maintain the security of the wildlife area and reduce disturbance to neighboring private lands.*

Problem Statement

- During peak use, traffic and parking constriction and impeded access for emergency responders compromises SIWA user safety.

Goals and Objectives

- The goals of this study are to: 1) review historical traffic patterns in the SIWA during peak usage; 2) evaluate existing infrastructure deficiencies impacting parking and traffic flow during peak usage; 3) assess infrastructure needs for improving parking and traffic flow; and 4) recommend strategies for implementation that mitigate parking deficiencies and improve traffic flow, including policies, infrastructure improvements, and programmatic changes.

Existing Conditions

- Historical data shows the peak utilization times at the SIWA generally occur between 10:00 AM and 8:00 PM, with peak traffic activity occurring between 2:00 PM and 3:00 PM.
- The total peak parking demand exceeded the total capacity of 928 parking spaces by approximately 24% between 3:00 PM and 4:00 PM on July 4, 2024.

Traffic and Parking Management Options

Options for managing traffic and parking in the SIWA were grouped into one (1) of three (3) categories:

- Roadway improvements
- Parking area improvements
- Parking operation improvements

Potential roadway improvements include the following options:

1. Gated entry
2. Wayfinding and informational signage
3. Roundabouts, mini traffic circles, and U-turns
4. Roadway median
5. Pave the northern portion of NW Reeder Road

Potential parking area improvements include the following options:

1. Camera detection
2. Smart parking sensors
3. Permeable parking pavers with parking space markers and parking stops

Potential parking operation improvements include the following options:

1. Website and social media alerts
2. Link to live video feed
3. SIWA hotline
4. Advance reservation system
5. Shuttle services
6. Park and ride
7. Parking attendant
8. Mobile device parking apps
9. Parking meters and software

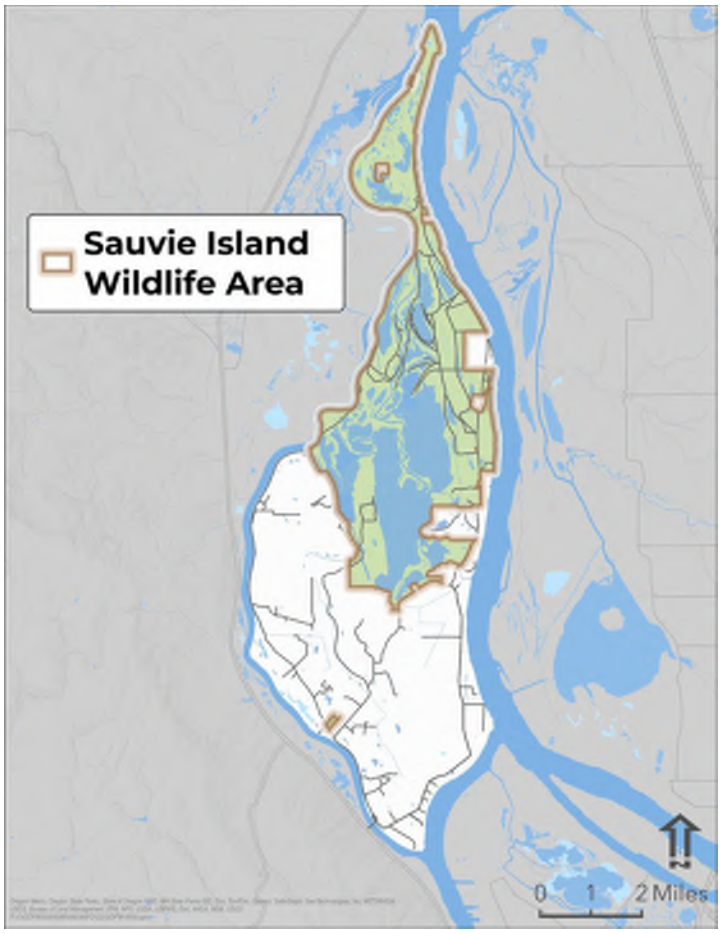
See Appendix B: SIWA Solutions for in-depth discussion of traffic and parking management options.

1 SAUVIE ISLAND WILDLIFE AREA (SIWA) AND PROJECT DESCRIPTION

1.1 Background

The Sauvie Island Wildlife Area (SIWA) is a wetland-focused wildlife area managed by the Oregon Department of Fish and Wildlife (ODFW). It is located within Columbia and Multnomah Counties and covers an area of over 18 square miles. The SIWA was established in 1947 with goals to protect, improve, and manage waterfowl habitat and provide a public hunting area. A map of the SIWA is presented in Figure 1 below.

Figure 1 – Sauvie Island Wildlife Area Map



The 2012 Sauvie Island Wildlife Area Management Plan established the following Management Vision:

Wetlands, and associated upland habitats, in the Columbia River bottomlands are being preserved and enhanced through sound management measures to support a diverse array of fish, wildlife and plant species, for use and enjoyment by present and future generations.

The plan also established four (4) Plan Goals to support the vision. Specifically related to the beaches of the SIWA, Goal 4 of the Plan was established as the following:

Goal 4: To control other public uses to minimize impacts on fish and wildlife, their habitats, and fish and wildlife related recreation and to maintain the security of the wildlife area and reduce disturbance to neighboring private lands.

1.1.1 Effects of Increasing Public Use

Public use of the SIWA has steadily increased over the years. As of 2012, SIWA staff estimated that beach visitors accounted for as much as 85% of all summertime use. At times, public use has exceeded the physical capacity of facilities, including parking areas. The Oregon State Police (OSP) Fish and Wildlife Summer 2018 Beach Use and Overtime Report for the SIWA notes that 873 parking spaces are allocated for use by SIWA beach visitors. Data from 2016-2018, however, has shown that on hot days the beaches can generate the entry of over 4,000 vehicles into the SIWA. We note this does not necessarily mean 4,000 vehicles were parked simultaneously during the peak hour, but rather the total number of vehicles over the course of a day was approximately 4,000 vehicles.

Along with rising numbers of visitors, SIWA staff have observed significant increases in traffic, parking congestion, noise, littering, vandalism, excessive alcohol consumption, and other illegal activity. As of 2018, only one full time

trooper was assigned to the SIWA year-round. At times, even with additional troopers working overtime, beach goers have outnumbered troopers by 2,000:1.

To address this imbalance, SIWA staff are considering approaches to control visitor numbers in cases where public use jeopardizes the primary mission of SIWA. In 2018, ODFW enacted a rule change in the SIWA banning the possession and consumption of alcoholic beverages from May 1 to September 30. The ODFW has also considered other long-term actions, including managing access to the area with a physical entry control structure and providing overtime funding for increased OSP patrols in the SIWA from May 1 to September 1.

Figure 2 – SIWA Sign Informing Visitors that Parking Permit is Required

1.1.2 SIWA Funding Through the Parking Permit Program

Since 1990, visitors have had to purchase a parking permit to park in the SIWA. Parking permit fees account for 20% of funds used to maintain the SIWA and are used to fund local law enforcement, portable toilets, inmate litter patrols, parking lot maintenance, signage, and related administration. The bulk of these services are provided to meet the needs of the large number of beach users.

SIWA staff are in the process of reviewing the parking permit program to determine its effectiveness in providing appropriate levels of funding. Staff anticipates that revenue from parking permits will continue to support the services listed previously. Staff also intends for a portion of revenue to go towards developing a SIWA-specific public use program to address impacts of increasing visitor numbers. Staff intend to determine how to manage the number of visitors to the SIWA and to identify the additional facilities, such as information reader boards and a staffed booth along Reeder Road, as needed. From 2007 to 2012, funding for the operation and maintenance of the SIWA averaged approximately $750,000 annually. The past annual budget from SIWA parking permits has been approximately $150,000. The department intends to continue at this level or increase the budget proportionally over time, as the statewide parking permit program revenues increase. To implement new beach visitor management programs, ODFW will need additional funding and staff.

1.1.3 Multnomah County's Sauvie Island and Multnomah Channel Rural Area Plan (2015)

Multnomah County's 2015 Sauvie Island and Multnomah Channel Rural Area Plan explains that motor vehicles, bicyclists, pedestrians, horses, and farm equipment all share use of Sauvie Island's road network. Safety concerns and conflicts between modes have become more common in recent years during summer months when beach use and visitor vehicle traffic is highest. The plan addressed three key transportation issues, one of which was

concern regarding the increasing numbers of visitors to Sauvie Island and related issues, such as increased traffic and increased demand on emergency service providers.

Figure 3 – Functional Classification of Sauvie Island Roads

To address this issue, Multnomah County established the following policies related to the Sauvie Island road network that directly impact the SIWA:

Policy 5.4 – Consider context sensitive design when reviewing rural roadway standards to determine appropriate paved shoulder widths to preserve rural character of roads. Shoulder widening should aim to achieve a minimum of 3-foot paved width. The eastern portion of NW Reeder Rd (the portion east of the intersection with Gillihan Rd) is a rural local road. See Figure 3 for a road classification map of the area.

Policy 5.6 – Coordinate with ODFW and Columbia County to manage and reduce demand on the Sauvie Island transportation system, especially during peak use periods, by making more efficient use of capacity on the system through strategies such as user fees, shuttles, and parking management programs. Strategies may include:

1. *Encourage and support action by ODFW to increase daily fees during peak use periods to an amount that will effectively reduce the traffic burden on Sauvie Island roads and reduce adverse wildlife impacts resulting from heavy traffic, noise, and dust.*
2. *Encourage Columbia County and the Columbia County Sheriff to prohibit parking on county roads outside designated parking areas and to post and enforce its parking restrictions.*
3. *Encourage the use of ride sharing and support safe and convenient park and ride facilities for carpools and transit service in convenient and appropriate off-island locations.*
4. *Explore options for shuttle support and traffic reduction strategies such as traffic fees and parking management programs.*
5. *Coordinate with transit agencies and service providers to identify existing transit deficiencies and the improvements necessary to increase accessibility to transit service by potential users.*

Policy 5.13 – Encourage the Multnomah County Sheriff's Office to explore increased patrols and service to the island and keep the Sheriff's Office apprised of identified peak periods (days and seasons).

Policy 5.14 – Maintain updated traffic counts for the plan area capturing peak season volumes.

1.2 Purpose

With the increase in beach usage by the public in recent years and the limited infrastructure to serve peak usage during hot summer days, ODFW is exploring mitigation measures, both proactive and reactive, to manage traffic congestion and over-parking within the SIWA.

1.3 Study Area

This study focuses on the northeast quadrant of the island and includes review of the following specific locations:

- Turning movement counts (see Figure 4):
    A. NW Gillihan Road/NW Reeder Road
    B. NW Reeder Road roadway volumes at three key segments (see Figure 4) North of Marshal Beach RV Park
    C. North of Gilbert Lake Boat Ramp Access
    D. North of McNary Lake Boat Ramp Access
- Parking utilization at (see Figure 5):
    1. Willow Bar
    2. Reeder Road South
    3. Reeder Road North
    4. Warrior Rock

Figure 4 – Traffic Count Study Area

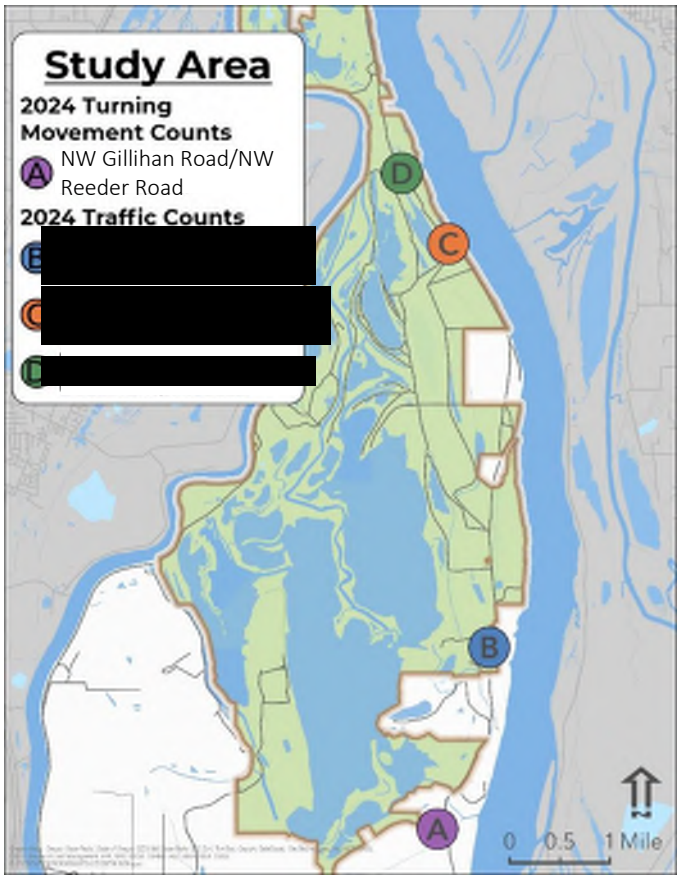
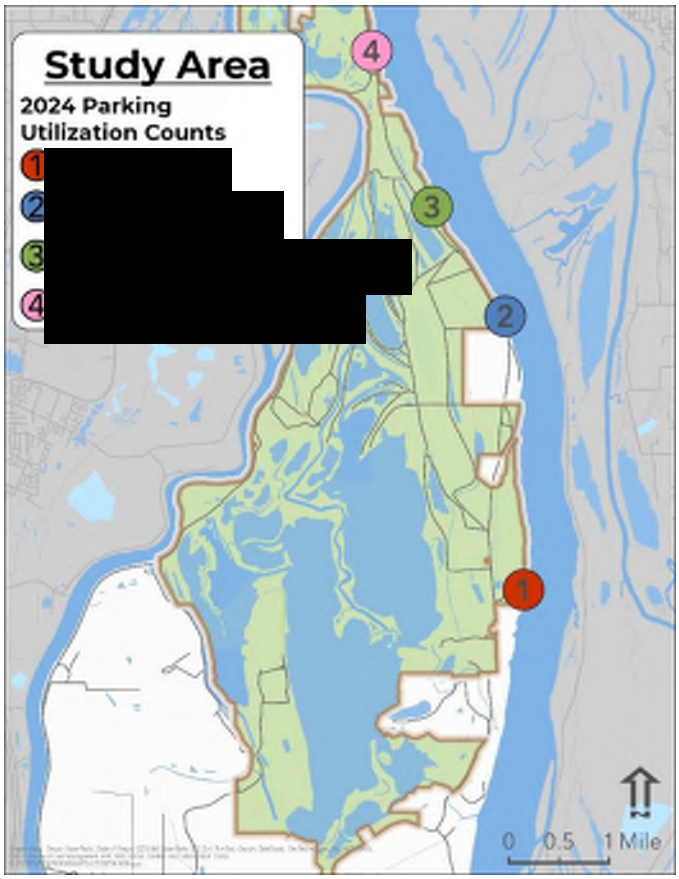


Figure 5 – Parking Count Study Area



1.4 Problem Statement

Access to the SIWA and its beaches along the Columbia River is via a single two-lane County (both Multnomah and Columbia counties) road. There are multiple parking areas along the road within the SIWA but nearly all of these are immediately adjacent to the road, or fully contiguous with the road, providing no opportunity for vehicles to fully leave the road when double or triple parking occurs. This, along with the volume of traffic itself, creates an extremely dense crowding of vehicles along the roadway during periods of high public use.

During periods of high public use the incidence of illegal parking at SIWA dramatically increases. Vehicles parking in "No Parking" zones can impede the travel lane required for emergency response vehicles to access the beach area and private residences beyond the beaches. This poses a potentially significant risk to public safety in the case of needed emergency response, responses that can also be required more often during periods of high public use on the beaches. Illegal parking commonly also includes double or triple parking which creates conflict between users that often requires law enforcement intervention. Multiple approaches have been taken to prevent illegal parking, including a reader board at the entrance to the island indicating when parking is fully occupied and increased towing of illegally parked vehicles may occur, but the problem has continued to grow despite these efforts.

During peak use, traffic and parking congestion are seen to impede access for emergency responders, and thus compromise SIWA user safety. The quality of public access to SIWA is significantly and negatively affected during peak use periods, and SIWA staff and law enforcement personnel (when available) are forced to dedicate limited resources to mitigating the negative effects of congestion rather than focusing on operations of the SIWA and public safety, respectively.

1.5 Goal and Objectives

The goals and objectives of this study include the following:

- Review historical traffic patterns in the SIWA during peak usage.
- Evaluate existing infrastructure deficiencies impacting parking and traffic flow during peak usage.
- Assess infrastructure needs for improving parking and traffic flow during peak usage.
- Recommend strategies for implementation that mitigate parking deficiencies and improve traffic flow, including policies, infrastructure improvements, and programmatic changes.

2 SUMMARY OF CURRENT LAND USE AND TRANSPORTATION FACILITIES

2.1 Land Use

The SIWA is zoned Multiple Use Agriculture (Minimum 20 acres) (MUA20). Chapter 39 of the Multnomah County Zoning Code was reviewed to understand what may be allowed within this zone.

2.1.1 Allowed Uses

Uses that are allowed outright within the MUA20 zoning designation are as follows:

- Public and private conservation areas for the protection of water, soil, open space, forest and wildlife resources.
- Signs, as provided in Chapter 39 of the Multnomah County Zoning Code.
- Transportation facilities and improvements consistent with the adopted Multnomah County Functional Classification of Trafficways plan.[1]
- Transit stations and park and ride facilities (subject to provisions of Community Service Uses).

Park and ride facilities are subject to the provisions of the Community Service Uses as included in Section 39.7515 of the Multnomah County Zoning Code. The provisions include the following limitations:

- The park and ride must be consistent with the character of the area.
- The park and ride must not adversely affect natural resources.
- The park and ride must not:
    - Force a significant change in accepted farm or forest practices on surrounding lands devoted to farm or forest use; nor
    - Significantly increase the cost of accepted farm or forest practices on surrounding lands devoted to farm or forest use.
- The park and ride must not require public services other than those existing or programmed for the area.
- The park and ride must be located outside a big game winter habitat area as defined by ODFW or that agency has certified that the impacts will be acceptable.
- The park and ride must not create hazardous conditions.

The park and ride must satisfy the applicable policies of the Comprehensive Plan. If ODFW wishes to implement a park and ride service as part of its SIWA traffic and parking management plan, it will need to follow the provisions noted above. Designating preexisting parking lots (those belonging to local businesses, for example) as park and rides could be one way to ensure that they meet these zoning requirements. For example, preexisting parking lots have likely already been deemed to be consistent with the character of the area, to have minimal impact on natural resources, to be outside big game winter habitat, and to not create hazardous conditions.

[1] The Multnomah County Functional Classification of Trafficways plan can be found here: https://multco.us/file/functional_classifications_of_roadways%3A_findings_and_recommendations_technical_report/download

2.1.2 Uses Requiring Additional Review

Uses that require additional review within the MUA20 zoning designation are as follows:

- Temporary uses when approved in accordance with Section 39.8750 of the Multnomah County Zoning Code. The Planning Director may issue temporary permits, valid for a period of not more than one year after issuance, for uses which are of a temporary nature, such as "other uses of a temporary nature when approved by the Planning Director."
- Placement of structures necessary for continued public safety, or the protection of essential public services or protection of private or public existing structures, utility facilities, roadways, driveways, and accessory uses. and exterior improvements damaged during an emergency/disaster event. This includes replacement of temporary structures erected during such events with permanent structures performing an identical or related function. Land use proposals for such structures shall be submitted within 12 months following an emergency/disaster event. Applicants are responsible for all other applicable local, state, and federal permitting requirements.
- Wireless communication facilities (WCFs) that employ concealment technology or co-location as described in MCC 39.7710(B) pursuant to the applicable approval criteria of MCC 39.7700 through 39.7765.
    - Section 39.7710 (C) states that an application for a WCF not employing co-location or concealment technology shall be reviewed under a Community Service/Type III and Design Review process unless within an Exclusive Farm Use base zone.
- Structures or uses customarily accessory or incidental to any use permitted or approved in this base zone, which do not meet the "accessory structures" standard in MCC 39.4310 Allowed Uses, but which meet the following provisions:
    - The applicant must show that building features or combined building footprints exceeding the Allowed Use provisions are the minimum possible departure from the Allowed Use standards to accommodate the use.
    - Compliance with MCC 39.8860 is required – Prior to issuance of any development permit involving an Accessory Building, the property owner shall record a covenant with the County Records that states that the structure cannot be occupied as a dwelling or for any other form of permanent or temporary residential use.

If ODFW wishes to implement seasonal park and rides (in operation for three months out of the year, for example), install cameras to monitor traffic, or set up a guard shack to physically filter or restrict traffic, it will need to consider the provisions listed above.

Multnomah County may consider a seasonal park and ride to be a "temporary use," which could mean that ODFW would need to apply for an annual permit from the Multnomah County Planning Director.

Surveillance cameras may qualify as WCFs, which Multnomah County defines as "unstaffed facilit[ies] for the transmission or reception of radiofrequency signals, usually consisting of an equipment cabinet or other enclosed structure containing electronic equipment, a support structure, antennas, or other transmission and reception devices." If this is the case and ODFW wishes to install cameras, it will likely need to undergo a Community Service/Type III and Design Review process.

If ODFW intends to set up a guard shack or structure of some kind within the SIWA, Multnomah County may consider the structure to be an accessory structure. If this is the case, ODFW would need to show that the

building features and footprint exceed the Allowed Use standards by as little as possible and record a covenant with the County Records stating that the structure will not be used for residential use of any kind.

2.1.3 Conditional Uses

Uses that may be conditionally approved within the MUA20 zoning designation are as follows:

- Community Service Uses listed in MCC 39.7520 pursuant to the provisions of MCC 39.7500 through MCC 39.7810;
    - Section 39.7805 states that waterfront parking areas and all ingress and egress must be constructed two (2) feet above the elevation of the 100-year flood boundary.
    - Section 29.8010 requires a final design review plan be approved by the Planning Director before a permit can be issued for improvements to a parking area. A design review plan includes the layout and design of all existing and proposed improvements to parking and circulation areas. The purpose of this requirement is to promote functional, safe, innovative, and attractive site development.

If ODFW wishes to modify the existing parking areas it will need to submit a design review plan to Multnomah County for approval.

2.2 Transportation Facilities

Access to Sauvie Island and the SIWA is available through a combination of Oregon Department of Transportation (ODOT), Multnomah County, and Columbia County roadways. Table 2-1 presents a summary of the roadway classifications per jurisdiction for facilities in and adjacent to Sauvie Island.

2.2.1 Road Facilities

Access to Sauvie Island is provided via NW Sauvie Island Road, a Multnomah County facility, from NW St. Helens Road (US 30), an Oregon Department of Transportation (ODOT) facility. NW Sauvie Island Road (Multnomah County) continues west toward the west side of the island, and NW Gillihan Road (Multnomah County) spurs from NW Sauvie Island Road and continues east toward the east side of the island.

The NW Gillihan Road/NW Reeder Road intersection is a stop-controlled intersection providing a pivotal connection to the SIWA beaches and often experiences congestion during times of peak beach usage. NW Reeder Road continues north to provide direct access to the SIWA beaches, where a bulk of parking adjacent to the roadway is located. NW Reeder Road is partly owned and maintained by Multnomah County and partly owned and maintained by Columbia County.

Table 2-1. Roadway Classifications

Roadway	Jurisdiction	Functional Classification
St. Helens Road (US 30)	ODOT	Statewide Highway/Principal Arterial
NW Sauvie Island Road	Multnomah County	Collector
NW Gillihan Road	Multnomah County	Collector
NW Reeder Road	Multnomah County	Collector (west of Gillihan Road) Local (east of Gillihan Road to Columbia County line)
NW Reeder Road	Columbia County	Local (from Multnomah County line to terminus)

Source: Sauvie Island and Multnomah Channel Rural Area Transportation System Plan (TSP), August 2015

2.2.2 Traffic Control

There is currently a signal located at the NW St. Helens Road (US 30)/NW Sauvie Island Road intersection at the Wapato Bridge providing access to the island. However, there are currently no signals located on the island itself. All forms of traffic control on Sauvie Island are currently STOP signs.

2.2.3 Access

Access to Sauvie Island is available via Wapato Bridge at NW St. Helens Road (US 30). Access to the SIWA is provided via NW Reeder Road at NW Gillihan Road.

2.2.4 Pedestrian and Bicycle Facilities

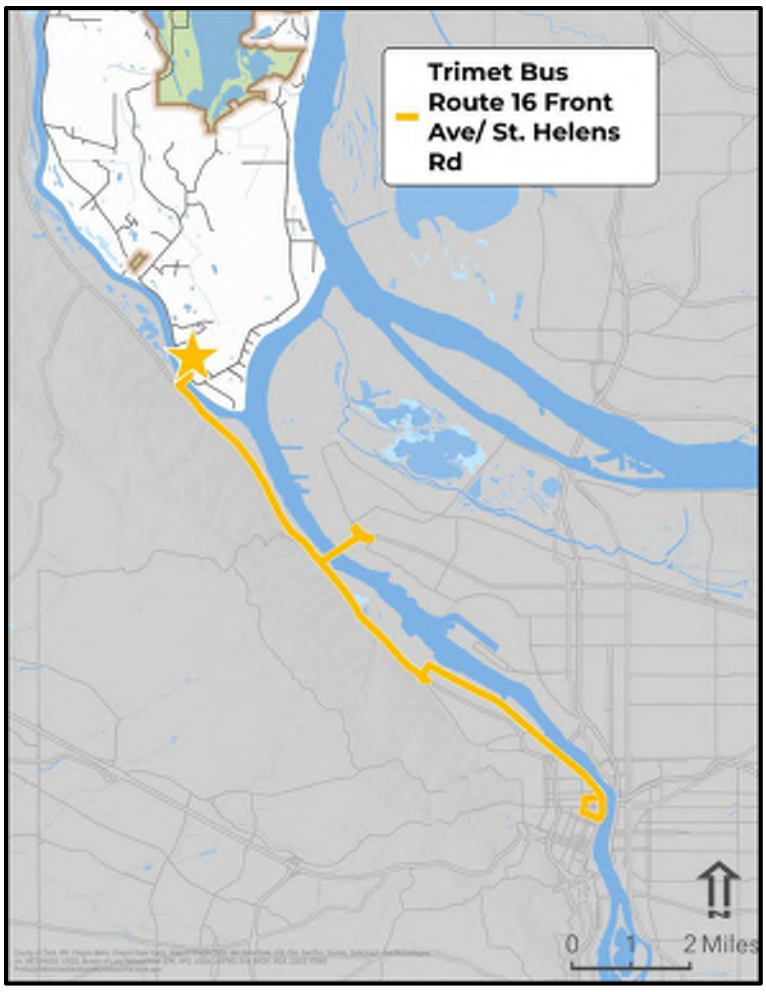
NW Sauvie Island Road, NW Gillihan Road, and NW Reeder Road are all regularly utilized by bicyclists. There are no dedicated bike lanes or sidewalks on these facilities. Therefore, bicyclists share the road with motor vehicles as shown in Figure 6.

Figure 6 – Vehicle Passing Bicyclists on Roadway (Source: DEA)

2.2.5 Public Transportation Services

Public transit to Sauvie Island is available via TriMet Bus Line 16 with a stop southeast of the NW Sauvie Island Road/NW Gillihan Road intersection (see Figure 7). TriMet Bus Line 16 provides service between the St. Johns neighborhood/Sauvie Island and downtown Portland. Headways are approximately one hour with half-hour headway service during the morning commute period.

Figure 7 – TriMet Bus Route 16 Route Map



2.3 Existing Transportation Deficiencies

The existing roadway network was reviewed against jurisdictional standards by functional classification. Table 2-2 below includes a summary of the existing conditions for roadways serving Sauvie Island. The northern end of Sauvie Island is within Columbia County, and therefore a portion of NW Reeder Road is owned and maintained by Columbia County. This portion of roadway is currently gravel, as shown in

Figure 8. The currently adopted Columbia County Transportation System Plan (TSP) includes a project to improve Reeder Road to local roadway standard and to include wider shoulders (Project ID 47). This project is identified as financially constrained in the TSP and does not have any funding identified through the currently adopted Capital Improvement Program.

Table 2-2. Roadway Characteristics

Roadway	Existing Pavement Width	Standard Pavement Width
NW Sauvie Island Road (east of NW Reeder Road)	~20-50’	24’
NW Sauvie Island Road (west of NW Reeder Road)	~20’	22’
NW Gillihan Road	~24-26’	24’
NW Reeder Road (east of NW Gillihan Road)	~20-22’	22’
NW Reeder Road (west of NW Gillihan Road)	~20-22’	22

Figure 8 – Unimproved NW Reeder Road in Columbia County (Source: DEA)

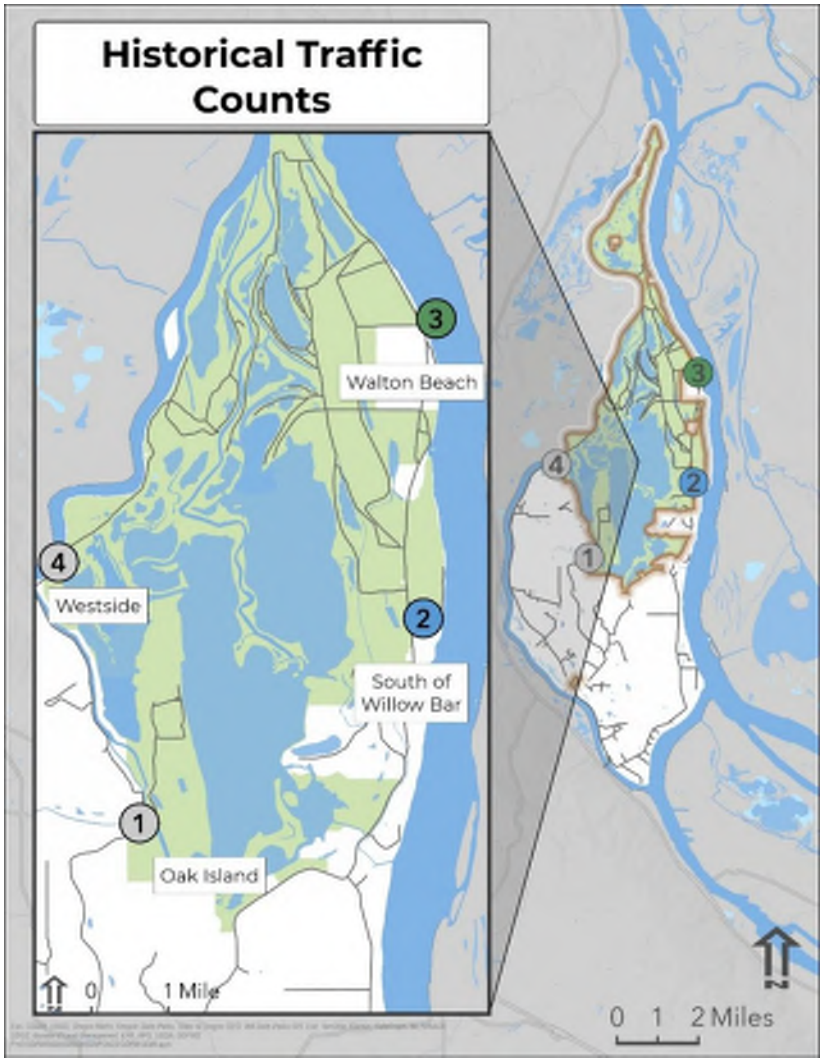
3 HISTORICAL AND EXISTING TRAFFIC CONDITIONS

The assessment of historical and existing traffic conditions includes a collection of historical traffic and weather data between 2014 and 2024, existing traffic data collected in 2024, and a review of traffic operations and observations in the field.

3.1 Historical Traffic Conditions

ODFW has four (4) traffic recorders on the island: 1) Oak Island; 2) South of Willow Bar; 3) Walton Beach; and 4) Westside, as presented in Figure 9. Traffic data has been collected at these locations since 2014. The traffic data collected at recorders #2 and #3 specifically were reviewed to evaluate historical traffic patterns associated with heavy beach usage.

Figure 9 – Historical Traffic Count Locations



Daily data for years 2019, 2022, and 2023 were correlated against historical high temperatures to determine what temperature ranges significantly impacted traffic in the SIWA. The temperature and traffic volume data show that historically high temperatures have a significant impact on traffic in the SIWA. There is a direct correlation between summer temperatures and beach visitation in the SIWA area. Higher beach visitation is notably higher when temperatures exceed 90 degrees F, regardless of day of week. Regarding holidays, traffic has been lower on July 4 potentially because visitors tend to make plans on this holiday and travel out of town. However, Tuesday, July 4, 2023 was one of the three highest traffic days that year. Additionally, traffic volumes have been historically high on Labor Day weekend.

The daily data also showed the peak utilization times occurred between 10:00 AM and 8:00 PM, with peak traffic activity occurring between 2:00 PM and 3:00 PM.

Three charts (Figure 10, Figure 11, and Figure 12) depicting the correlation between historical temperatures and daily traffic volumes (years 2019, 2022, and 2023, respectively) on the island are presented below for reference.

Figure 10 – Daily Traffic vs. Temperatures (2019)

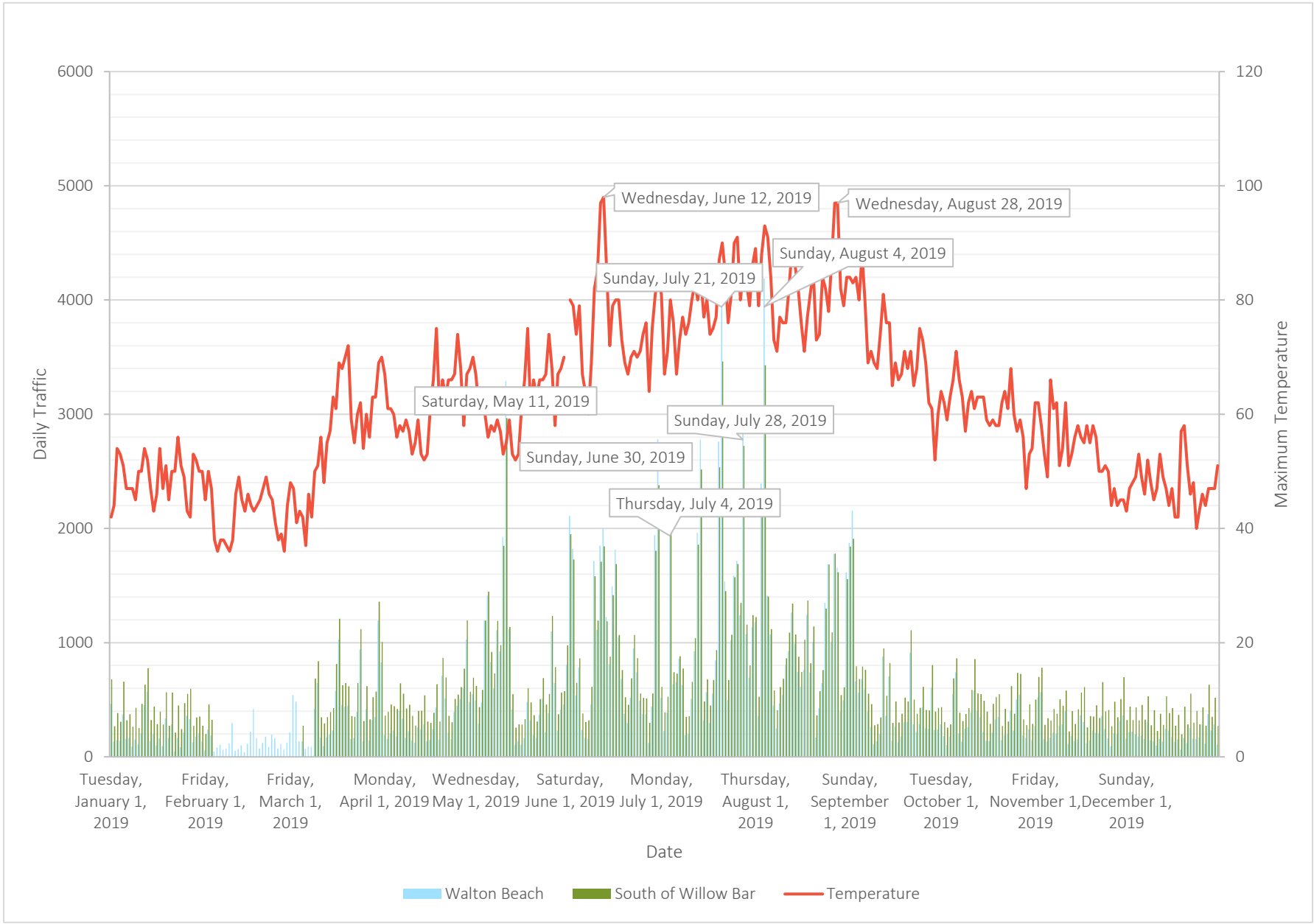


Figure 11 – Daily Traffic vs. Temperatures (2022)

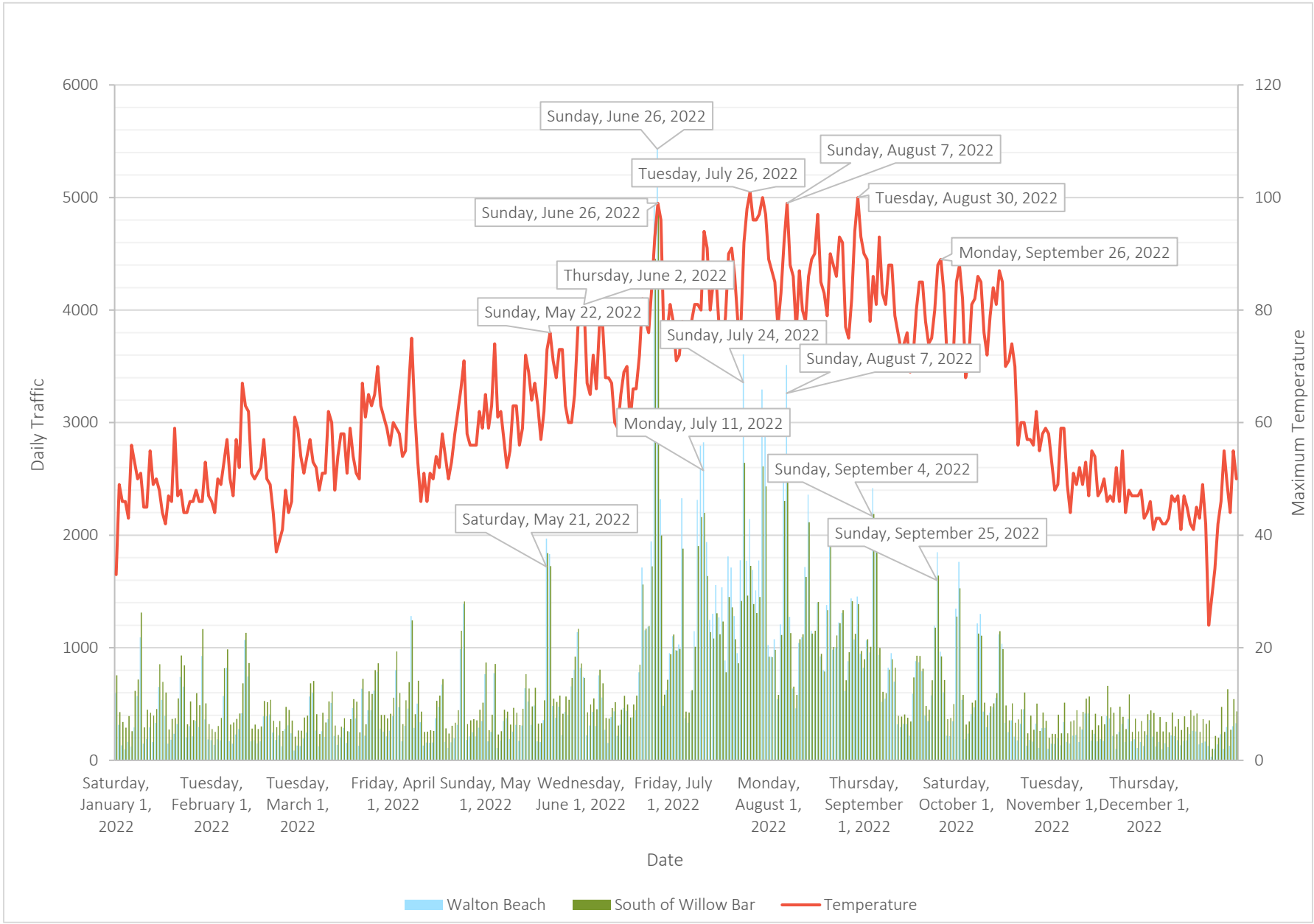
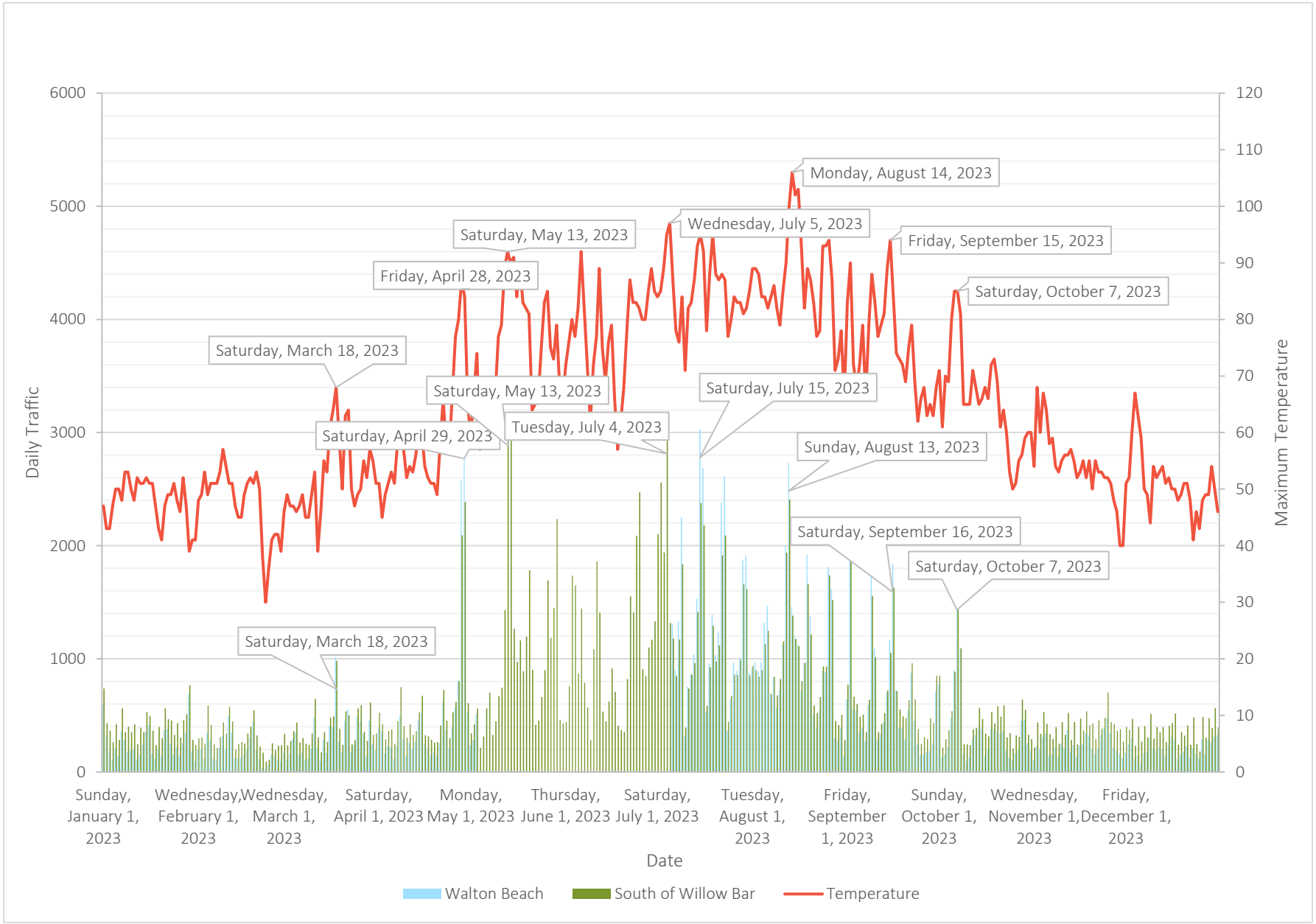


Figure 12 – Daily Traffic vs. Temperatures (2023)



3.2 Existing Traffic and Parking Conditions

Traffic volume and parking utilization data was collected in July 2024 to evaluate existing conditions. Based on a review of traffic data collected by ODFW on July 4, 2024 and June 26, 2022 as presented in Figure 11, we note traffic and parking demand data collected on July 4, 2024 does not reflect true peak conditions. Therefore, traffic and parking data collected on July 4, 2024 was calibrated to match peak conditions on June 26, 2022 using a scale factor of 1.47 derived using daily traffic counts collected at Walton Beach on both dates and reflective of 3,860 daily trips on July 4, 2024 and 5,682 daily trips on June 26, 2022.

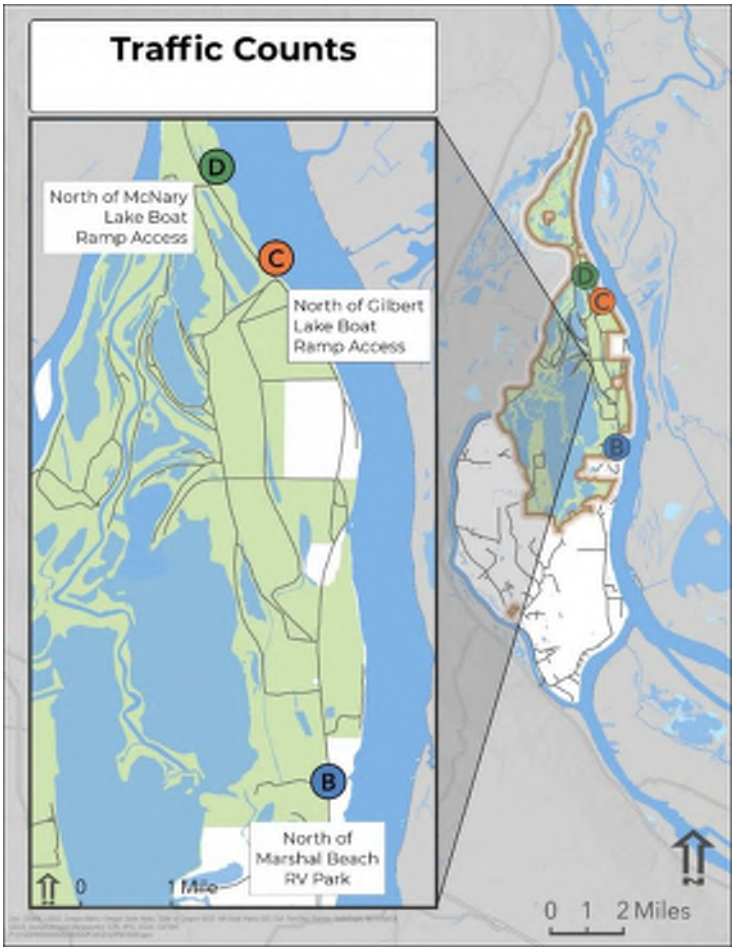
3.2.1 Existing Traffic Counts

The following traffic count data was collected in July 2024 to assess existing conditions for a peak utilization day (see Figure 13):

- July 4, 2024: 24-hour Turning Movement Counts (TMCs)
    A. NW Gillihan Road/NW Reeder Road
- July 2 – July 8, 2024: Road Tube Counts
    B. North of Mashal Beach RV Park
    C. North of Gilbert Lake Boat Ramp Access
    D. North of McNary Lake Boat Ramp Access

The road tube count data shows the highest traffic days were Thursday, July 4, Saturday, July 6, and Sunday, July 7. The recorded high temperatures on these days were 91, 99, and 100 degrees, respectively. The Marshal Beach RV Park location is the southernmost point of data collection, and the McNary Lake location is the northernmost point of data collection. The highest traffic activity was recorded at the Marshal Beach RV Park location, with traffic steadily decreasing at the other two data collection sites to the north.

Figure 13 – 2024 Traffic Count Locations

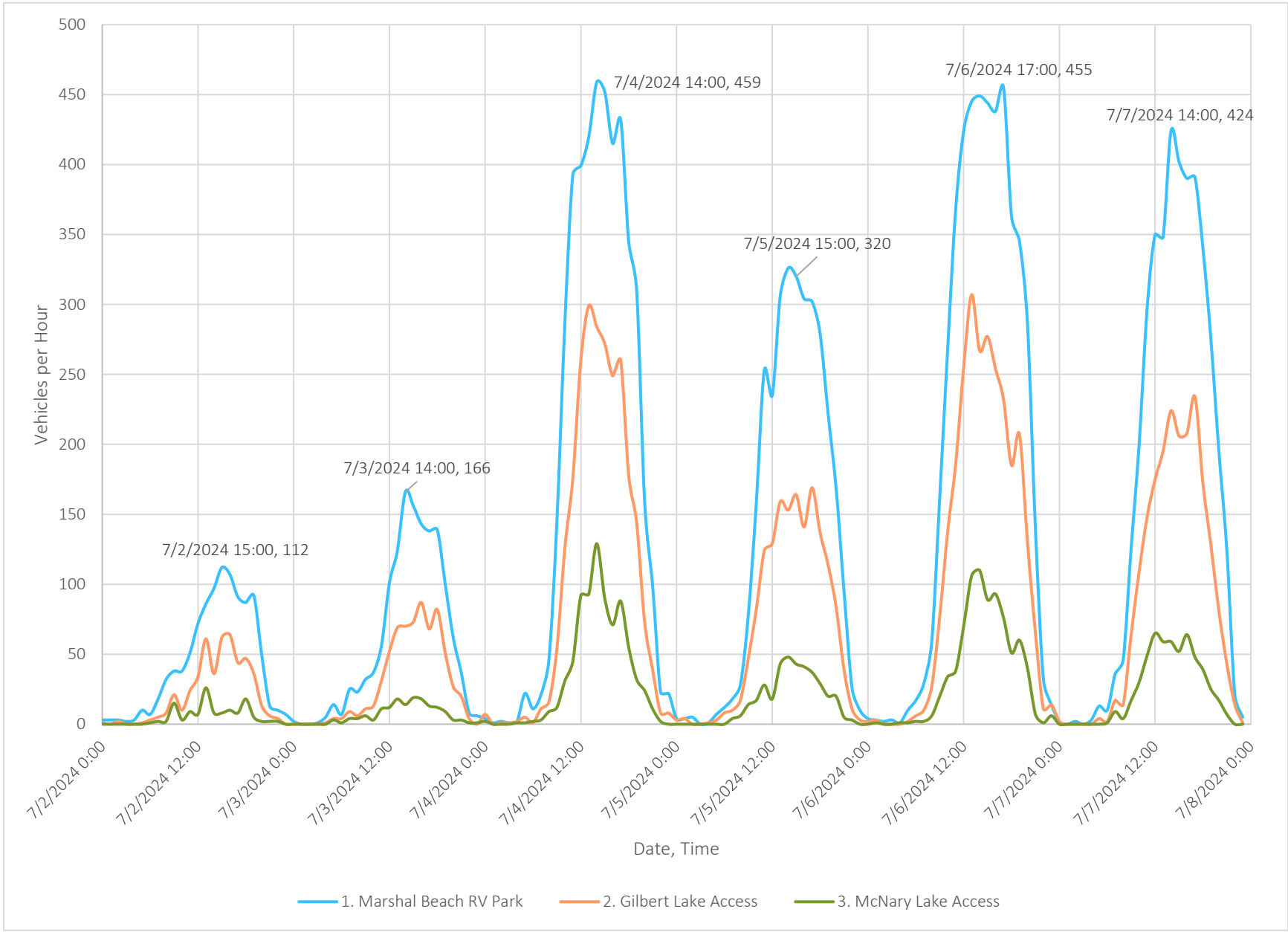


During a field visit on July 4, 2024 congestion along NW Reeder Road was observed as visitors attempted to look for parking along the beaches, as depicted in Figure 14.

Figure 14 – Vehicle Passing Idling Vehicle on NW Reeder Road (Source: DEA)

Figure 15 depicts the total traffic volumes on NW Reeder Road between July 2 and July 8, 2024 at the three locations noted in Figure 13.

Figure 15 – SIWA Traffic Counters: Total Traffic July 2, 2024 through July 8, 2024



The total daily traffic recorded north of the Gilbert Lake access on July 4, 2024 is 2,466, which is very comparable to the historical daily traffic volume recorded by ODFW at the Walton Beach location on July 4, 2022 (2,328).

A 24-hour turning movement counts at the NW Reeder Road/NW Gillihan Road intersection were also collected on July 4, 2024, as shown on Figure 16. The turning movement count data supports the peak times of entering and exiting traffic patterns for the SIWA. The peak hours for entering and exiting traffic were observed to be 11:15 AM and 5:15 PM, respectively, as presented in Figure 17. The combined peak hour was observed to occur between 2 and 3 PM. The projected volumes for June 26, 2022 are presented in Figure 18.

Figure 16 – 2024 Turning Movement Count Location

We note traffic operations on July 4 were atypical at this location between approximately 7:00 AM and approximately 11:30 AM as the eastbound right-turn and westbound left-turn movement were restricted during the Foot Traffic Flat Half & Full Marathon, 5k, and 10k. However, the peak period occurred between 2:00 PM and 3:00 PM, so peak traffic operations were not impacted by the race.

3.2.2 Existing Traffic Operations

The NW Gillihan Road/NW Reeder Road intersection is STOP-controlled on the eastbound approach. While there is a STOP sign on the northbound approach, northbound right-turning vehicles are allowed to turn without stopping. Therefore, the only STOP-controlled movements at this intersection are the eastbound through, eastbound right-, and northbound left-turning movements.

Figure 17 – July 4, 2024 Traffic Entering (Northbound)/Exiting (Southbound) SIWA at NW Reeder Road/NW Gillihan Road Intersection

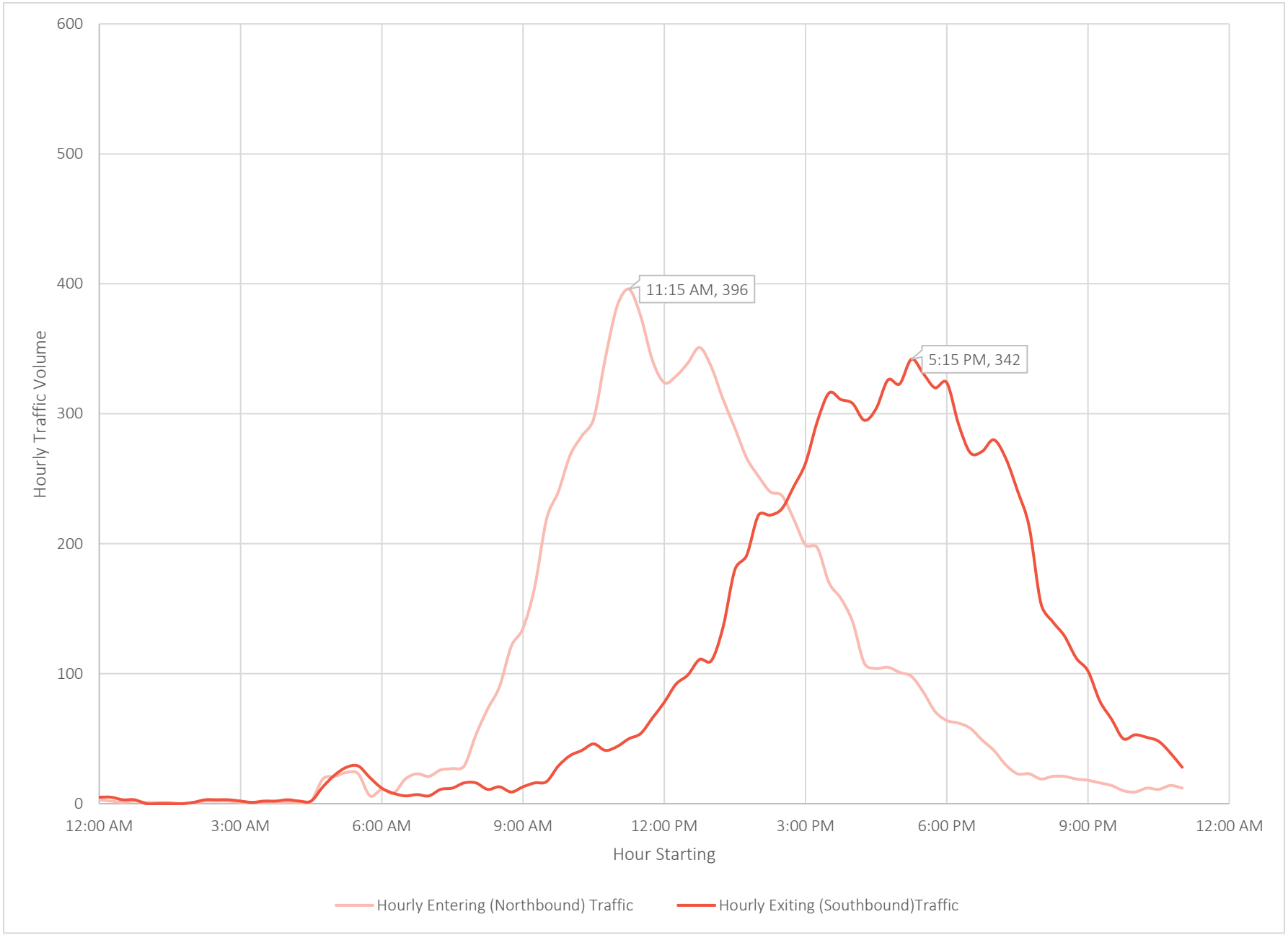
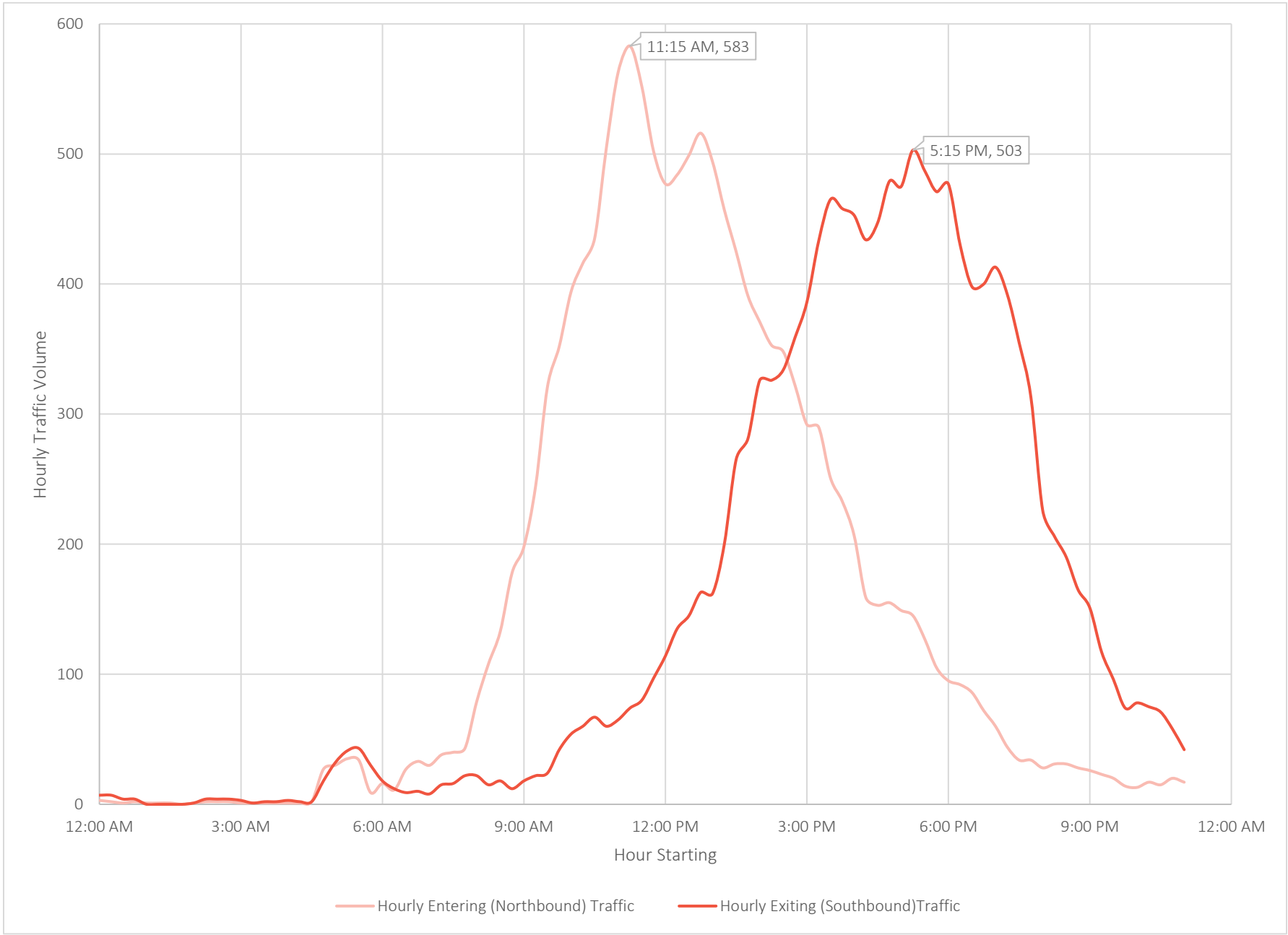


Figure 18 – Projected June 26, 2022 Traffic Entering (Northbound)/Exiting (Southbound) SIWA at NW Reeder Road/NW Gillihan Road Intersection



3.2.1 95th Percentile Queues

Video footage taken on July 4, 2024 at this location was reviewed to understand existing queues during peak traffic activity. No significant queuing was observed in the video. A SimTraffic simulation was also conducted using the peak hour volumes observed between 2:00 PM and 3:00 PM. The simulation did not result in significant queuing, consistent with the observations made from the video footage. Similar results were observed using projected June 26, 2022 traffic volumes.

3.2.2 Existing Parking Capacity

The existing parking areas serving the SIWA are currently gravel surfaces. There is no delineation in parking spaces due to the nature of the material and therefore, the capacity of parking spaces may vary greatly depending on how drivers utilize the parking areas. Based on surface areas, typical parking space and drive aisle requirements in urban areas, and a "factor of safety" to allot an additional buffer between vehicles due to the lack of parking space definition, we prepared estimates of the parking capacity in each parking area. These estimates assume no double parking. They are presented in Table 3-1. The parking capacity estimates are documented in Appendix E.

Table 3-1. Parking Capacity

Parking Area	Capacity
Willow Bar	50
Walton Beach	276
Collins Beach	562
Warrior Rock	40
TOTAL	928

3.2.3 Existing Parking Utilization

Additionally, parking utilization data was collected on July 4, 2024 between the peak utilization times of 10:00 AM and 8:00 PM for the following locations:

- Willow Bar (see Figure 19)
- Walton Beach (see Figure 19)
- Collins Beach (see Figure 27)
- Warrior Rock (see Figure 27)

Parking demand estimates were also recorded for July 4, 2024. The peak parking demand in the SIWA was approximately 1,150 vehicles at about 3 PM. This is consistent with the traffic data that suggests the average dwell time for visitors occurs between 12 PM and 5 PM, with peak parking occurring at 3 PM. The busiest parking area observed was the Collins Beach area, followed by the Walton Beach area, Willow Bar, and finally Warrior Rock.

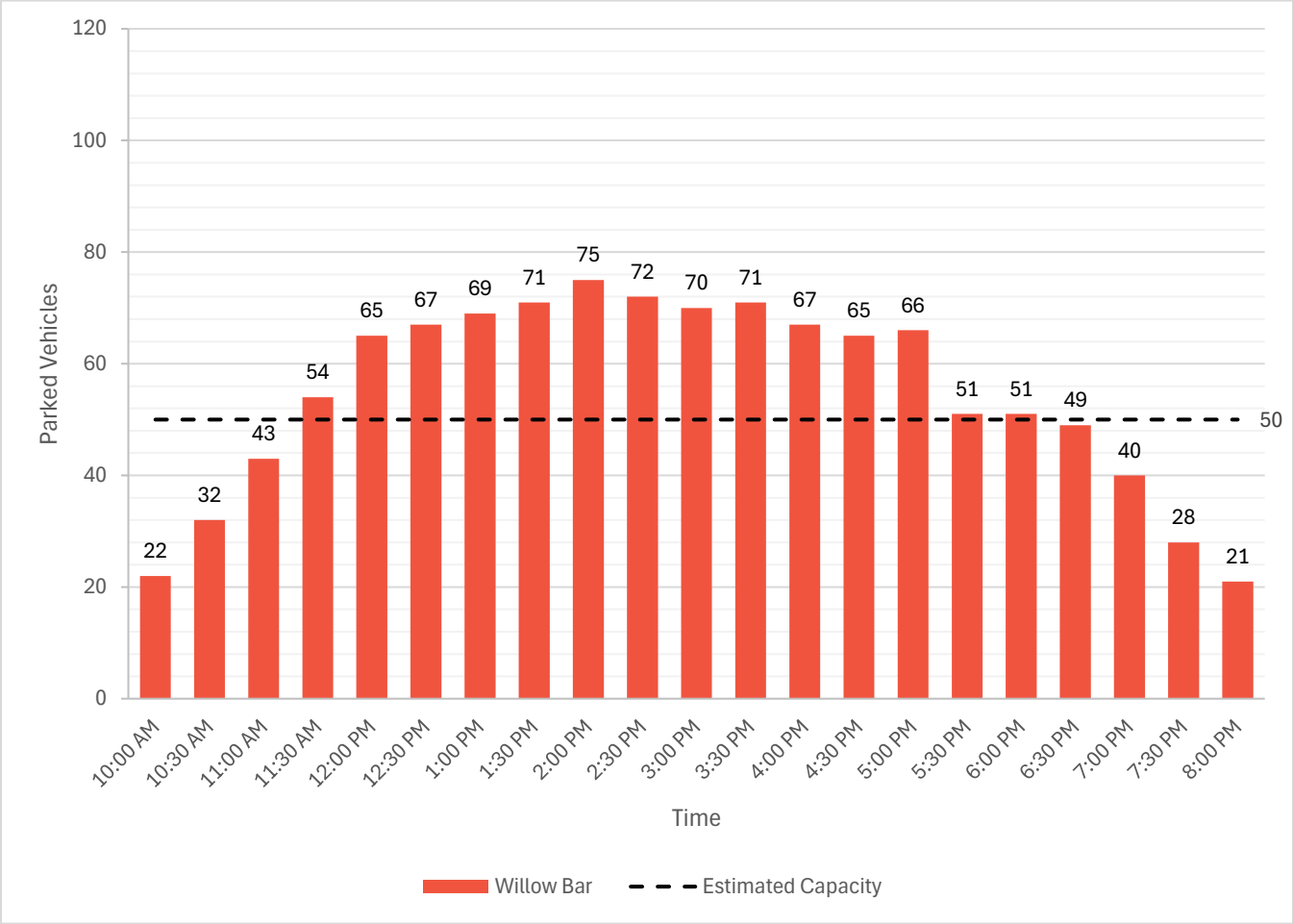
Figure 19 – 2024 Parking Utilization Count Locations (South)

3.2.4 Willow Bar

Figure 20 shows the Willow Bar parking area at about 12:30 PM on July 4, 2024. The peak parking utilization in the Willow Bar parking area was observed to occur between 2:00 PM and 3:00 PM with a peak parking count of 75 vehicles, as depicted in Figure 21. We note this shows a peak parking demand of 25 vehicles more than the estimated parking capacity. Therefore, it is assumed there are approximately 25 vehicles that are not parked in the general parking area and instead are parking along the gravel roadway leading to the parking area, which may be exacerbating traffic congestion and increasing the potential for crashes.

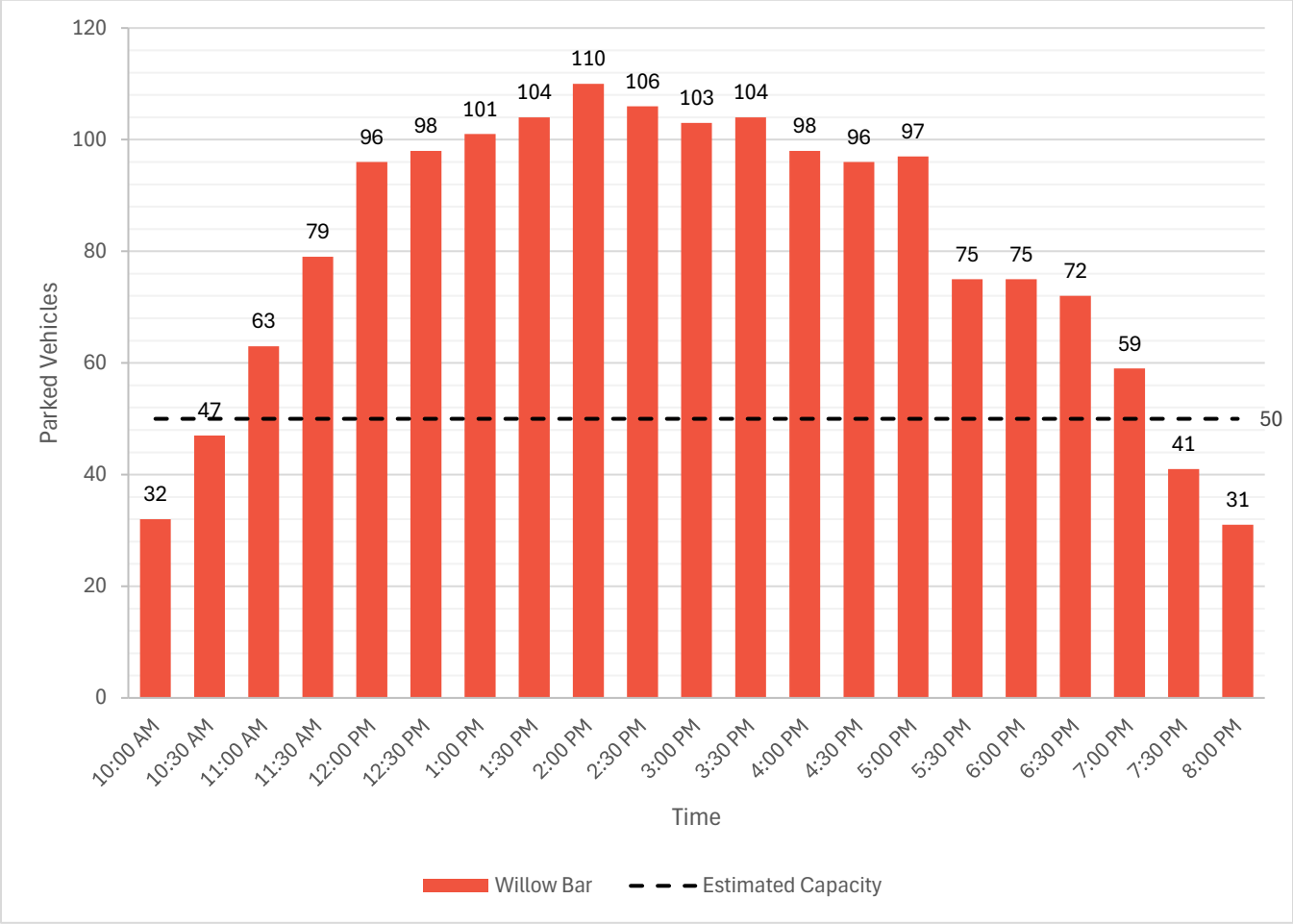
Figure 20 – Willow Bar Parking Area (Source: DEA)

Figure 21 – Willow Bar Observed Parking Demand: July 4, 2024



The parking demand estimates for June 26, 2022 (peak activity during hottest day) show the theoretical parking capacity was exceeded at the Willow Bar parking area for most of the day. The parking demand observed on July 4, 2024 exceeded the theoretical parking capacity, and therefore the estimated parking demand in Figure 22 were likely not realized due to the physical constraints in this parking area. In other words, it is probable that the Willow Bar parking area was at capacity and the parking demand presented in Figure 22 shifted to the Walton Beach area.

Figure 22 – Willow Bar Parking Demand Estimates: June 26, 2022



3.2.5 Walton Beach

The parking utilization in the Walton Beach area along NW Reeder Road appeared to be the most congested. As previously noted, there were many vehicles idling looking for parking, and many vehicles observed to be "double parked," or parked behind another vehicle, essentially trapping the anterior vehicle, as depicted in Figure 23 and Figure 24.

Figure 23 – Head-in Double Parking in Walton Beach Parking Area (Source: DEA)

Figure 24 – Parallel Double Parking in Walton Beach Area (Source: DEA)

The parking demand estimates for June 26, 2022 (peak activity during hottest day) show the theoretical parking capacity was also exceeded at the Walton Beach parking area for most of the day. The parking demand observed on July 4, 2024 exceeded the theoretical parking capacity as well. The peak parking demand period for both dates occurred between 3:00 PM and 3:30 PM at this location, as shown in Figure 25 and Figure 26. The peak parking demand during this hour was observed to be 686 vehicles in June 2022 and 467 vehicles in July 2024. The parking capacity is estimated to be only 276 vehicles.

Figure 25 – Walton Beach Parking Demand: July 4, 2024

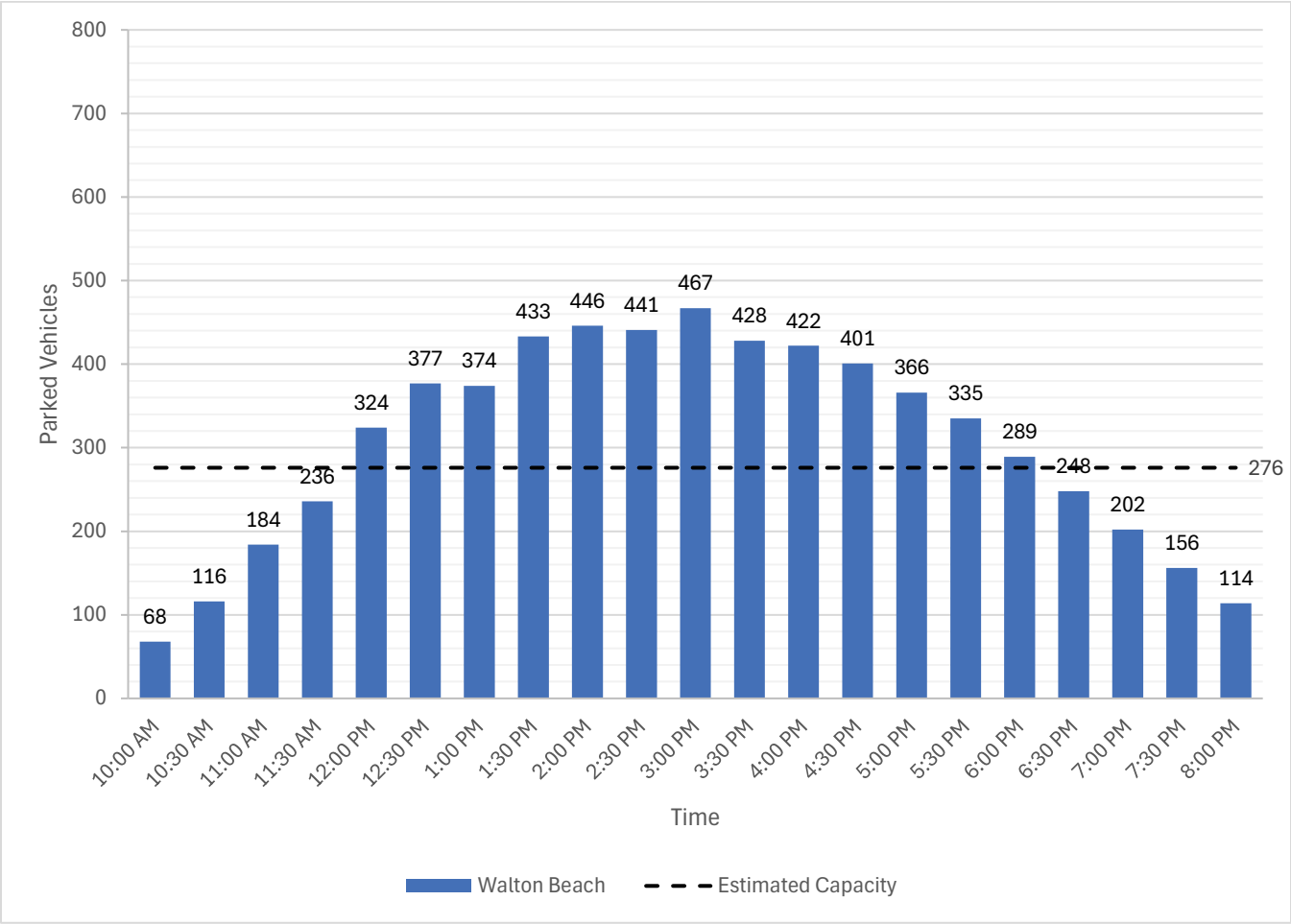
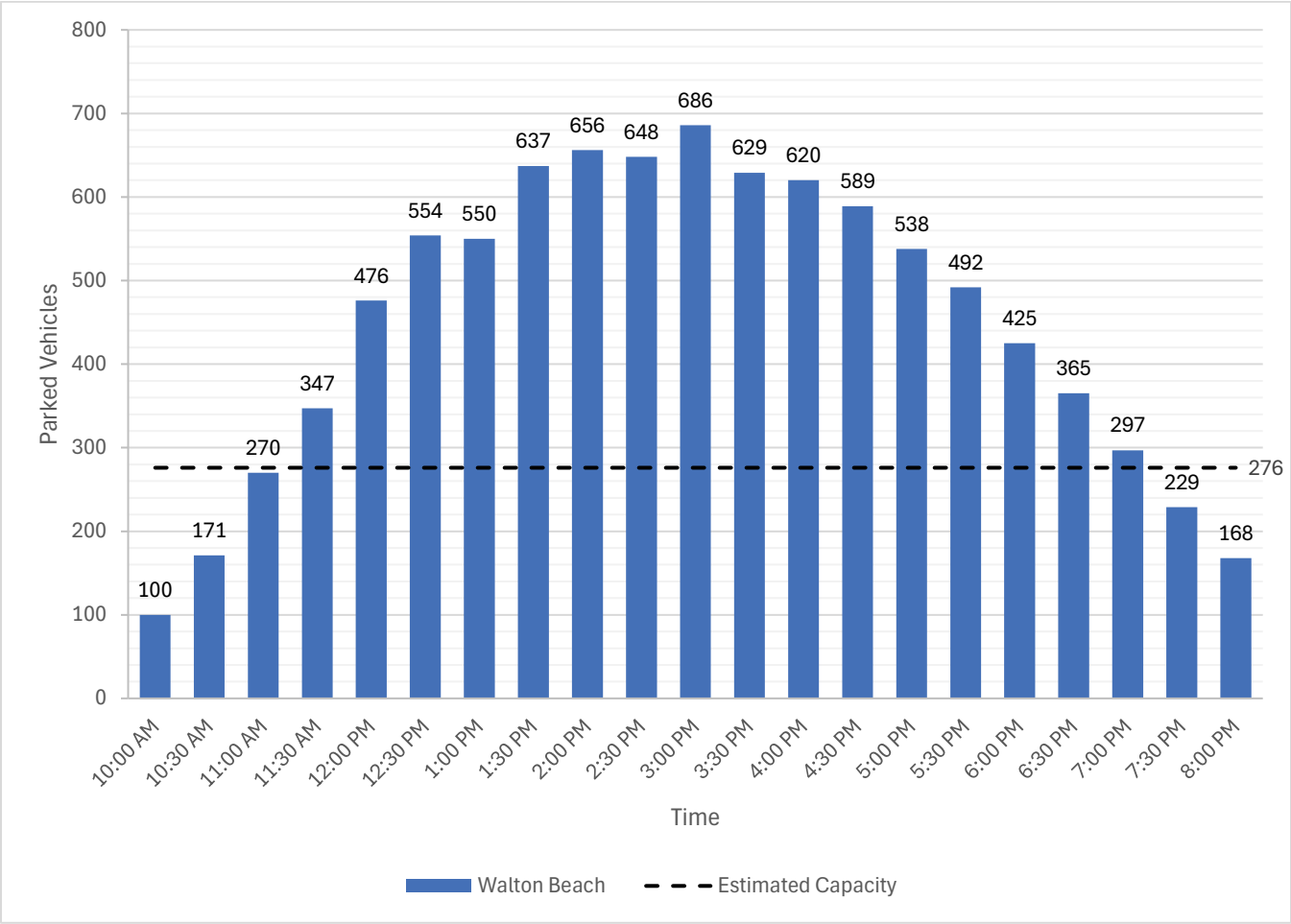


Figure 26 – Walton Beach Parking Demand Estimates: June 26, 2022



3.2.6 Collins Beach

Parking utilization at the Collins Beach areas appeared to be more orderly with fewer vehicles double parked and less congestion overall, as depicted in Figure 28 and Figure 29. This may be due to visitors favoring the Willow Bar, Walton Beach, and Warrior Rock areas in comparison with Collins Beach. This may also be attributed to visitors avoiding travel on this section of roadway (under Columbia County jurisdiction) which is currently unimproved with a gravel surface.

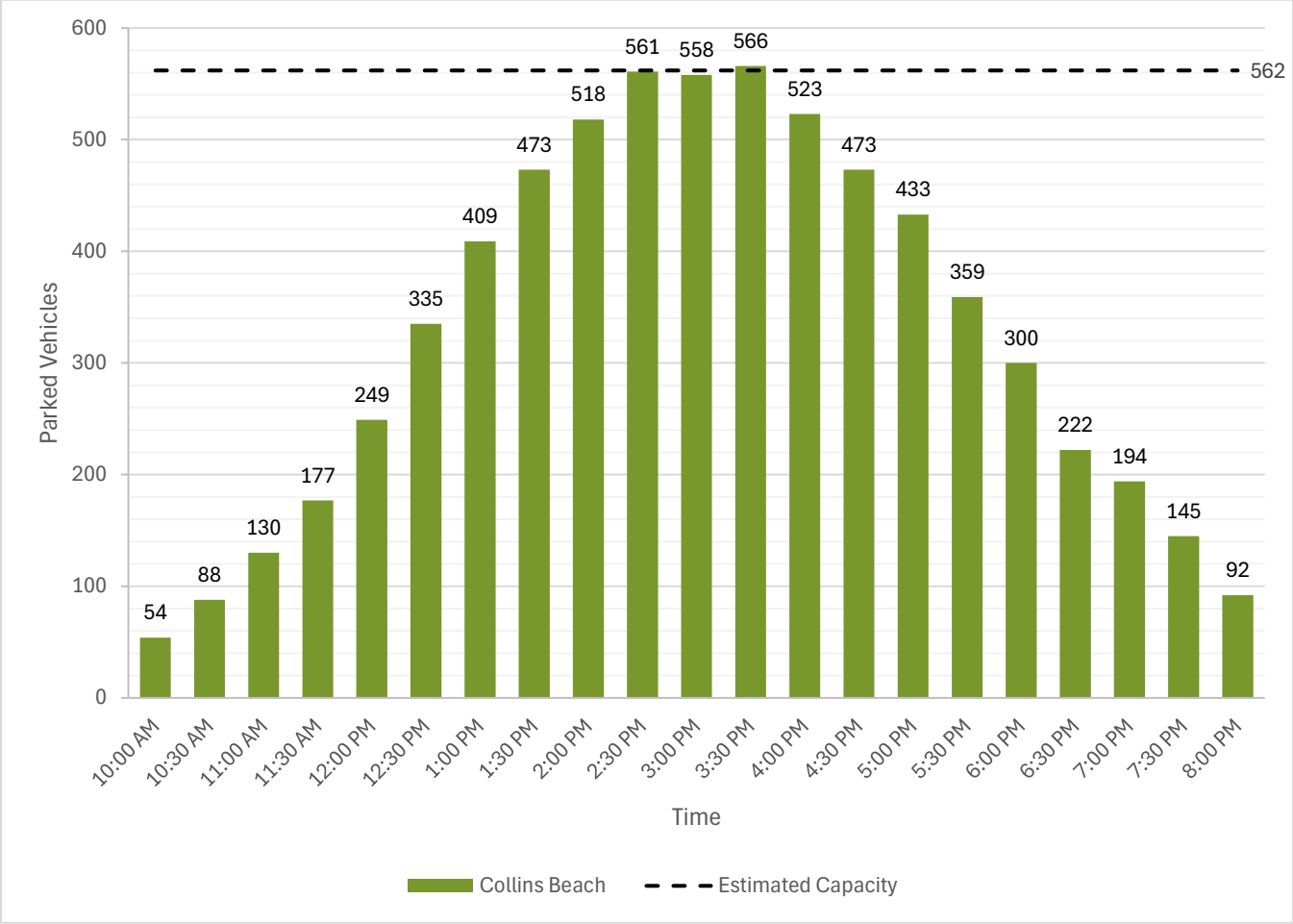
The peak parking demand at the Collins Beach parking area on July 4, 2024 was 566 vehicles compared to the estimated capacity of 562 vehicles. Peak demand occurred between 3:30 PM and 4:00 PM, as shown in Figure 30.

Figure 27 – 2024 Parking Utilization Count Locations (North)

Figure 28 – Collins Beach Parking Area (Source: DEA)

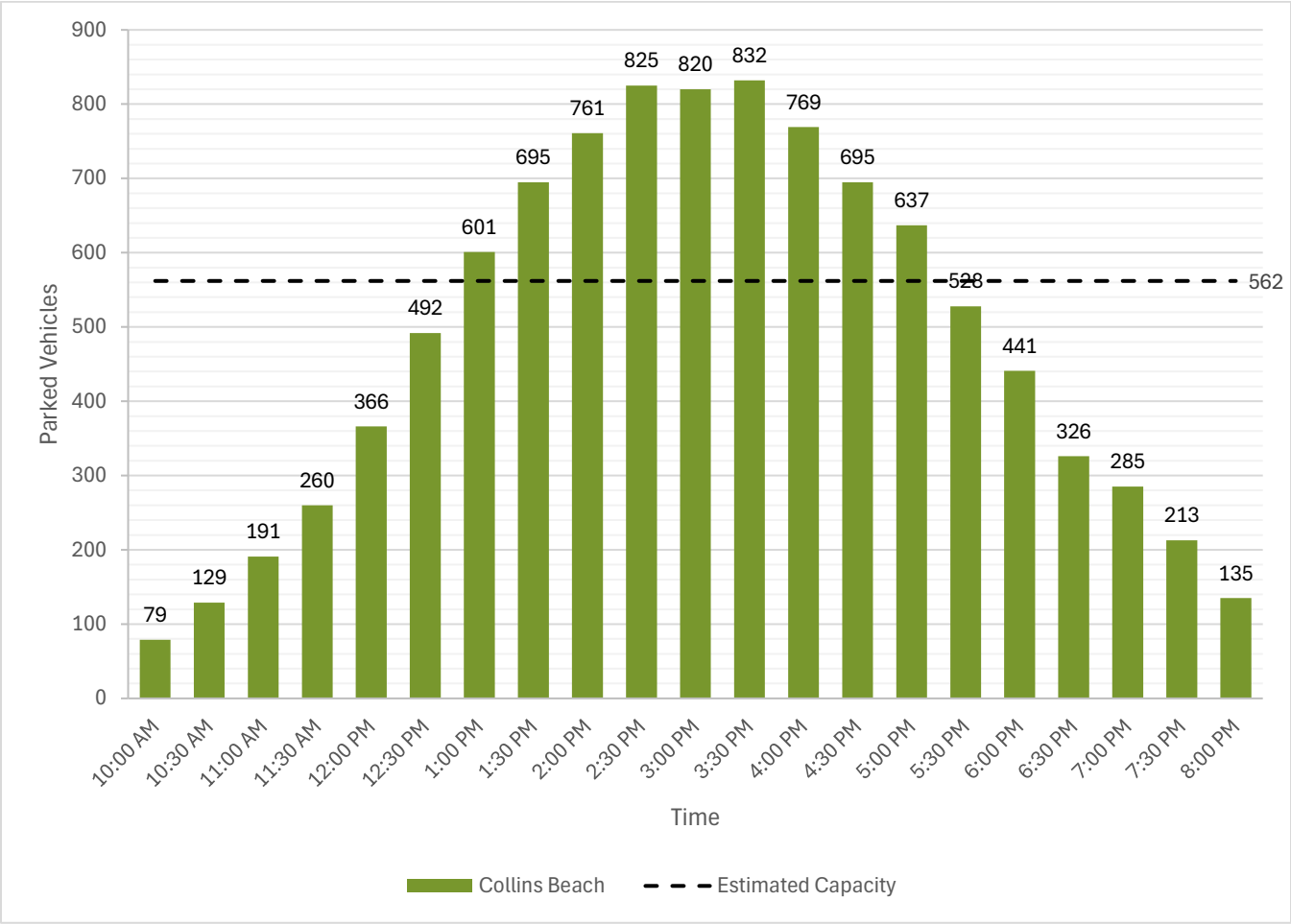
Figure 29 – Collins Beach Parking Area (Source: DEA)

Figure 30 – Collins Beach Parking Demand: July 4, 2024



As presented in Figure 31, the parking demand in the Collins Beach lot on June 26, 2022 (peak activity during hottest day) area also exceeded the estimated parking capacity. This is possible because many vehicles double park, as observed on July 4, 2024.

Figure 31 – Collins Beach Parking Demand Estimates: June 26, 2022



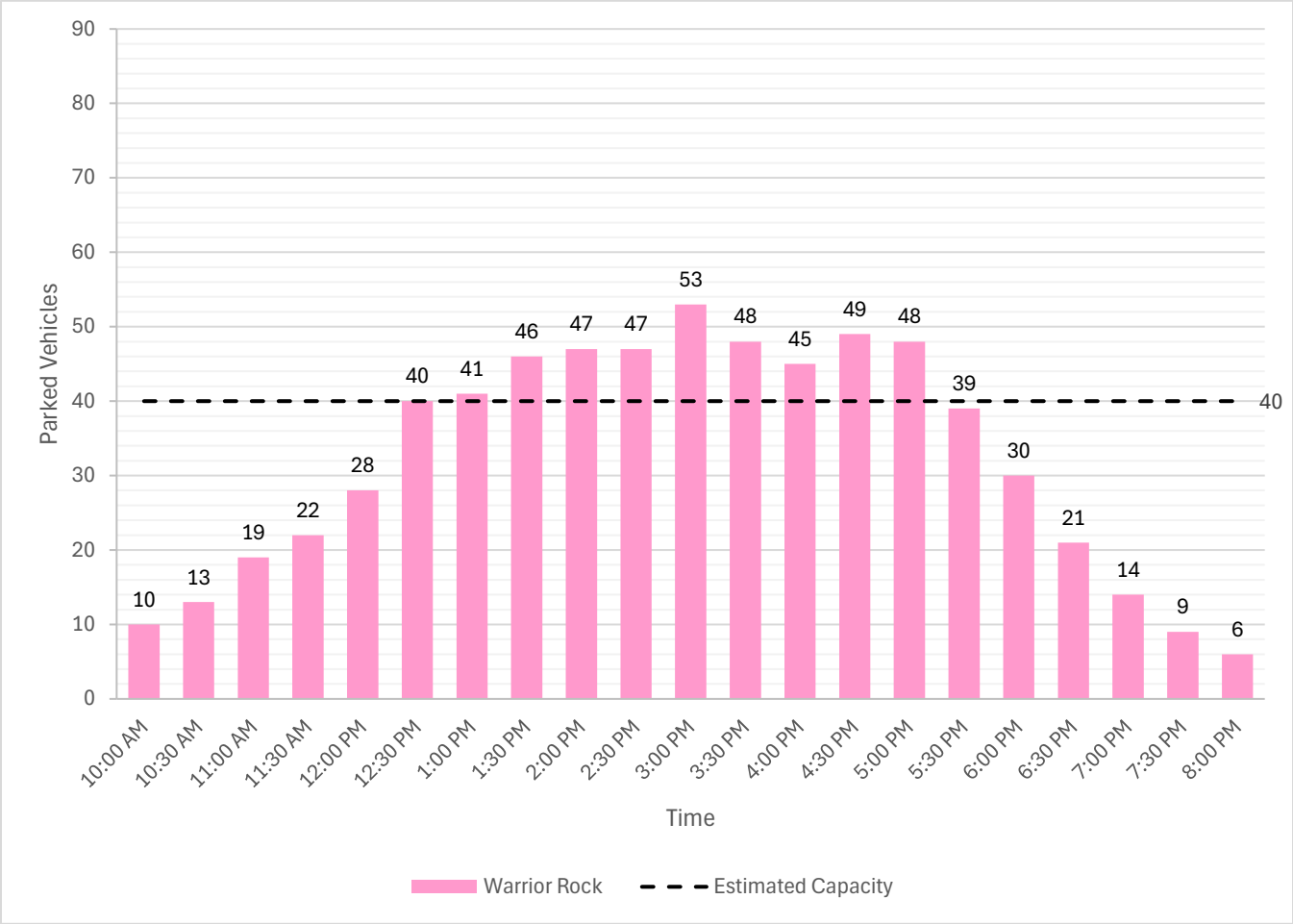
3.2.7 Warrior Rock

During the July 4, 2024 field visit parking utilization at Warrior Rock was approaching capacity just before 1:00 PM, as depicted in Figure 32 and Figure 33. Parking utilization at Warrior Rock was observed to exceed the estimated capacity between 1:00 PM and 5:00 PM, as presented in Figure 34. The peak parking demand was observed to be 53 vehicles between 3:00 PM and 4:00 PM.

Figure 32 – Warrior Rock Parking Area (Source: DEA)

Figure 33 – Warrior Rock Parking Area (Source: DEA)

Figure 34 – Warrior Rock Parking Demand: July 4, 2024



The parking demand estimates for June 26, 2022 show the theoretical parking capacity in the Warrior Rock parking area was exceeded for most of the day. While the parking demand observed on July 4, 2024 exceeded the theoretical parking capacity, the parking demand on June 26, 2022 likely exceeded the parking capacity but not to the extent as estimated in Figure 35 due to the physical constraints in this parking area.

Figure 35 – Warrior Rock Parking Demand Estimates: June 26, 2022

3.2.8 Total Parking Demand

Parking demand was observed to exceed the total estimated parking capacity of 928 spaces by approximately 24% between 3:00 PM and 4:00 PM on July 4, 2024, as shown in Figure 36. In the Willow Bar, Walton Beach, and Warrior Rock parking areas, parking far exceeded capacity. In the Collins Beach parking area, parking slightly exceeded capacity.

Figure 37 shows that the peak activity on June 26, 2022 was estimated to have exceeded SIWA parking capacity by approximately 82%.

Figure 36 – SIWA Total Parking Demand: July 4, 2024

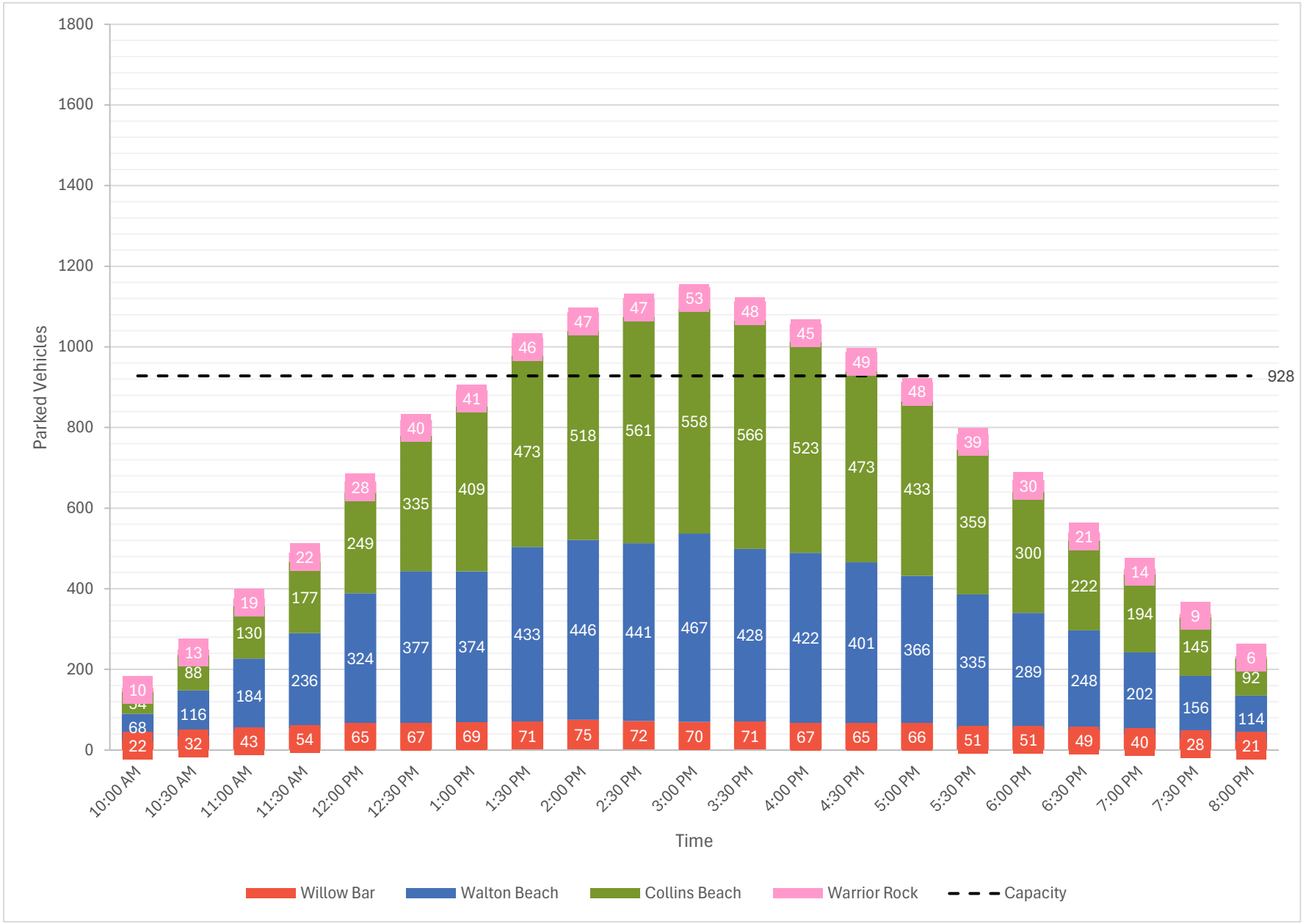
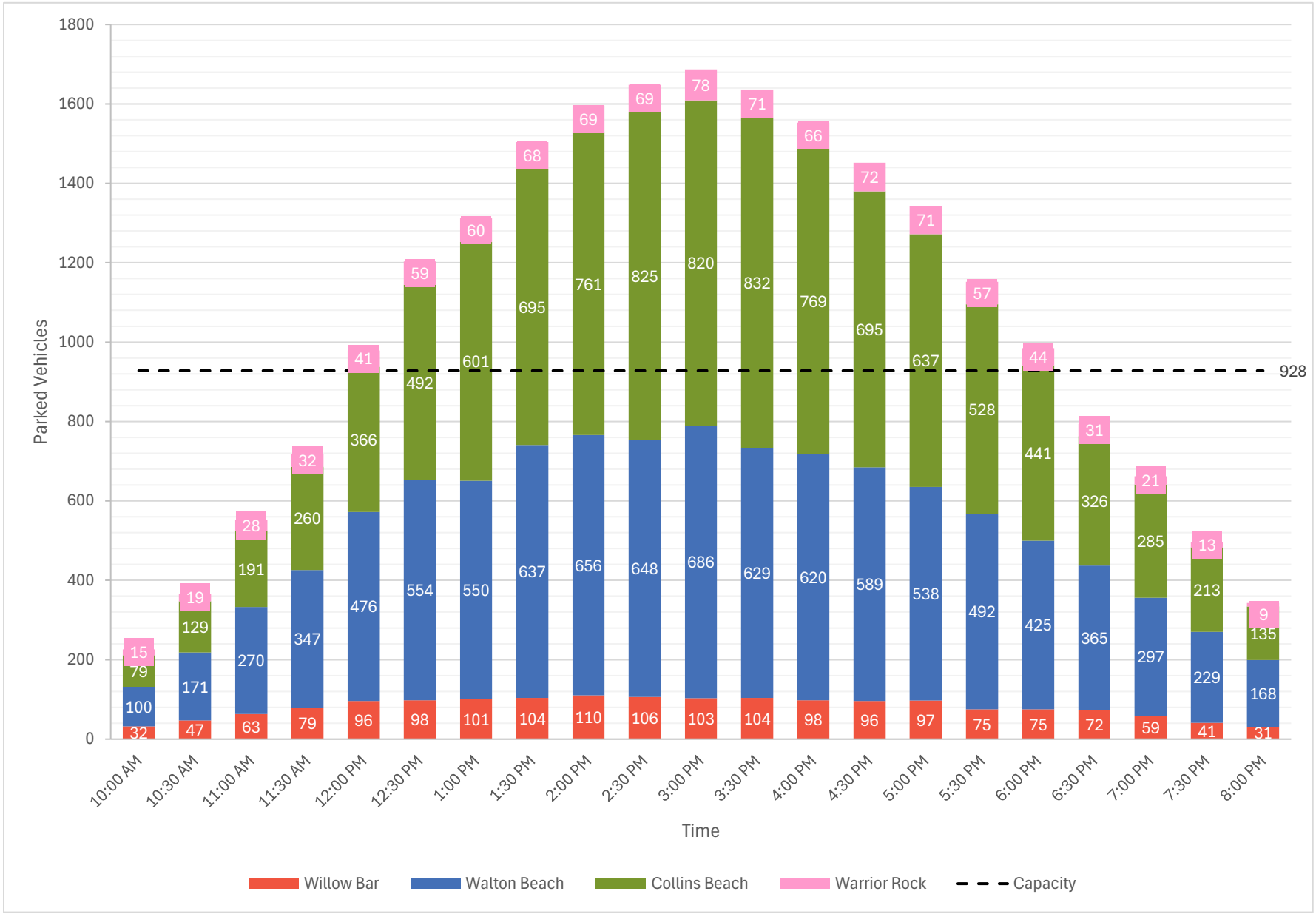


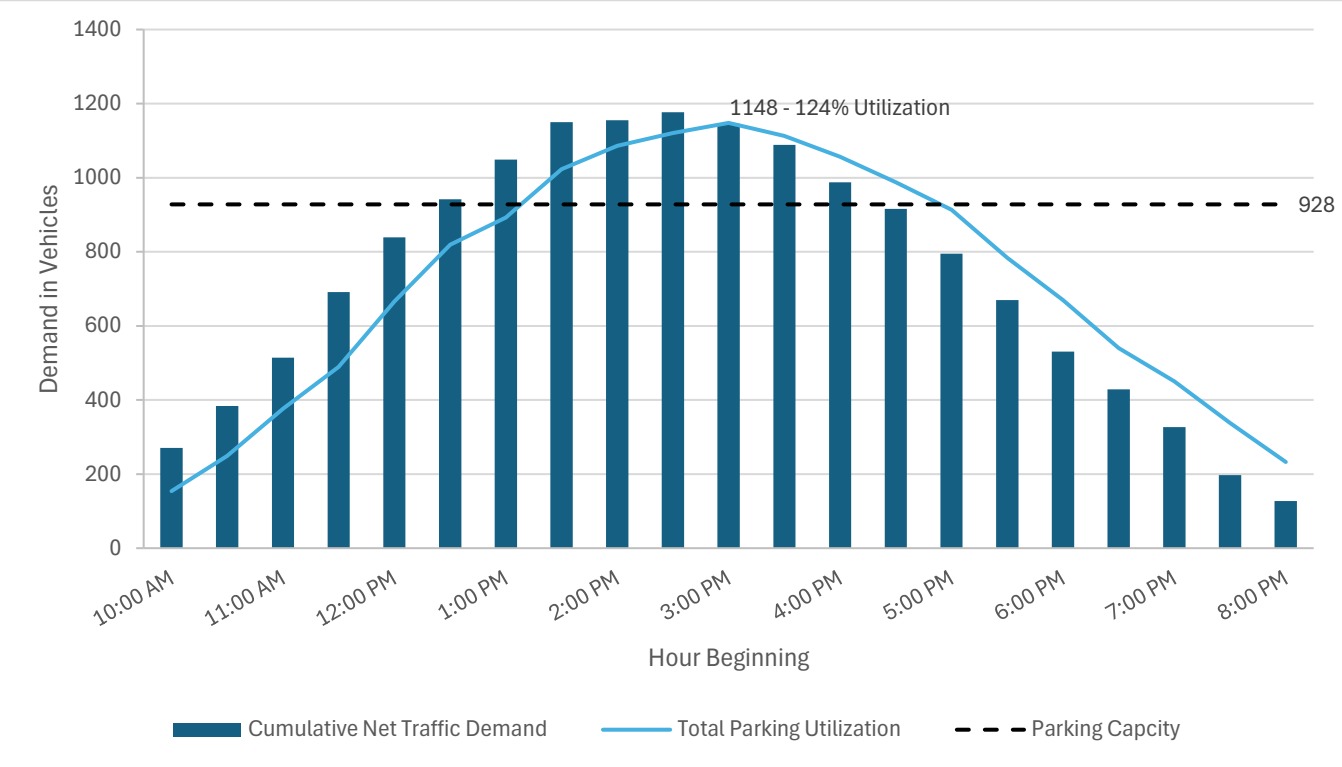
Figure 37 – SIWA Total Parking Demand Estimates: June 26, 2022



3.2.9 Existing Traffic-to-Parking Ratio

To better understand and manage future traffic and parking congestion in the SIWA area, it is important to understand the relationship between entering traffic and parking capacity. Utilizing traffic and parking data collected on July 4, 2024, we projected the entering traffic equivalent to 100%, 90%, and 80% parking utilization in the SIWA. This was done by first establishing the net traffic demand (traffic entering minus traffic exiting the SIWA) and comparing the net traffic demand with the total parking demand estimates between 10:00 AM and 8:00 PM, as presented in Figure 38. The peak parking demand was observed to be 1,148 between 3:00 PM and 3:30 PM with the net traffic demand peaking half-an-hour earlier between 2:30 PM and 3:00 PM. The peak entering traffic between 10:00 AM and 8:00 PM was observed to be 204 entering vehicles between 11:30 AM and 12:00 PM.

Figure 38 – Observed Traffic Demand vs. Parking Utilization: July 4, 2024



It will be important for ODFW to understand the relationship between levels of entering traffic and parking utilization. As parking utilization increases, parking scarcity may make traffic more difficult to manage.

Below are charts projecting net traffic demand vs. parking utilization at 100% (see Figure 39), 90% (see Figure 40), 80% (see Figure 41) utilization.

Figure 39 – Projected Traffic Demand vs. Parking Utilization at 100% Utilization

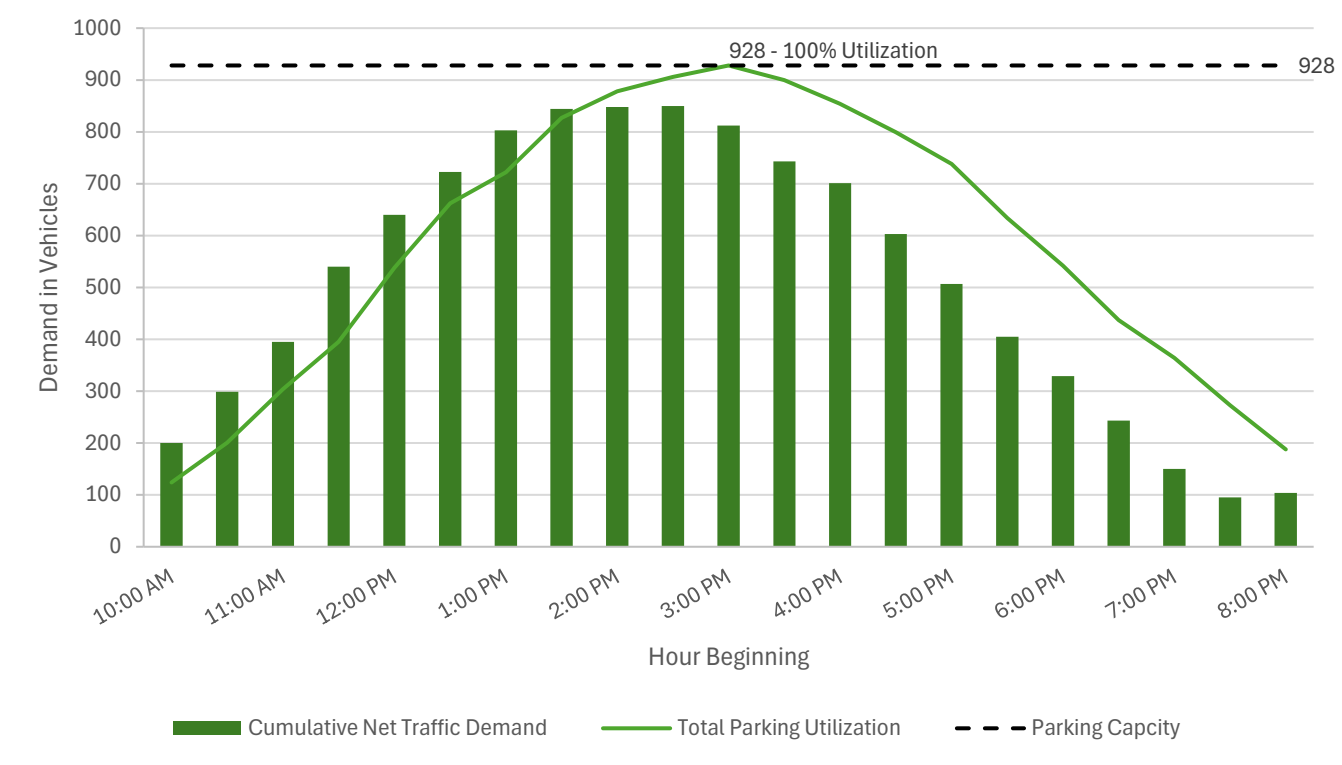


Figure 40 – Projected Traffic Demand vs. Parking Utilization at 90% Utilization

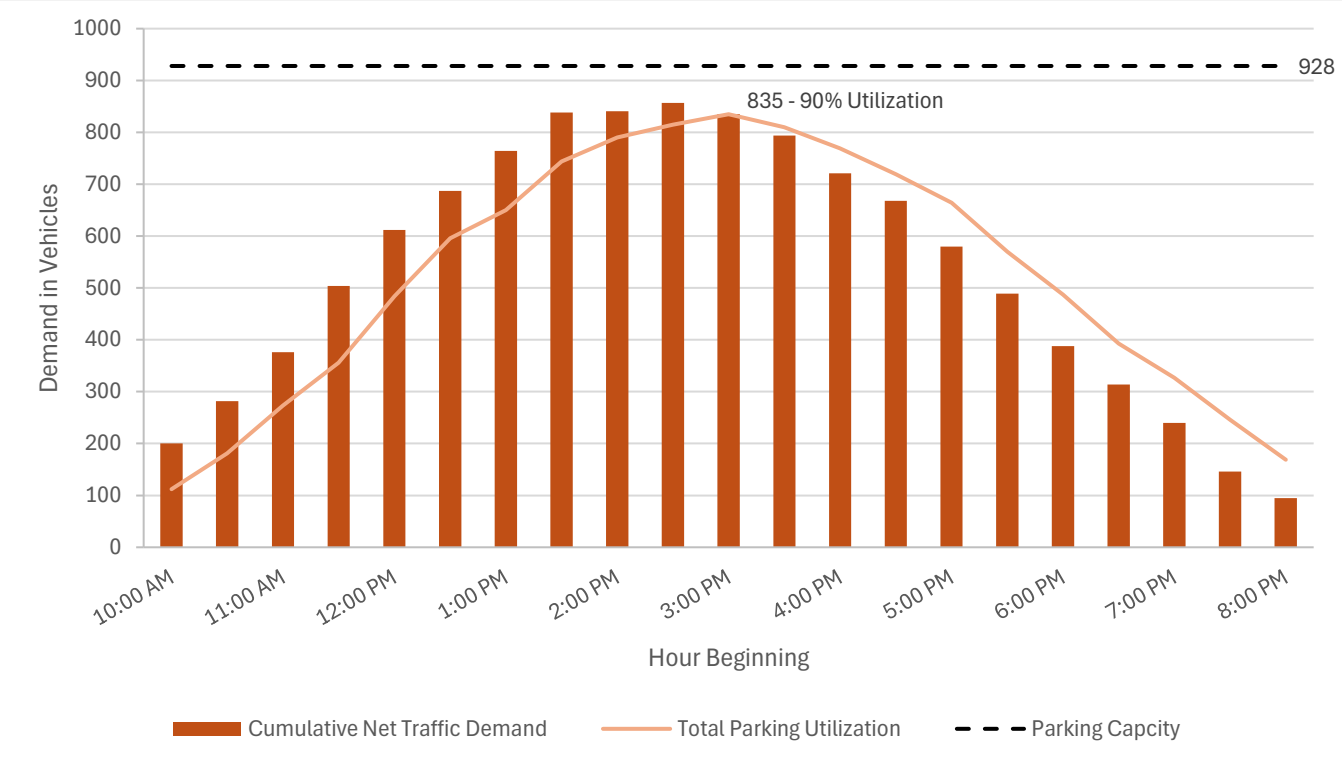


Figure 41 – Projected Traffic Demand vs. Parking Utilization at 80% Utilization

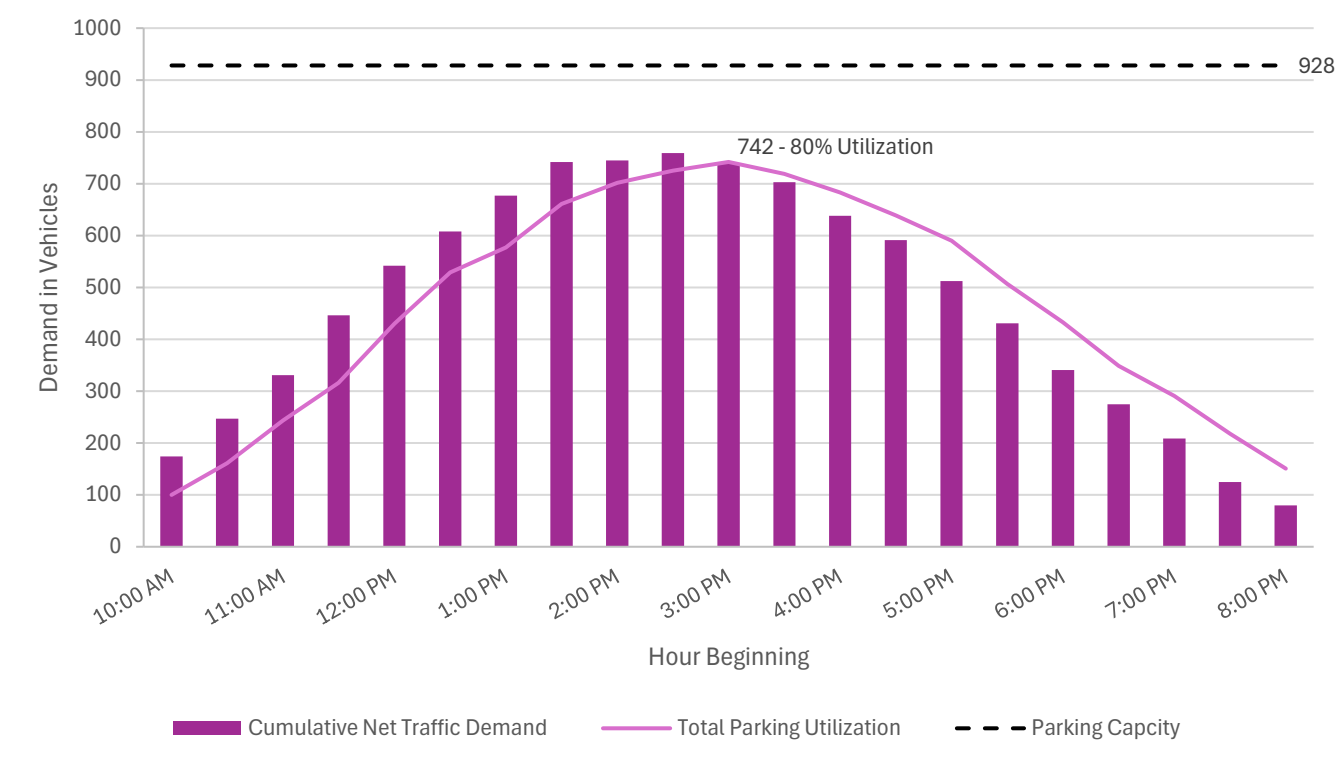


Table 3-2 summarizes the traffic-to-parking relationship projections based on the data collected on July 4, 2024 and the charts above.

Table 3-2. Traffic Demand vs. Parking Utilization Projections

Time	124% Peak Utilization (Observed)		100% Peak Utilization (Projected)		90% Peak Utilization (Projected)		80% Peak Utilization (Projected)	
	Entering Traffic	Parking Demand	Entering Traffic	Parking Demand	Entering Traffic	Parking Demand	Entering Traffic	Parking Demand
10:00 AM	115	154	93	124	84	112	74	100
10:30 AM	139	249	112	201	101	181	90	161
11:00 AM	146	376	118	304	106	273	94	243
11:30 AM	204	489	165	395	148	356	132	316
12:00 PM	173	666	140	538	126	484	112	430
12:30 PM	152	819	123	662	111	596	98	529
1:00 PM	156	893	126	722	113	650	101	577
1:30 PM	158	1,023	128	827	115	744	102	661
2:00 PM	113	1,086	91	878	82	790	73	702
2:30 PM	130	1,121	105	906	95	815	84	725
3:00 PM	96	1,148	78	928	70	835	62	742

As presented in Table 3-2, the peak 30-minute period for entering traffic is projected to occur between 11:30 AM and 12:00 PM. At projected 100%, 90%, and 80% utilization the entering traffic between 11:30 AM and 12:00 PM

is estimated to be 165, 148, and 132 vehicles, respectively. This applies to peak activity days such as July 4 and July 5, 2024. The peak entering traffic on July 5, 2024 also occurred between 11:30 AM and 12:00 PM consistent with July 4, 2024 activity. However, entering traffic on July 2 and July 3, 2024 peaked between 2:30 PM and 3:00 PM. We note these days are associated with considerably lower traffic in comparison with the peak days of July 4 and July 5, 2024.

Overall, traffic volumes were lower on July 4, 2024 (3,860 daily trips at Walton Beach) in comparison with historical data from June 26, 2022 (5,682 daily trips at Walton Beach). Based on this volume comparison, we note the parking demand on a very busy day likely exceeds the patterms shown in Figure 38.

4 SAFETY

4.1 Crash History Analysis

Crash data on NW Reeder Road and NW Gillihan Road were reviewed for the most recent five-year period of complete data between years 2018 and 2022. During this five-year period there were nine (9) crashes reported on NW Gillihan Road, 19 crashes on NW Reeder Road, and one (1) crash reported at the NW Gillihan Road/NW Reeder Road intersection. All crashes reported on NW Reeder Road occurred west of the intersection with NW Gillihan Road and therefore outside of the SIWA study area. The focus of the crash data review is on NW Gillihan Road which provides direct access to the SIWA study area, and the intersection of NW Gillihan Road/NW Reeder Road, where the traffic entering and exiting the SIWA converges.

Most (4) of the crashes reported on NW Gillihan Road were reportedly turning-movement collisions, followed by rear-end collisions (3) and fixed-object collisions (3). One (1) of the fixed-object collisions resulted in a serious injury (Type A).

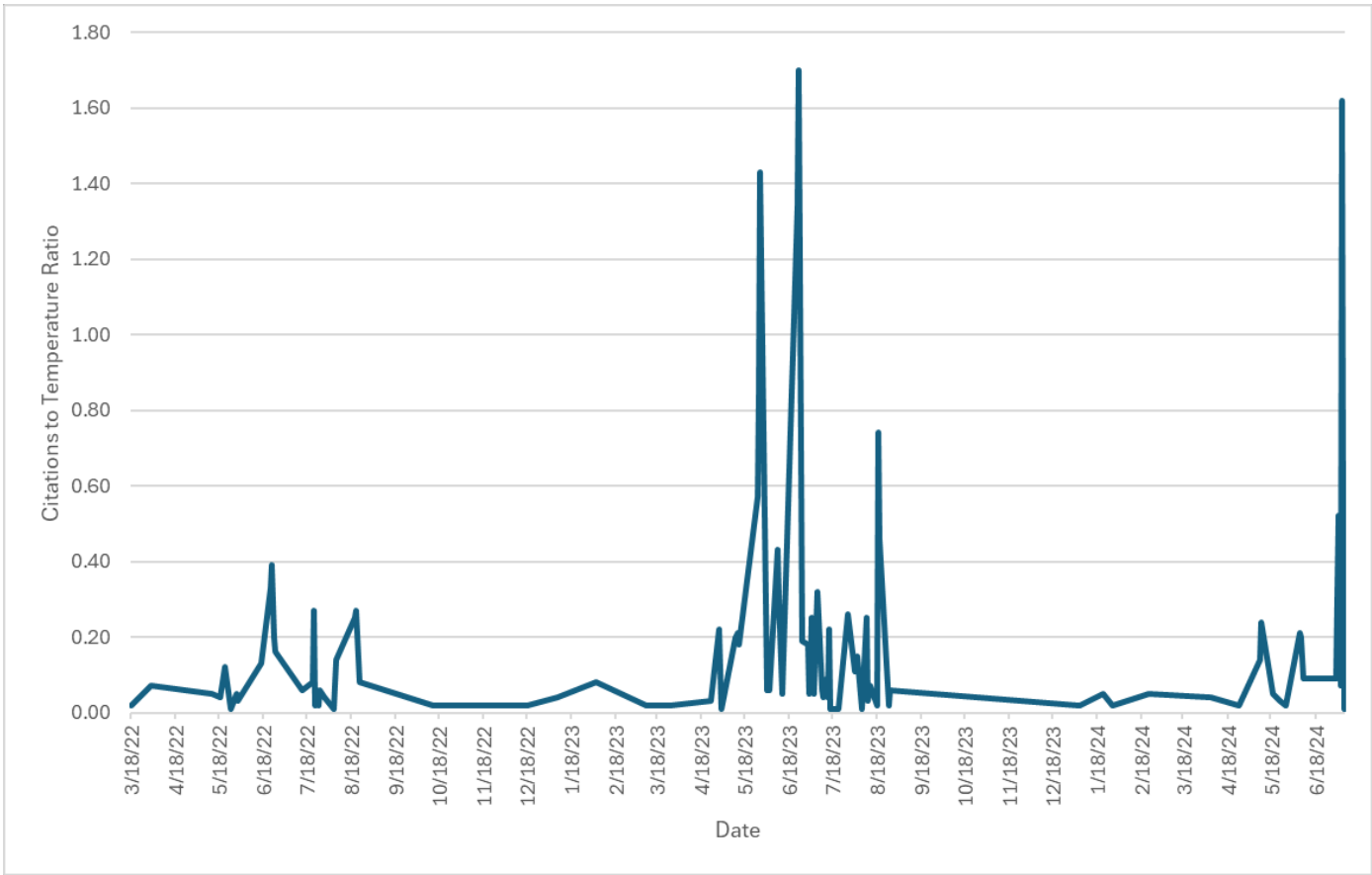
The crash reported at the NW Gillihan Road/NW Reeder Road intersection was reportedly a rear-end collision involving two (2) westbound traveling vehicles. This crash was reported to have resulted in property damage only (PDO) and no injuries.

The historical crash data does not suggest there are existing geometric deficiencies or extreme traffic congestion concerns that may degrade safety on NW Gillihan Road and NW Reeder Road.

4.2 Citation History

Increased traffic during the hot weather season in the SIWA has historically resulted in large volumes of citations issued by the Oregon State Police (OSP) unit managing the wildlife area. Citation data was provided by OSP for years 2022, 2023, and 2024. Figure 42 shows this data in terms of a “citations-to-temperature ratio.” There are significant spikes in the ratio value during warmer months each year, indicating that OSP issues more citations on warmer days. During the count period starting the week of July 2, 2024 OSP noted the number of citations significantly decreased from 106 citations on Saturday, July 6, 2024 to 53 citations on Sunday July 7, 2024. There is not a strong correlation between citations issued and temperature or citations issued and traffic on the island.

Figure 42 – Traffic Citations in the SIWA



4.3 Emergency Response History

Alarm response data was provided by the Sauvie Island Fire Department (SIFD) for years 2021, 2022, and 2023. Figure 43 shows the total number of alarms that SIFD responded to by month in 2021 and 2023 combined. Although October had the highest number of alarms overall, several months in the warmer weather season (May, June, August, and September) also had relatively high numbers of alarm responses. Although the SIFD data did not specify, this trend could mean that higher levels of beach use in the hot weather months generates an increase in events requiring SIFD response.

Figure 43 – Sauvie Island Fire Department Alarm Responses by Month (2021 and 2023)

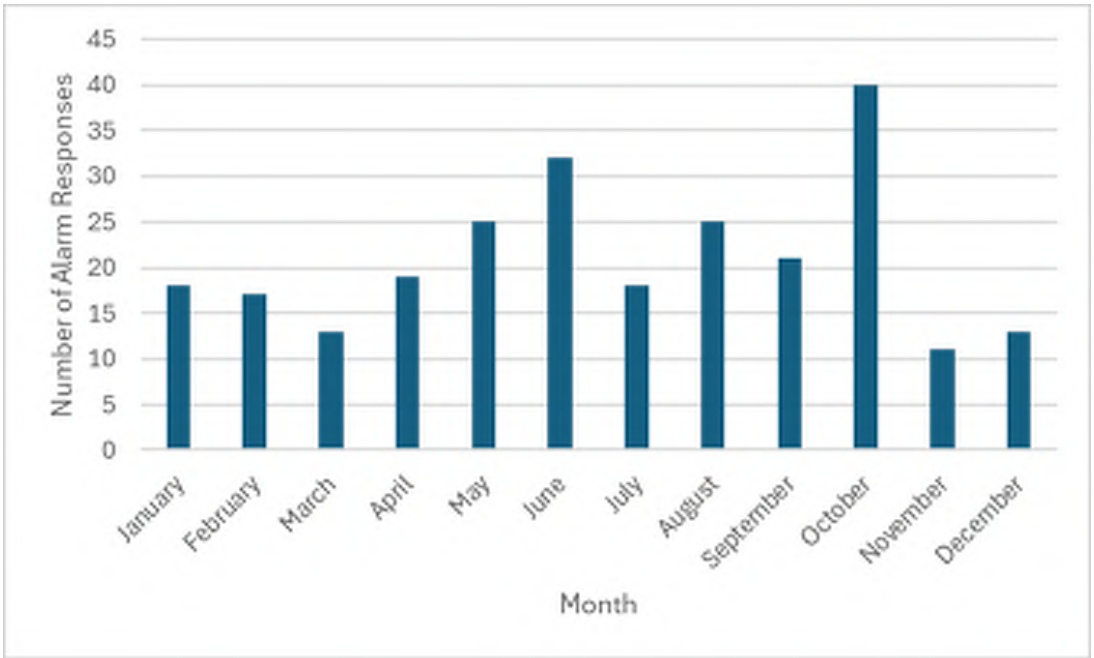


Table 4-1 breaks down the types of alarms that SIFD responded to in 2022 and 2023 within the SIWA. Overall, SIFD responded most frequently to medical alarms (13 total incidences) and fire alarms (12 total incidences). Rescue alarms rounded out the top three alarm types (7 total incidences). The majority of these alarms occurred along the SIWA beachfront area.

Table 4-1. Sauvie Island Fire Department Alarms in the SIWA (2022 and 2023)

Alarm Type	2022	2023	Total
Medical	7	6	13
Fire	7	5	12
Rescue	2	5	7
Power	2	1	3
Hazmat	0	1	1
Total	18	18	--

5 EVALUATION OF TRAFFIC AND PARKING MANAGEMENT OPTIONS

5.1 Process Overview

Options for managing traffic and parking in the SIWA were grouped into one (1) of three (3) categories:

- Roadway improvements
- Parking area improvements
- Parking operation and management improvements

See Appendix B: SIWA Solutions for an in-depth discussion of all potential traffic and parking management options.

After reviewing all potential solutions, ODFW Staff met with DEA representatives to refine requirements and to discuss ODFW reactions to each solution. ODFW emphasized that two (2) important aspects of any solution for the SIWA are that it 1) not damage or endanger wildlife habitat in any way and 2) reduce the number of people and vehicles attempting to enter the SIWA on what are typically the busiest days. The following sections reflect ODFW's feedback on each solution and identify the solutions that ODFW Staff considered most viable and worthy of further development. Potential solutions are the following:

Roadway Improvements

1. Gated entry
2. Wayfinding and informational signage
3. Roundabouts, mini traffic circles, and U-turns
4. Roadway median
5. Pave the northern portion of NW Reeder Road

Parking Area Improvements

1. Camera detection
2. Smart parking sensors
3. Permeable parking pavers with parking space markers and parking stops

Parking Operation and Management Improvements

1. Website and social media alerts
2. Link to live video feed
3. SIWA hotline
4. Advance reservation system
5. Shuttle services
6. Park and ride
7. Parking attendant
8. Mobile device parking apps
9. Parking meters and software

5.2 Review of Roadway Improvement Solutions

In the discussion of roadway improvement solutions, ODFW noted that it currently does not have ownership of the roads that approach and run through the SIWA. As it stands, ODFW must seek approval from Multnomah County or Columbia County (depending on the location) before altering the roadways in any way. To facilitate implementation of its desired solutions for SIWA congestion management, ODFW could formally request Columbia County vacate NW Reeder Road north of NW Rentenaar Road. If Columbia County agrees to vacate, ODFW will own this portion of NW Reeder Road and have significantly more control over managing the roadway.

5.2.1 Gated Entry (Strong Support)

Gated entry to the SIWA is a necessity because it provides a way to physically limit vehicle access. Locating the gate at the East Side Check Station at the intersection of NW Reeder Road and NW Rentenaar Road would be ideal as there is plenty of space for vehicles to turn around and because ODFW already has a checkpoint structure at that location. Figure 44 shows this location.

Figure 44 – Sauvie Island East Side Check Station at Intersection of NW Reeder Rd and NW Rentenaar Rd

An automatic gate would best suit ODFW's needs. ODFW noted that it recently installed an automatic gate at St Louis Pond and that the results have been favorable. One difference between St Louis Pond and the SIWA, however, is that the St Louis Pond gate only closes outside of business hours (overnight). A gate at the SIWA, on the other hand, would need the ability to close after a certain number of vehicles have passed through in a day or to only allow vehicles with a valid permit to enter. Due to these complexities, ODFW may need to plan to have a staff member present at the gate on busy days (one option would be to have a staff member present every weekend day during the summer).

Although necessary, gated entry is not a standalone option – it will need to be integrated along with other solutions to be most effective at reducing congestion along the routes to, and within, the SIWA.

5.2.2 Wayfinding and Informational Signage (Some Support)

ODFW emphasized the need for signage that will keep people from trying to access the SIWA when it is very busy. For example, a dynamic, real-time reader board at the eastern end of the Wapato Bridge broadcasting SIWA traffic conditions could help keep vehicles from getting caught in traffic on NW Reeder Road. Upon seeing the

sign, vehicles could decide whether to continue to the beaches. If the sign indicated heavy congestion ahead, vehicles could easily turn around in the Gillihan Layover Terrace Parking Lot. ODFW Staff noted that they already own one (1) reader board, making this option highly feasible.

Signage along NW Reeder Road leading to the SIWA is particularly important if ODFW installs an entry gate. Relevant signage could include distance measures to the gate (e.g. 10, 5, 3, 2, 1, 0.5, and/or 0.25 miles), distance measures to the next turnaround opportunity, and/or a list of requirements to enter the SIWA (e.g. a parking permit).

Similarly, static wayfinding signage within the SIWA should identify distance measures to the next turnaround opportunity.

5.2.3 Roundabouts, Mini Traffic Circles, and U-Turns (Strong Support)

Roundabouts, mini traffic circles, and U-turns have potential to improve SIWA traffic conditions. It is important, however, to choose the right structure for each location. U-turns, for example, could be beneficial but their large footprints may preclude their use. In these cases, mini roundabouts could be more suitable.

Another potential issue is that it may be difficult for ODFW to get approval from Multnomah and/or Columbia County to install these structures. For this reason, it would be beneficial if Columbia County and/or Multnomah County vacated NW Reeder Road and transfer ownership to the state.

Turnaround opportunities before any entry gate will be especially important because they will provide opportunity for users to leave the area on busy days rather than stay stuck in a long queue waiting for SIWA parking to become available.

ODFW also noted that a turnaround at the north end of NW Reeder Road (near Warrior Rock) would be beneficial. A roundabout at the entrance to the Willow Bar parking area as depicted in Appendix D could also improve circulation in this area.

5.2.4 Roadway Median (Strong Support)

Pairing roadway medians with designated turnaround opportunities would be ideal, but again, roadway ownership will impact feasibility. Roadway medians require space that the current right of way cannot accommodate. If ODFW can take ownership of Columbia County's and Multnomah County's portion of NW Reeder Road, however, it could eliminate double parking at Walton Beach and Collins Beach parking areas and create the space necessary to install the medians.

5.2.5 Pave the Northern Portion of NW Reeder Road (Not Needed)

Paving the northern portion of NW Reeder Road is unlikely to resolve congestion issues within the SIWA. The thought behind this proposal was that paving the road would distribute parking more evenly throughout the SIWA because drivers would feel more comfortable driving farther north on asphalt to distant parking areas. ODFW Staff explained, however, that on the busiest days drivers tend to drive all the way north regardless of road surface in search of parking. Therefore, paving NW Reeder Road would not reduce congestion in the SIWA.

One instance in which paving NW Reeder Road may be helpful is if ODFW implements a reservation system that assigns specific parking spaces to visitors.

5.3 Review of Parking Area Improvements

5.3.1 Camera Detection (Some Support)

ODFW views the use of cameras enabled with artificial intelligence (AI) is a feasible method for counting vehicles entering the SIWA.

5.3.2 Smart Parking Sensors (Not Needed)

When installed in gravel, as they would be in this case, smart parking sensors are unlikely to last long enough to make the cost of purchasing and installing them worthwhile.

5.3.3 Permeable Parking Pavers with Parking Space Markers and Parking Stops (Some Support)

Having a way of delineating parking spots in the SIWA would be helpful. Delineating parking would enhance the effectiveness of other solutions because it would establish a definitive capacity of parking within the SIWA. If ODFW decides to implement a reservation system, knowing the total number of parking spaces in the SIWA will allow ODFW to accurately judge the number of permits to issue. Even without a reservation system, delineating parking spaces would allow ODFW to identify the number of parking spaces available at any given time and issue media alerts accordingly. Clearly delineating parking spots also has the potential to reduce the ambiguity of parking requirements for both visitors and parking enforcement personnel.

A downside of this option is that it requires the purchase and installation of a significant number of components over a large land area. It may, however, be possible to achieve similar benefits with fewer components. One option, for example, is to forego the permeable parking pavers and markers and to delineate parking spots with only the rubber parking stops. This solution would be significantly less expensive but potentially less efficient because there would be no lines to guide a driver attempting to park.

5.4 Review of Parking Operation Improvements

ODFW saw potential in many of the proposed web-based solutions in this section. Many of these solutions allow visitors to stay informed about current conditions in the SIWA without having to leave home.

5.4.1 Website and Social Media Alerts (Strong Support)

Website and social media alerts are a cost effective, efficient way of alerting potential visitors to times that the SIWA will be busier than usual and encouraging them to make other plans. ODFW plans to vet staff capacity to take on this task and is also looking into ways to automate the process to reduce the staff time required.

One potential way to automate this solution is to pair it with an AI camera that automatically provides parking capacity updates or provides a permit availability dashboard on the SIWA website.

5.4.2 Link to Live Video Feed (Strong Support)

Providing interested visitors with live stream video of traffic conditions is another way to potentially reduce congestion in the SIWA on busy days. Live SIWA video links would work similarly to the ODOT TripCheck website. Surveillance cameras located at strategic spots would enable SIWA visitors to access the website and check traffic conditions in real time from home. Potential locations for cameras include Willow Bar and known choke points along NW Reeder Road where traffic backs up on very busy days. On busy days, seeing people get turned away at the gate may discourage potential visitors from making the trip. In addition, cameras could be stationed along SIWA parking areas to inform visitors of parking utility and availability.

Streaming live video from SIWA has been unreliable due to an unstable network connection. ODFW will need to conduct further research to determine technical equipment that improves the quality and reliability of wireless video feed data.

Should ODFW choose to implement a reservation system (see 5.4.4), live video feed would be less critical but still beneficial. On busier days, it inform potential visitors without reservations to see that vehicles are being turned away. On less busy days when a reservation is not required, it would allow potential visitors to make more informed decisions about their visit.

5.4.3 SIWA Hotline (Some Support)

A hotline has significant potential to reduce the number of people trying to access the SIWA on busy days. If implemented with a reservation system, for example, potential visitors could call to find out how many parking permits are left for the following day. To make it worthwhile, however, ODFW would need to be able to automate the system to reduce the amount of staff time required to operate and maintain it.

ODFW noted that most people who visit the SIWA do not realize that they are accessing ODFW property and that, as a result, it would be important to call the hotline something that people will recognize. ODFW recommended that it be called the “Sauvie Island Beach Parking Hotline.”

5.4.4 Advance Reservation System (Strong Support)

Implementing an advance reservation system for the SIWA is ODFW's preferred alternative. A well-designed reservation system, in conjunction with other solutions such as gated entry, would ensure that only people in possession of valid permits have access to the SIWA.

ODFW referenced the Columbia River Gorge's recently implemented reservation system as a model of success. To drive to Multnomah Falls, for example, visitors must visit www.Recreation.gov up to two weeks in advance to purchase a timed use permit for their personal vehicles between May 24 and September 2. A small number of permits are also available for pickup at various visitor centers in the area.

ODFW could implement a system with several of the elements used in the Multnomah Falls reservation system. For example, most permits could be made available up to two weeks in advance through an online reservation website or smart phone app while the remaining few are available from a physical location on Sauvie Island. An important difference, however, is that a reservation system for the SIWA would likely not include a timed entry component. ODFW explained that during the summer, most SIWA beachgoers arrive in the morning and stay until evening. Consequently, it would be ideal to limit the total number of people and/or vehicles entering the SIWA on a daily basis. In other words, once the vehicle capacity has been reached at the SIWA in a day, additional visitors will be turned away. This system would eliminate the possibility of parking spaces opening up as people depart the SIWA, and therefore reduce the number of people waiting hopefully at the entrance for a chance to enter.

A reservation system could also eliminate the need for assigned and/or delineated parking spots. If the number of permits were limited to the parking capacity within the SIWA's designated parking areas, it would not matter as much if vehicles did not park in the most efficient configuration possible.

5.4.5 Shuttle Service (Not Needed)

A shuttle service is unlikely to improve conditions in the SIWA. For the sake of safety, ODFW seeks to limit not only the number of vehicles but also the total number of people in the SIWA at any one time. If not paired with a reservation system based on number of people, a shuttle service has the potential to increase the number of people visiting on a daily basis.

Additionally, people visiting the SIWA often bring large beach gear items with them. It would be difficult to regulate the amount of equipment that shuttle-riders bring with them onto the shuttle, and large items would reduce the number of passengers that the shuttle can hold, potentially making it less efficient.

5.4.6 Park and Ride (Not Needed)

For reasons similar to those given for a shuttle service, park and rides are unlikely to improve conditions in the SIWA. This solution has the potential to increase the number of people present in the SIWA at once, even with the implementation of a vehicle reservation system.

5.4.7 Parking Attendant (Some Support)

A parking attendant will likely be necessary to help manage traffic conditions in the SIWA in the short term. In the long term, however, ODFW seeks to implement a solution that does not require a parking attendant.

5.4.8 Mobile Device Parking Apps (Strong Support)

Mobile device parking apps are a promising solution for the SIWA area. The potential to require visitors to purchase parking at a numbered spot could eliminate the need for a parking attendant. Enabling potential visitors to view parking availability on their phones before leaving home could also prevent them from making unnecessary trips on very busy days when parking is not available.

One challenge associated with this solution is that not all potential visitors have access to a smart phone. To address this, ODFW could install a parking meter outside the boundaries of the SIWA (potential locations include at the Cracker Barrel store, at the Gillihan Layover Terrace Parking Lot, or just outside the potential entry gate at the intersection of NW Reeder Road and NW Rentenaar Road) for those visitors without access to a smart phone.

5.4.9 Parking Meters and Software (Some Support)

Relying on parking meters alone to manage parking in the SIWA would not be ideal. The linear length of the SIWA's parking areas would require the installation of a large number of meters to reduce the distance that visitors must walk to access them. ODFW also noted that state park guidance is generally to avoid using parking meters unless absolutely necessary because of the significant risk of vandalism.

Installing one parking meter to supplement a mobile device parking app system, however, could work well. A parking meter would provide access for SIWA visitors that do not have access to smart phones. Additionally, it would be much easier to monitor and protect a single meter from vandalism by locating it in an area monitored by a staff member or surveillance cameras. As noted in the previous section, potential locations include the Cracker Barrel store, Gillihan Layover Terrace Parking Lot, or just outside the potential entry gate at the intersection of NW Reeder Road and NW Rentenaar Road.

Were ODFW to install a single parking meter in conjunction with implementing some kind of reservation system, it would be important to also place an emphasis on broadcasting SIWA conditions through a variety of media sources (e.g. website, social media, reader boards, and hotline). This will help inform people without smart phones so they do not travel to SIWA when there are no reservations/permits remaining for the desired timeframe.

6 SHORT- AND LONG-TERM SOLUTION PACKAGES

The potential solutions described in Appendix B could be combined in a number of ways to achieve improved traffic and parking conditions within the SIWA. DEA developed the short- and long-term solution packages described below in response to its understanding of ODFW's long-term vision for the SIWA. The short-term package solutions aim to improve conditions with minimal commitment to expensive, technology-heavy solutions while also providing opportunities for ODFW to gather data for what direction to head in the future. The short-term solutions are also intended to be flexible enough to act as a foundation for and facilitate the transition to the long-term package solutions. The long-term package solutions are based on the assumption that ODFW ultimately desires to manage SIWA traffic and parking conditions using an advance reservation system.

See Appendix C for a summary of short- and long-term solution packages.

6.1.1 Short-Term Plan (Within one (1) year)

Within the first year, ODFW could focus on implementing simpler, less technology-dependent solutions to begin addressing SIWA traffic congestion. Conducting small pilot programs for more time- and resource-intensive solutions would also be time well-spent during this first year. Pilot programs would allow ODFW to test multiple courses of action, gather data, and compare results before committing to them on a large scale long-term.

Solutions that lend themselves to more immediate implementation within the first year are the following:

1. Gated Entry: Installing a fully-integrated automatic gate system at the entrance to the SIWA may be difficult to achieve within the first year. Installing a temporary, simple gate system augmented by human support, however, could provide similar benefits in the short term. One option would be to install two gates – one for entering vehicles and one for exiting vehicles.

   In one scenario, ODFW could have a gate attendant present to operate the entry and exit gates. In this case, either the parking attendant or an automated counting system could track the number of vehicles that have entered the SIWA on a particular day. Once the number of vehicles entering the SIWA hit the limit, the attendant would no longer open the gate for additional cars but would open the exit gate for vehicles departing the SIWA. When vehicle entries hit 50%, 75%, and 100% of the limit, the parking attendant could publish alerts to reader boards, social media platforms, and the SIWA website to warn potential visitors to the lack of parking in the area.

   An alternative would be to program the entry gate to issue parking passes and allow entry to a designated number of vehicles each day. Once the number of vehicles entering the SIWA hit the limit, the gate would not open for additional cars. The gate for exiting vehicles would open when a driver scanned the ticket issued upon entry. Although the gates in this instance would operate automatically, it would be ideal to have an ODFW staff member present to monitor the gates (in case of malfunction) and react to emergency situations (e.g. grant access to emergency vehicles if the vehicle limit has already been reached for the day). When vehicle entries hit 50%, 75%, and 100% of the limit, the staff member could publish alerts to reader boards, social media platforms, and the SIWA website to prevent potential visitors from arriving to the area.

ODFW may also wish to install a similar gate system at the entrance to the Willow Bar parking area. An additional gate may require an additional parking attendant.

2. Wayfinding and Informational Signage: Pairing signage with any form of gated entry system will be critical. Signage should be designed to keep potential visitors informed of SIWA capacity status (e.g. 50%, 75%, and 100% full / gate closed) and to alert them to turnaround opportunities outside of the SIWA. ODFW currently owns a reader board and noted that an ideal location for it would be at the eastern end of the Wapato Bridge because there is a convenient turnaround location nearby (Gillihan Layover Terrace Parking Lot). Within the first year, ODFW could station its reader board at this location and update as SIWA capacity status, as reported from the entry gate, changes (e.g. 50%, 75%, and 100% full / gate closed).

   Static signs with information about distance to turnaround points before the entrance to the SIWA could also be helpful to install within the first year. Potential turnaround locations before the entrance to the SIWA include:
   - Intersection of NW Rentenaar Road and NW Reeder Road (Sauvie Island East Side Check Station)
   - Sauvie Island Wildlife Area East Side Viewing Platform parking area
   - Entrance to Willow Bar parking area
   - Parking Lot on north side of Bills Crossing
   - Intersection of NW Reeder Road and NW Gillihan Road
   - Gillihan Layover Terrace Parking Lot

3. Roundabouts, Mini Traffic Circles, and U-Turns: Pending Columbia County approval, installing a mini rubber traffic circle before the proposed gate at NW Reeder Rd and NW Rentenaar Road would provide a safe place for vehicles to turn around if the entry gate is closed when they arrive.

4. Permeable Parking Pavers with Parking Space Markers and Parking Stops: Running a pilot program to test the benefits of various combinations of permeable parking pavers, parking space markers, and parking stops would help ODFW make an informed decision about which combination to ultimately pursue. ODFW could study the effect that each combination has on parking behavior in a small area, such as the Willow Bar parking area.

   ODFW could test any one or more of these options in the Willow Bar parking area for a month at a time and compare results to each other and to a “no-build” situation:
   - Install rubber parking stops at the head of every designated parking space (no permeable parking pavers and parking markers);
   - Install permeable parking pavers and parking markers (no rubber parking stops);
   - Install permeable parking pavers, parking markers, and rubber parking stops;
   - Install a combination of each of the previous three options at once:
     - At least one row of rubber parking stops only
     - At least one row of permeable parking pavers and parking markers only

- At least one row of permeable parking pavers, parking markers, and rubber parking stops

5. Website and Social Media Alerts: Pairing website and social media alerts with any form of gated entry system will be critical. Alerts could be issued based on high temperature forecasts for coming days and when SIWA parking capacity reaches 50%, 75%, and 100% / gate closed status. The parking attendant at the entry and exit gates could have the responsibility of publishing these alerts if automating the system is not feasible at first.

6. Link to Live Video Feed: Implementing a live video feed pilot program would provide ODFW with valuable information about whether installing more live streaming cameras would help manage SIWA traffic conditions. For the pilot program, ODFW could install a single camera that allows potential visitors who access the live stream website to view the SIWA entry gate. The entry gate is an ideal location to live stream because it would allow viewers to see whether the gate is currently open or closed and the frequency with which vehicles are entering.

   ODFW noted that video live streams from the SIWA may not always be reliable due to limited connectivity. Experimenting with a single camera would allow ODFW to troubleshoot any challenges on a small scale and determine whether moving forward with more cameras in the future is worthwhile.

7. Parking Attendant: As noted in Section 5.5.1.1, having an ODFW staff member on site to monitor entry and exit gate operations and SIWA capacity may be necessary in the short term.

8. Mobile Device Parking Apps: Once ODFW determines the combination of permeable parking pavers, parking markers, and/or rubber parking stops (if any) work best to delineate parking spaces in the SIWA, it would be possible to run pilot programs using a mobile device parking app. ODFW could experiment with different system configurations to see which one maximizes parking efficiency in the SIWA. It would be ideal to run this pilot program across all parking lots behind the SIWA gate system.

   Potential system configurations include the following:

   Park Anywhere Available as Long as Daily Limit Not Reached: One option would be to configure the system to allow visitors to park anywhere within the SIWA as long as the daily entry limit has not been reached. This system would not require numbering of parking spaces but would likely require visitors to spend more time searching for an open parking space compared to other configurations. Potential visitors would be able to see on their smart phones how many open parking spaces remain at the SIWA in real time and decide whether it is worthwhile to make the trip.

   Pay Ahead of Time to Park at an Assigned Numbered Spot: A second option would be to configure the system to assign a numbered parking space for each vehicle (as long as parking is still available in the SIWA) before they park. This system would require numbering parking spaces but would likely reduce the amount of time visitors spend searching for an open parking space. Before leaving home, visitors could request a spot assignment through the app and pay a spot reservation fee. Upon completion of this process, the app would issue the visitor an assigned parking space. One downside of this option is that visitors could be assigned parking spaces far away from their desired destination, which could result in

frustration. Because spots would be assigned before visitors arrive, it would be ideal to require payment at the time of reservation to ensure that potential visitors did not reserve a space and then not show up. Once all spots had been assigned for a day, additional reservations would not be allowed (each parking spot would be assigned to one vehicle per day).

Pay Ahead of Time to Park at a Chosen Numbered Spot: A third option would be to configure the system to allow visitors to select a numbered parking space for each vehicle (as long as parking is still available in the SIWA) before they park. This system would require numbering parking spaces but would likely reduce the amount of time visitors spend searching for an open parking space. Before leaving home, visitors could request a specific spot (from the remaining available spots) and pay a spot reservation fee. The visitor would then leave home and navigate to the numbered parking space they selected before arriving. Because spots would be assigned before visitors arrive, it would be ideal to require payment at the time of reservation to ensure that potential visitors did not reserve a space and then not show up. Once all spots had been assigned for a day, additional reservations would not be allowed (each parking spot would be assigned to one vehicle per day).

At Time of Parking, Pay and Enter License Plate Number and Number of Occupied Space: A fourth option would be to configure the system to require visitors to enter the number of the space they are parked in after arrival. They could also enter their license plate number into the system to enable parking enforcement by linking the license plate to the spot number in the system. ODFW could also require payments if desired. This system would require numbering parking spaces and, while likely not as efficient as the second and third options, would reduce the amount of time visitors spend searching for an open parking space when compared to the first option.

9. Parking Meters and Software: If ODFW wishes to accommodate potential visitors without smart phones, ODFW could install a parking meter just outside the SIWA gates. The parking meter could be configured to integrate with and match the requirements of the parking app.

6.1.2 Long-Term Plan (Within three (3) years)

Solutions that could work well for the SIWA in the long term include the following:

1. Gated Entry: In the long term, ODFW could upgrade the temporary, simple gate system augmented by human support (described in Section 5.5.1.1) to a fully integrated automatic gate system at the entrance to the SIWA. The gate system would have one gate for entering vehicles and one for exiting vehicles. Unlike the temporary gate, which would operate on a first-come-first-served basis, the long-term gate system would pair with an online reservation system. For the gate to grant a vehicle entry to the SIWA during the seasonal reservation window, the driver would have to scan a code on a day-use permit (physical or digital) purchased either online or through a kiosk. People without a permit would not be able to enter the SIWA. To exit the SIWA, the driver would again scan the code on the day-use permit. Although the gate would operate automatically, it would be ideal to have an ODFW staff member in the vicinity to monitor the gates (in case of malfunction) and to react to emergency situations (i.e. grant access to emergency vehicles).

   ODFW may also wish to install a similar gate system at the entrance to the Willow Bar parking area.

   Outside of the seasonal reservation window, ODFW could program the gates to remain open at all times.

2. Wayfinding and Informational Signage: Pairing appropriate signage with the gated entry system will remain critical at this stage. Signage should be designed to keep visitors without permits from approaching the SIWA as much as possible. ODFW could maintain its reader board at the eastern end of the Wapato Bridge and update it with information on requirements for entering the SIWA and the number of same-day permits currently available from the on-site kiosk.

   ODFW could post additional static signs leading to the SIWA to warn visitors that they must have a permit to enter between a certain date range. It may also be beneficial to maintain previously installed static signs with information about distance to turnaround points before the entrance to the SIWA.

   All signage could also direct visitors to informational resources associated with the SIWA (e.g. the SIWA website, social media groups, and the hotline number).

3. Roundabouts, Mini Traffic Circles, and U-Turns: If Columbia County has vacated NW Reeder Road by this time, ODFW will have authority to install traffic control structures. It would remain beneficial to have a mini traffic circle before the proposed entry gate at the intersection of NW Reeder Rd and NW Rentenaar Road. It could also be helpful, although not necessary with the reduced visitation rates due to the reservation system, to install U-turns or mini traffic circles at strategic locations within the SIWA.

   Ideal locations for U-turns would be:
   - At the halfway point of the Walton Beach parking area
   - At the northern end of the Walton Beach parking area
   - At the halfway point of the Collins Beach parking area
   - At the northern end of the Collins Beach parking area

4. Roadway Median: Roadway medians will play an important role in reinforcing the effectiveness of mini traffic circles and U-turns as a long-term solution.

   To support the mini traffic circles and U-turns proposed in Section 5.5.3.3, ideal locations for roadway medians would be:
   - From 0.25 miles south of the SIWA entry/exit gate to the SIWA entry/exit gate
   - From 0.25 miles south of the Walton Beach parking area to the northern end of the Collins Beach parking area

   This totals approximately 1.4 miles of roadway median.

5. Permeable Parking Pavers with Parking Space Markers and Parking Stops: Unless ODFW determines that changes are required, it could maintain the status of permeable parking pavers, parking space markers, and parking stops established above based on data gathered during pilot programs.

6. Website and Social Media Alerts: Upon implementation of a reservation system, the focus of website updates and social media alerts could shift away from temperature alerts and remaining SIWA parking lot capacity and towards alerting potential visitors to the window during which reservations are required and the number of reservations remaining for a particular date. These alerts would be one way to allow visitors trying to get a same-day permit to check whether it is worth it to make the trip to the kiosk location to pick it up. It is most likely possible to automate these updates and alerts by linking them to the online reservation system.

7. Link to Live Video Feed: Live video feed will be less important if ODFW decides to transition to a reservation system. If ODFW wishes, however, it could maintain the live stream location at the entry/exit gates of the SIWA to enable potential visitors to view conditions during dates outside of the seasonal window requiring reservations.

8. SIWA Hotline: In addition to website updates and social media alerts, a SIWA hotline could provide another avenue for potential visitors to access SIWA information. It could provide information on when reservations are required and the number of reservations remaining for a particular date. This would allow people trying to get a same-day permit to check whether it is worth it to make the trip to the kiosk location to pick it up. Assuming that it is possible to automate this system so that it does not require significant staff time to maintain, it could be beneficial.

9. Advance Reservation System: During the summer months (e.g. June to August), ODFW could implement a paid reservation system to manage access to the SIWA. Ideally by this point, ODFW will have successfully completed pilot programs that provide it with a clear idea of how many vehicles and/or people can safely occupy the SIWA at one time. This information would determine the number of parking permits available daily.

   ODFW could direct people wishing to visit the SIWA to visit stateparks.oregon.gov up to two weeks in advance to purchase a day-use permit for their personal vehicles during the reservation season. A small number of permits could also be available for pickup from a kiosk at the Cracker Barrel Grocery Store or

outside the front gate of the SIWA to accommodate people who do not have access to reliable internet access or a smart phone.

An advance reservation system with a web-based component would eliminate the need for mobile device parking apps. Instead of checking whether parking is available on a mobile app, visitors would visit the reservation website and see if any permits remained for their desired day.

10. Parking Attendant: Implementation of a completely automated reservation system and a well-designed roadway and parking layout could potentially eliminate the need for a dedicated, full-time parking attendant. It would still be ideal, however, to have an ODFW staff member in the vicinity to monitor the gates (in case of malfunction), to react to emergency situations (i.e. grant access to emergency vehicles), and to address visitor concerns.

11. Parking Meters and Software: To accommodate potential visitors who do not have reliable internet access or do not own a smart phone, ODFW could set aside a certain number of permits per day during the reservation season to be accessible from an on-island kiosk.

    A potential location for the kiosk is just outside the SIWA entry/exit gate at the intersection of NW Rentenaar Road and NW Reeder Road. Were the kiosk to be located here, live stream feed may have the added benefit of limiting vandalism. This would allow ODFW staff to view the area and contact law enforcement in the event of vandalism without having to be physically present at the entrance.

    It would be beneficial to designate a small number of parking spaces outside the SIWA entrance to provide visitors a place to park without blocking the roadway while purchasing their physical permits at the kiosk.

APPENDIX A:
TECH MEMO 1 – EXISTING CONDITIONS

DAVID EVANS
AND ASSOCIATES INC.

MEMORANDUM

DATE: August 5, 2024

TO: Mark Nebecker, Chris Kern
Oregon Department of Fish and Wildlife (ODFW)
7118 NE Vandenberg Ave
Corvallis, OR 97330

FROM: Janet Jones

SUBJECT: Existing Conditions Memo

PROJECT: ODFW 0000-0009
Sauvie Island Wildlife Area (SIWA) Traffic Study

CC: Steve Niemela – ODFW
Jordan Hazen – ODFW
Doug Shugart – Oregon State Police
Andy Mortensen – David Evans and Associates
Janet Jones – David Evans and Associates

David Evans and Associates (DEA) has been reviewing existing traffic and parking conditions for the Sauvie Island Wildlife Area (SIWA), particularly during hot summer days and holidays. Below is a summary of historical traffic data provided by ODFW, as well as traffic data collected between July 2, 2024 and July 8, 2024 and parking data collected on July 4, 2024.

Historical Data

Historical traffic data was provided by ODFW to identify high traffic volume days during the summer. Daily data for years 2019, 2022, and 2023 were correlated against historical high temperatures to determine what temperatures significantly impacted traffic in the SIWA. Based on the data, DEA determined that historically high temperatures have a significant impact on traffic in the SIWA. There is a direct correlation between summer temperatures and beach visitation in the SIWA area. Higher beach visitation is notably higher when temperatures exceed 90 degrees F, regardless of day of week. In regard to holidays, traffic has been lower on July 4 potentially because visitors tend to make plans on this holiday and travel out of town. However, Tuesday, July 4, 2023 was one of the three highest traffic days that year. Additionally, traffic volumes have been historically high on Labor Day weekend.

Three charts depicting the correlation between historical temperatures and daily traffic volumes on the island are attached to this memo for reference.

July 2024 Field Conditions

Based on the review of historical data and the forecast for hot weather on Thursday, July 4, 2024, DEA arranged for traffic and parking data collection for this date. Consult staff conducted a site visit on July 4 to observe traffic and parking operations from 12 and 1 PM. The temperature was about 80 degrees F and the overall SIWA parking areas were significantly full.

DATE: August 5, 2024 **FROM:** Janet Jones

TO: Mark Nebecker, Chris Kern **SUBJECT:** Existing Conditions Memo

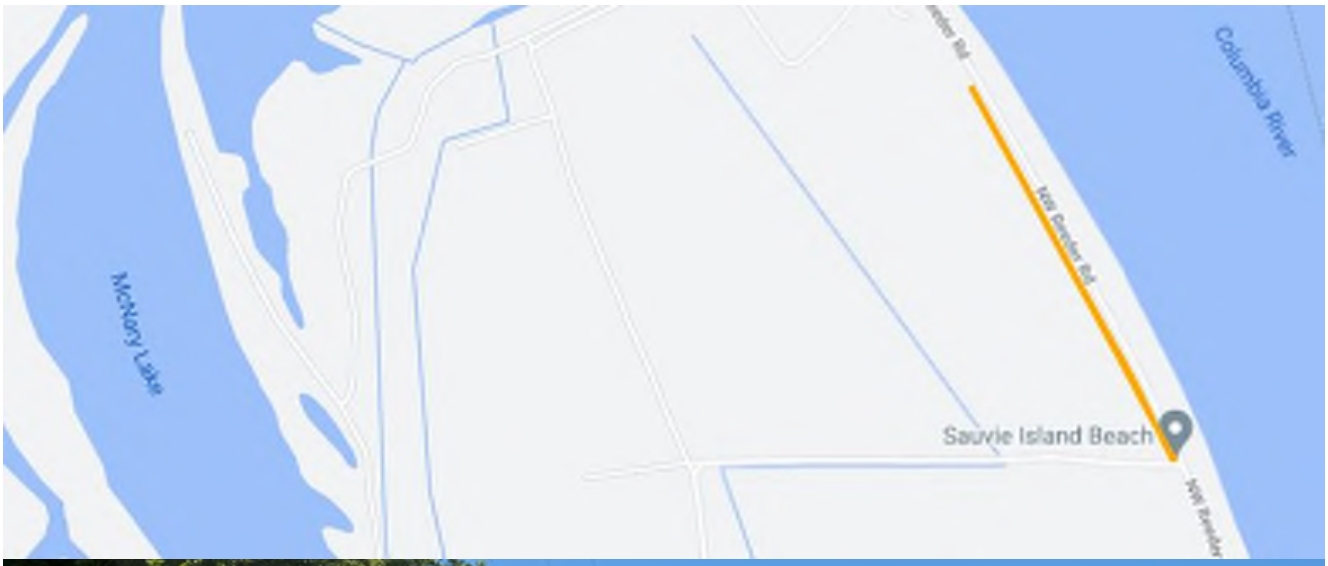
Willow Bar

At Willow Bar, the parking area was at capacity and there were other visitors (unparked cars), either waiting to park or waiting for their families or friends to leave.

DATE: August 5, 2024 **FROM:** Janet Jones

TO: Mark Nebecker, Chris Kern **SUBJECT:** Existing Conditions Memo

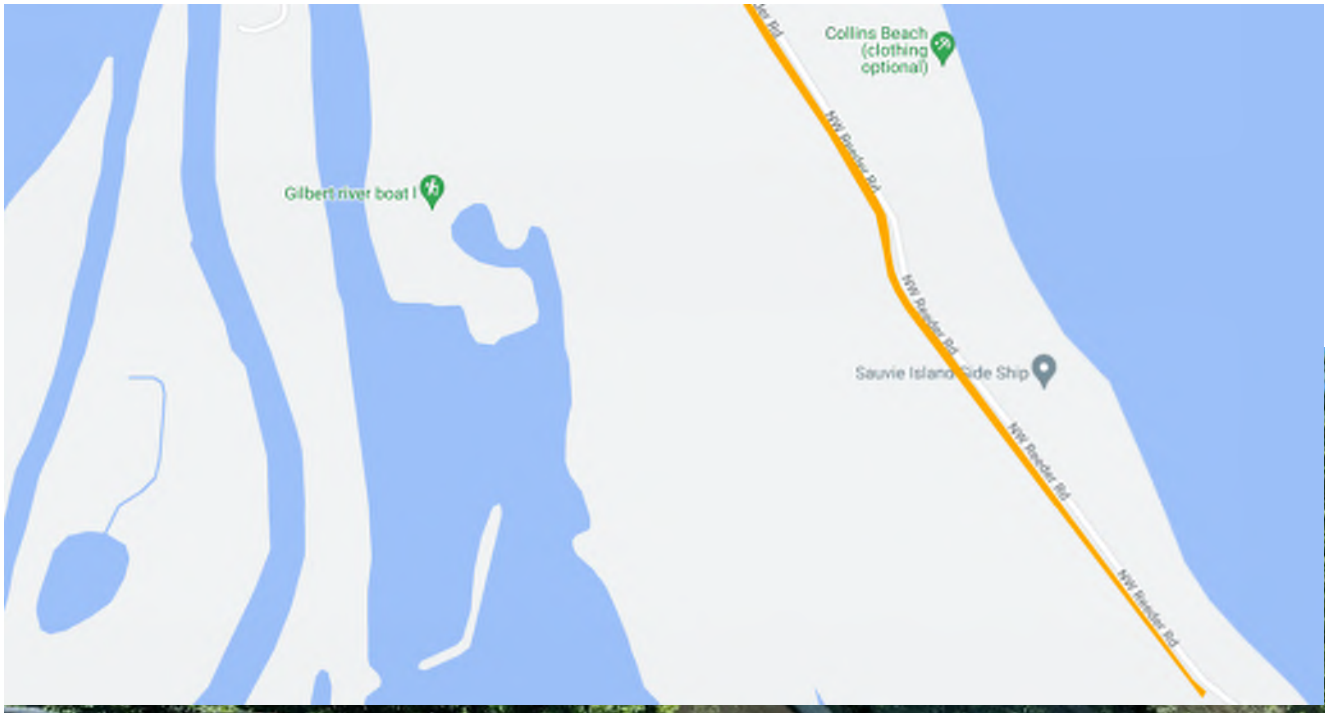
At Reeder Beach, (the southernmost beach) parking was at capacity, and in several locations there was stacked, double parking. In this area Reeder Road is paved. In addition, there were many drivers idling while looking for parking and causing traffic delays. A number of drivers were observed passing around idling cars in the opposing traffic lane.



DATE: August 5, 2024 **FROM:** Janet Jones

TO: Mark Nebecker, Chris Kern **SUBJECT:** Existing Conditions Memo

Walton Beach and Collins Beach Parking at each beach was about 70% utilized, with some double parking observed in spots. Parking vacancies appear directly related to longer distances between parking area and beach access.



DATE: August 5, 2024 **FROM:** Janet Jones

TO: Mark Nebecker, Chris Kern **SUBJECT:** Existing Conditions Memo

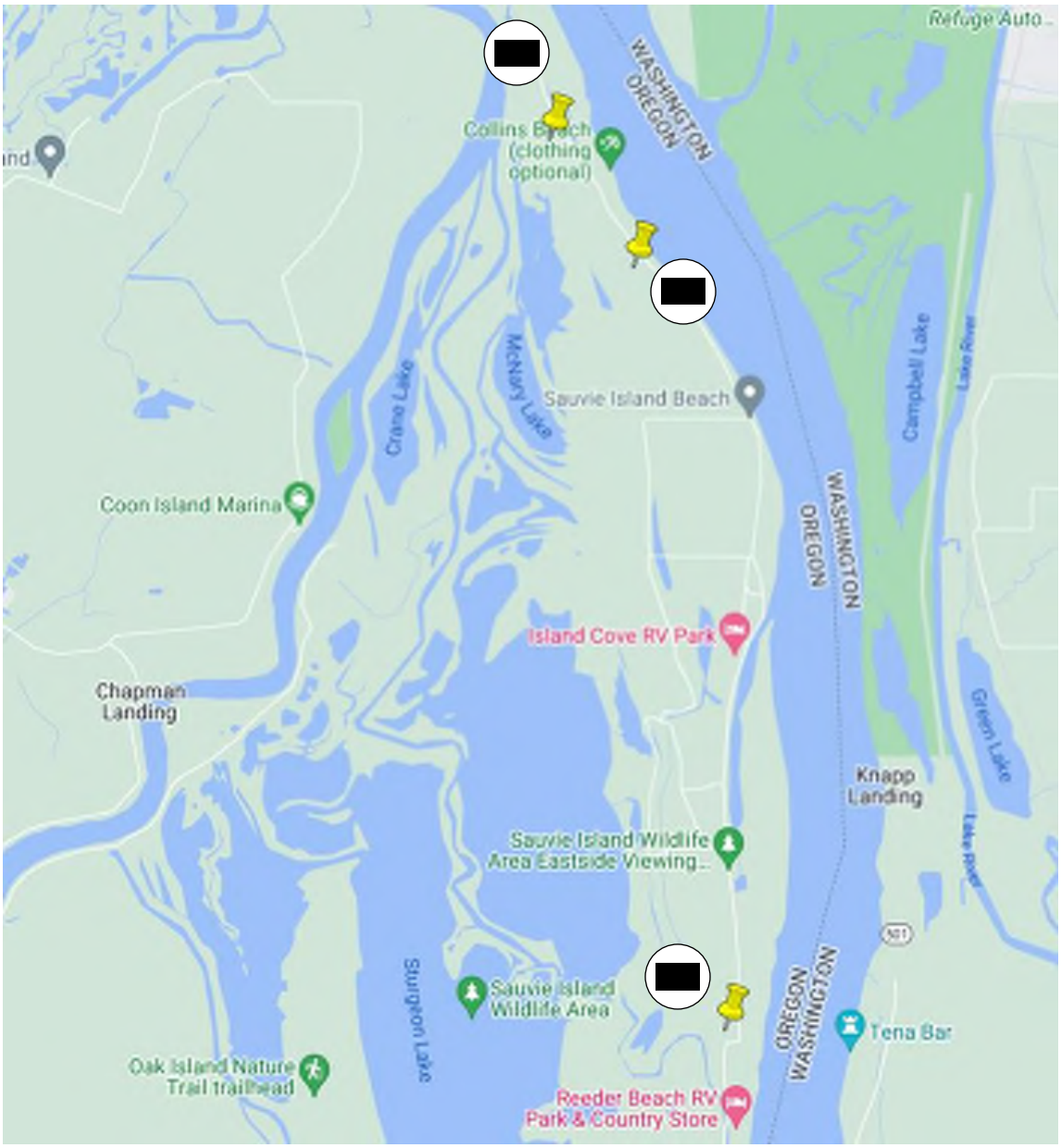
Warrior Lighthouse parking serves adjacent beaches and trail access. Parking was nearing capacity during the site visit. One vehicle was observed to form the double line of parking that was still accessible around 12:45 PM (not double parking and not blocking any access). Around 12:50 PM more vehicles were observed to travel to the lighthouse trail parking area. Traffic appeared to steadily increase around that time at the other beach areas.

DATE:	August 5, 2024	**FROM:**	Janet Jones
TO:	Mark Nebecker, Chris Kern	**SUBJECT:**	Existing Conditions Memo

July 2-8, 2024 Traffic Counts

Hourly tube count data was collected on NW Reeder Road at the following three (3) locations:

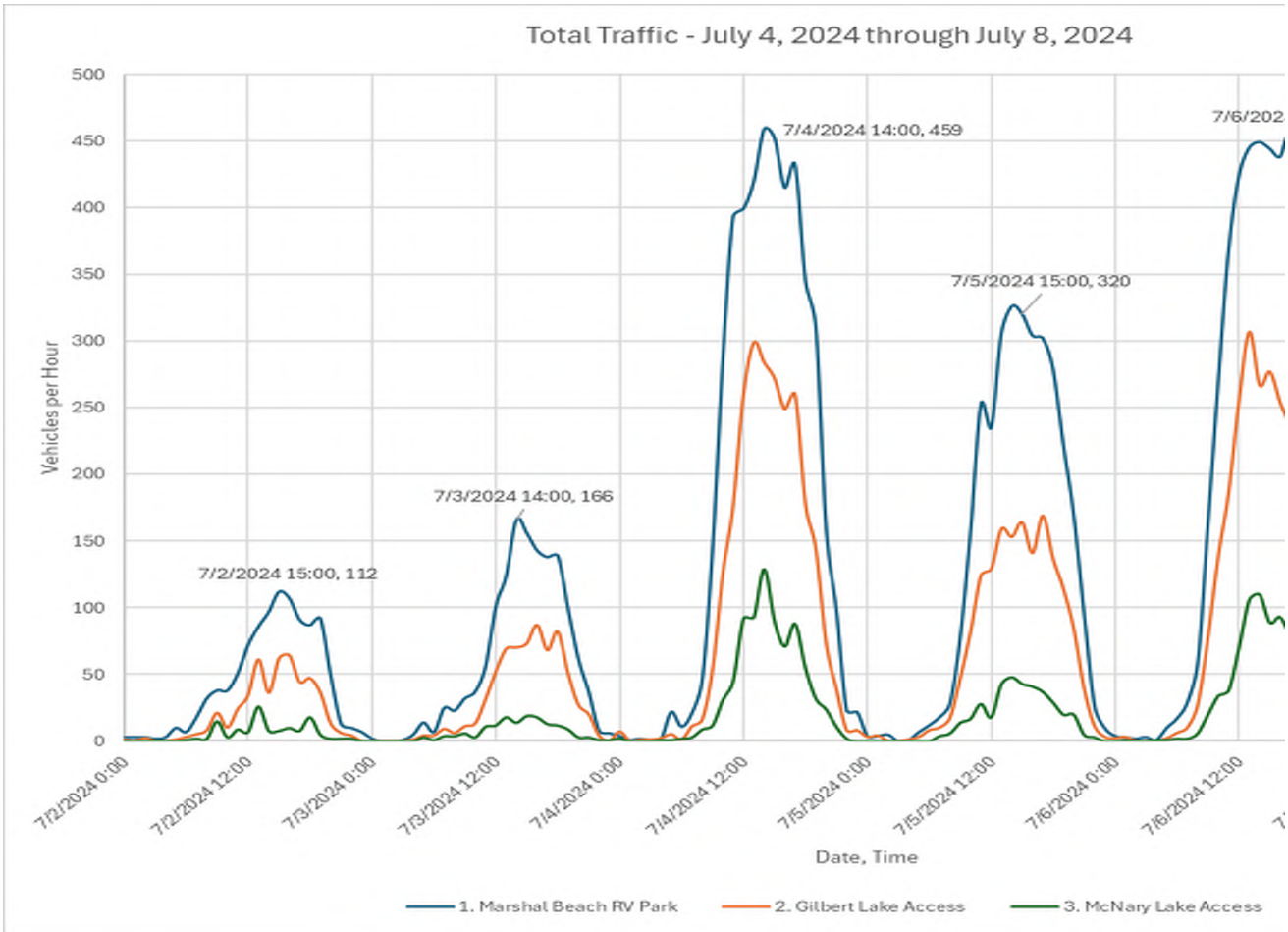
1. North of Marshal Beach RV Park
2. North of Gilbert Lake Boat Ramp Access
3. North of McNary Lake Boat Ramp Access



DATE: August 5, 2024 **FROM:** Janet Jones

TO: Mark Nebecker, Chris Kern **SUBJECT:** Existing Conditions Memo

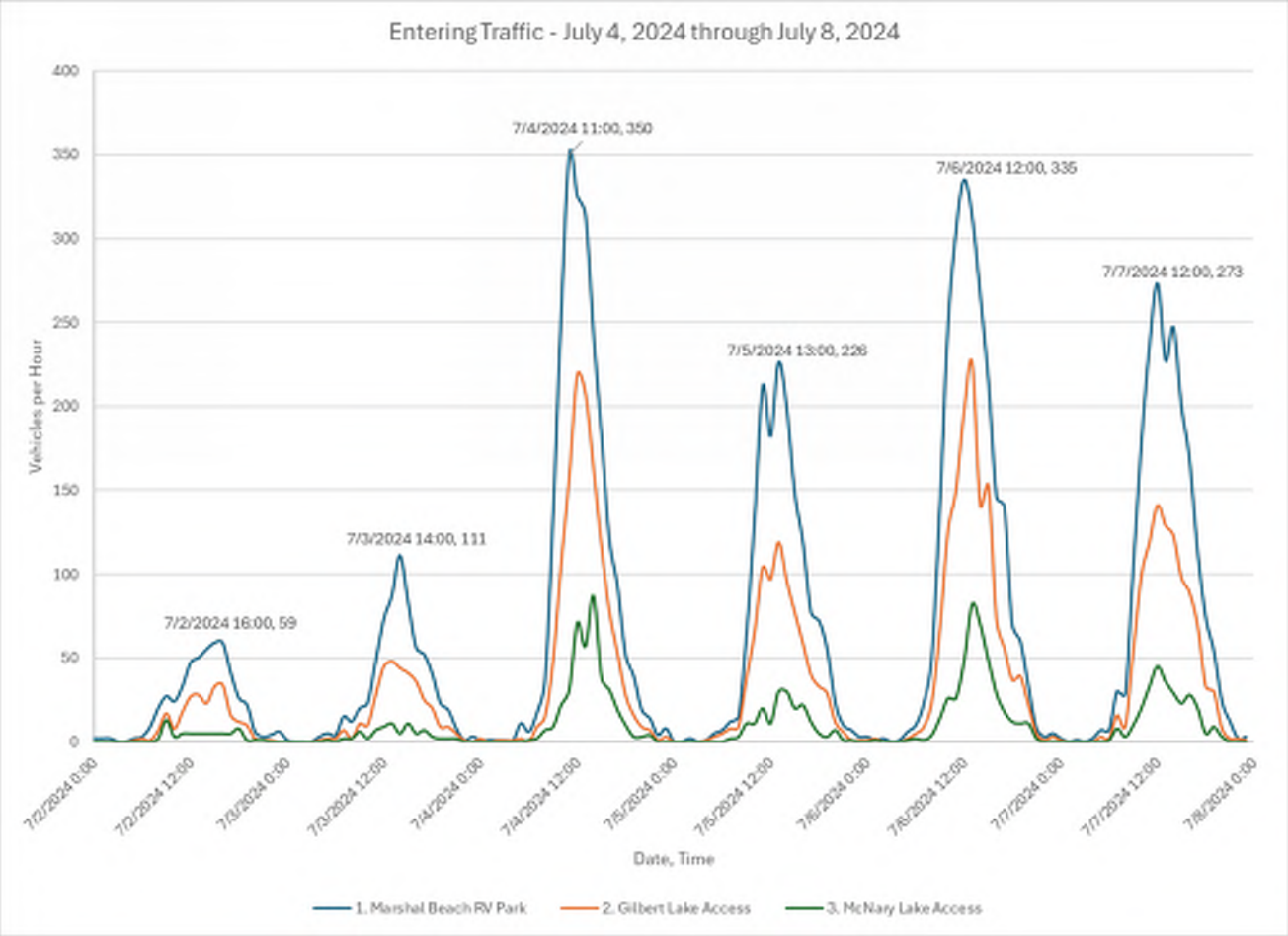
The data shows the highest traffic days were Thursday, July 4, Saturday, July 6, and Sunday, July 7. The recorded high temperatures on these days were 91, 99, and 100 degrees, respectively. The Marshal Beach RV Park location is the southernmost point of data collection, and the McNary Lake location is the northernmost point of data collection. The highest traffic activity was recorded at the Marshal Beach RV Park location, with traffic steadily decreasing at the other two data collection sites to the north.



DATE: August 5, 2024 **FROM:** Janet Jones

TO: Mark Nebecker, Chris Kern **SUBJECT:** Existing Conditions Memo

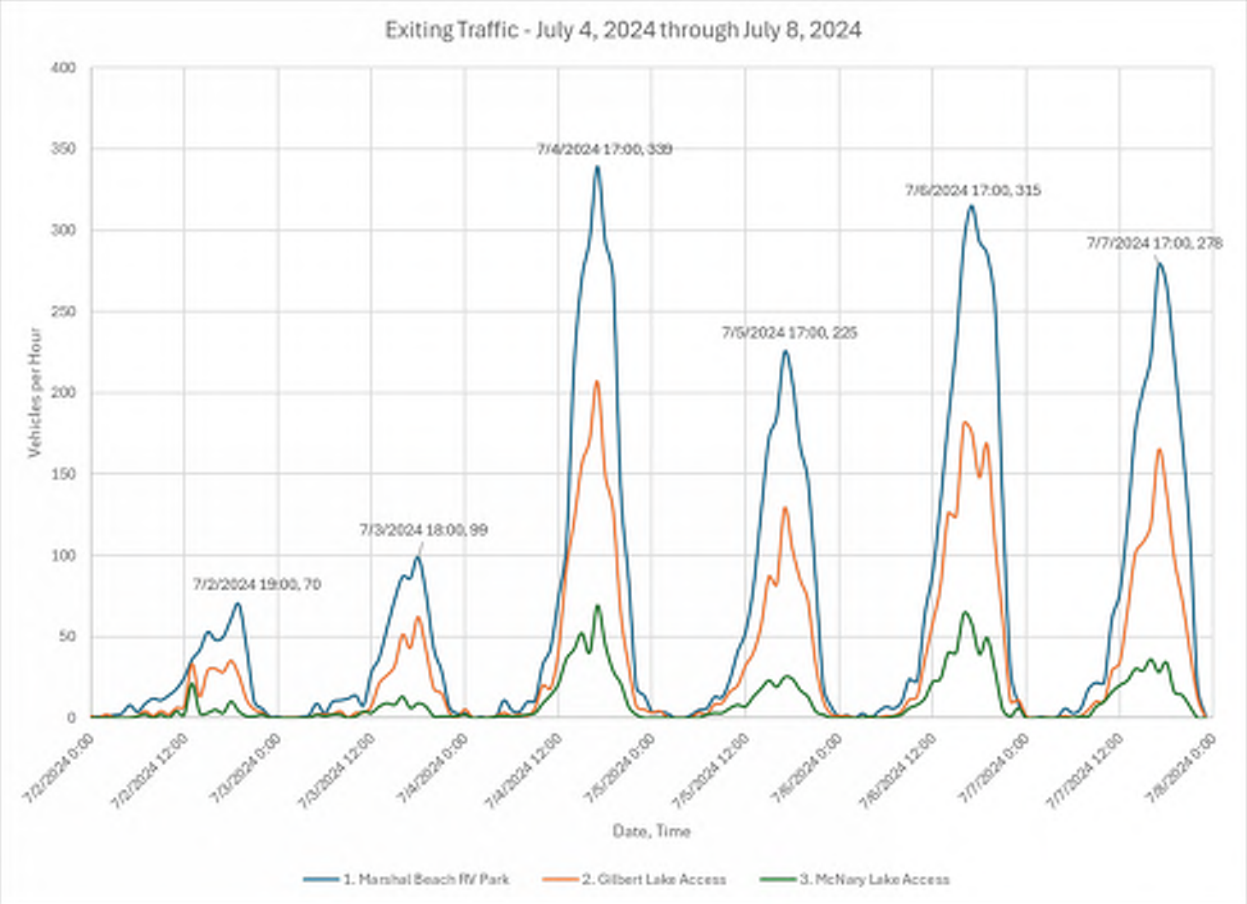
Peak inbound traffic occurred between 11 AM and 12 PM, as depicted below.



DATE: August 5, 2024 **FROM:** Janet Jones

TO: Mark Nebecker, Chris Kern **SUBJECT:** Existing Conditions Memo

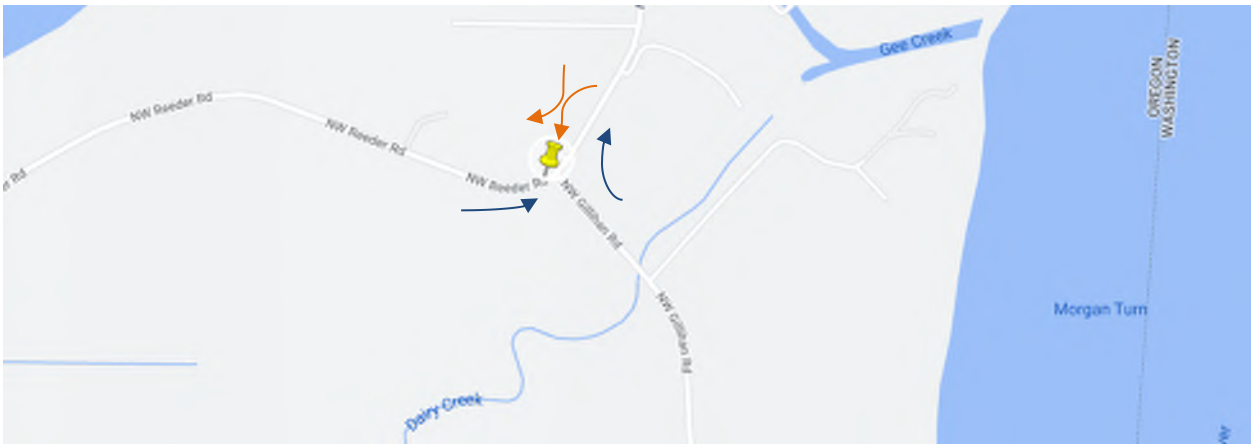
Peak outbound traffic occurred at 5 PM on the three busiest days, as depicted below.

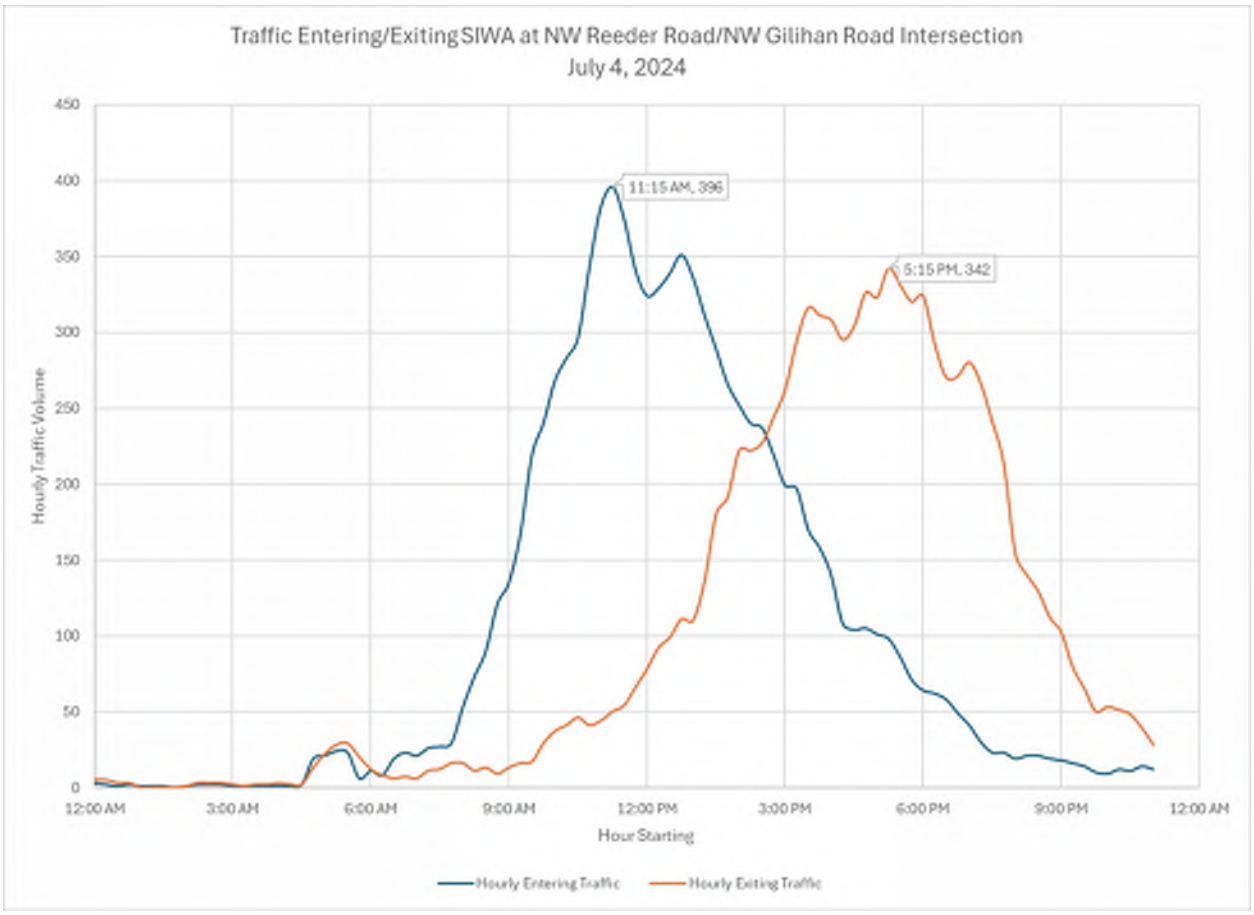


DATE: August 5, 2024 **FROM:** Janet Jones

TO: Mark Nebecker, Chris Kern **SUBJECT:** Existing Conditions Memo

A 24-hour turning movement counts at the NW Reeder Road/NW Gilihan Road intersection were also collected on July 4, 2024. The turning movement count data supports the peak times of entering and exiting traffic patterns for the SIWA. The peak hours for entering and exiting traffic were observed to be 11:15 AM and 5:15 PM, respectively. The combined peak hour was observed to occur between 2 and 3 PM.



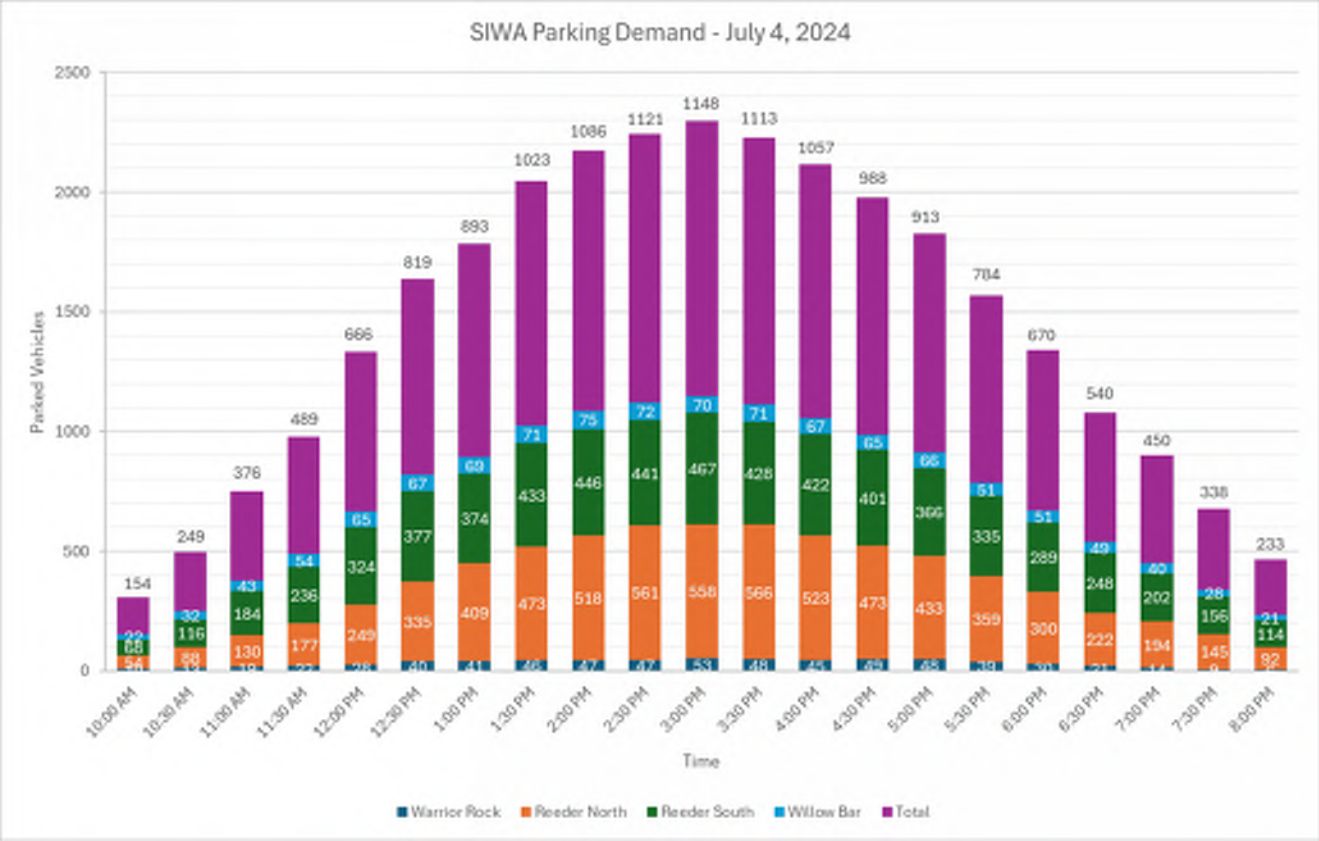


DATE: August 5, 2024 **FROM:** Janet Jones

TO: Mark Nebecker, Chris Kern **SUBJECT:** Existing Conditions Memo

July 4 Parking Demand

Parking demand estimates were also recorded for July 4, 2024. The peak parking demand in the SIWA was approximately 1,150 vehicles at about 3 PM. This is consistent with the traffic data that suggests the average dwell time for visitors occurs between 12 PM and 5 PM, with peak parking occurring at 3 PM. The busiest parking area observed was the northern Reeder Beach area, followed by the southern Reeder Beach area, Willow Bar, and finally Warrior Rock.



DATE: August 5, 2024 **FROM:** Janet Jones

TO: Mark Nebecker, Chris Kern **SUBJECT:** Existing Conditions Memo

DATE:	August 5, 2024	**FROM:**	Janet Jones
TO:	Mark Nebecker, Chris Kern	**SUBJECT:**	Existing Conditions Memo

Summary

The following summarizes existing conditions based on both historical traffic and weather data, and existing traffic and parking data:

- Traffic and parking activity significantly increases in the SIWA when temperatures exceed 85 degrees.
- Peak times for entering and exiting traffic on the island are approximately 11 AM to 12 PM and 5 to 6 PM, respectively. The peak hour for total traffic was observed to occur between 2 and 3 PM.
- Peak parking demand occurs at approximately 3 PM with a majority of vehicles parked along NW Reeder Road in the area of the southern beaches.

Attachments/Enclosures: None

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APPENDIX B:
SIWA SOLUTIONS

SMART MOBILITY
Connecting People + Places

DEA PROJECT NO.: ODFW0000-0009

TRAFFIC AND PARKING MANAGEMENT SOLUTIONS

Sauvie Island Wildlife Management Area (SIWA)

OCTOBER 24, 2024

PREPARED FOR OREGON DEPARTMENT OF FISH AND WILDLIFE (ODFW)

ATTN: MARK NEBECKER, CHRIS KERN

PREPARED BY DAVID EVANS AND ASSOCIATES, INC.

FROM: JANET JONES, PE, TRAFFIC ENGINEER
ANDREW MORTENSEN, SR. TRANSPORTATION PLANNER
ROSEMARY BETROS, TRANSPORTATION PLANNER

DAVID EVANS AND ASSOCIATES INC.

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INTRODUCTION

David Evans and Associates (DEA) has been reviewing existing traffic and parking conditions for the Sauvie Island Wildlife Area (SIWA), particularly during hot summer days and holidays. The Oregon Department of Fish and Wildlife (ODFW), supported by the Oregon State Police (OSP), faces many challenges managing large crowds and maintaining proper parking and traffic in the SIWA, often impacting emergency vehicle response. To effectively manage traffic flow during peak days, ODFW must also manage parking in the SIWA, which presents many challenges under existing conditions due to a lack of defined parking spaces. Below is a summary of options for addressing the parking and traffic flow challenges in the SIWA for ODFW's consideration.

Options were grouped into one (1)ss of three (3) categories:

1. Roadway Improvements
2. Parking Area Improvements
3. Parking Operation Improvements

A range of options within the three (3) categories above are presented in this memo, with a breakdown of pros, cons, and cost estimates for consideration. All cost estimates are rounded up to the nearest thousand dollars. Options can be mixed and matched to create an overall course of action tailored to ODFW's needs and preferences. It is also possible to implement many of these options as pilot programs before officially committing to any one or multiple options.

The options range in cost from low to high and offer methods to prevent traffic congestion and better manage parking utilization in a proactive manner, as well as react to changing conditions as traffic congestion and parking demand increase. The following chart summarizes proposed options based on scales of high cost versus low cost as well as proactive versus reactive options:

Table 1 - SIWA Traffic and Parking Management Options Summary (Source: DEA)

Relative Cost	Proactive Measures	Reactive Measures
Low Cost	Website and Social Media Alerts (Temperature)	Website and Social Media Alerts (Traffic)
	SIWA Hotline (Temperature)	SIWA Hotline (Traffic)
	Wayfinding and Informational Signage	Park and Ride
	Links to Live Video Feed	Parking Attendants
High Cost	Pave Northern Portion of NW Reeder Road	Gated Entry
	Roundabouts, Mini Traffic Circles, and U-Turns with Aprons	Shuttle Services
	Roadway Median	Mobile Device Parking Apps
	Permeable Parking Pavers and Parking Stops	Parking Meters and Software
	Advance Reservation System	Camera Detection
		Smart Parking Sensors

The options will be discussed with ODFW staff. Once ODFW selects its preferred options, we recommend initiating a small-scale pilot program to be started in late Spring/early Summer 2025 to monitor traffic and parking conditions with some level of improvements. This will help the project team determine how the selected options are impacting parking and traffic conditions in the SIWA to best select and implement long-term solutions.

1 ROADWAY IMPROVEMENTS

This section describes roadway improvements that can be implemented to alleviate traffic congestion, manage traffic flow during peak periods, and redistribute parking demand more effectively by allowing visitors to more easily navigate the SIWA road and parking network.

1.1 GATED ENTRY

Option: Install an automated gate system (see Figure 1) at the southern end of the SIWA that allows vehicles to enter only if parking is available. Issue passes to residents and emergency services so that they always have access. Gate locations ideally provide space for visitors to turn around easily if parking is full and the gate is closed when they arrive. Potential locations include:

- Intersection of NW Reeder Road and NW Gillihan Road
- Turnoff for the Willow Bar Parking area

Purpose: Physically control vehicle access to the SIWA on peak days.

Pros:

- Reduces traffic congestion by physically limiting access in the SIWA.
- Option to leave the gate open during non-peak times to minimize impact to emergency services and residents.
- Automatic gates offer the ability to have entry and exit gates operate without ODFW personnel present. For example, drivers could take a ticket at the entry gate that they scan upon leaving to lift the exit gate.
- Automatic gates can be purchased as part of a system that integrates other parking management devices, such as parking meters and lot full signs.
- Potential to collect additional funds for ODFW.
- Could pair well with an advance reservation system by allowing access only to drivers that present/scan a permit.
- Compatible with all other options presented in this memo.

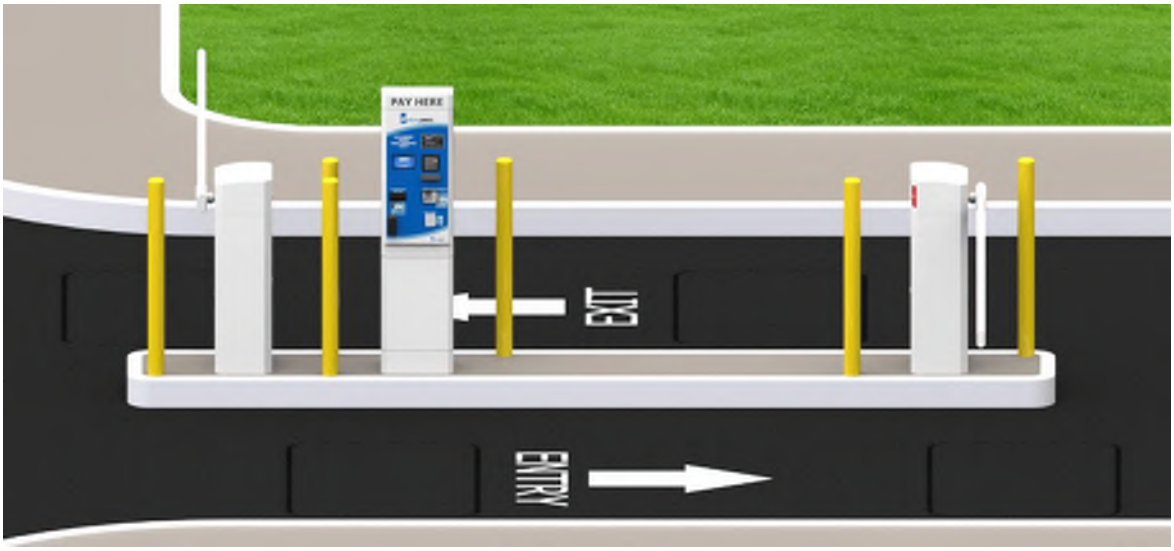
Cons:

- Impacts access for emergency response teams.
- Potentially frustrating for residents.
- May increase congestion/cause bottleneck conditions south of the SIWA as rejected vehicles turn around.
- Technology may detract from the feel of the rural setting.
- This system works best if ODFW also implements a traffic/parking condition monitoring option (See 2.1 Camera Detection, 0 Smart Parking Sensors, 3.7 Parking Attendant, and 3.9 Parking Meters and Software) so it has a way to know when all parking areas are full and when parking spots become available.

Cost Estimate [1]***:***

Cost Per Automatic Gate - $7,000
Cost Per Automatic Gate Parking System - $20,000 - $52,000
Estimated total cost (Average) - $36,000

Figure 1 - Gate System (Source: parkingboxx.com)



[1] Estimated cost for automatic gate and gate systems based on ParkingBoxx systems (https://parkingboxx.com/parking-system-pricing).

1.2 WAYFINDING AND INFORMATIONAL SIGNAGE

Option: Post signs with parking information (e.g. parking locations, distances to parking, and lot utilization) throughout the SIWA (see Figure 3). Signs could include a combination of dynamic signs/onsite message boards (see Figure 2) and programmable LED signs, and static signs (see Figure 3). A message board indicating parking availability could be especially helpful at the western end of the Wapato Bridge along Highway 30.

Purpose: Provide visitors with a more complete understanding of the area and help them make informed decisions and navigate the SIWA roadway system more efficiently.

Pros:

- Provides a low-cost option for traffic/parking management.
- Requires little maintenance.
- Ability to update messages remotely as conditions change.
- Potential to repurpose and relocate dynamic message boards for future needs.
- Many dynamic message boards are solar powered.
- Option to rent dynamic message boards means ODFW would not be responsible for maintenance and could limit cost of signs to a three-month period each year.
- Static wayfinding signage is compatible with all other options presented in this memo.
- Were ODFW to install technology to monitor parking and traffic, dynamic message signs could update automatically and reduce ODFW staff time needed to monitor conditions and update sign messages manually.
- Wayfinding signs are useful to visitors at all times of the year.

Cons:

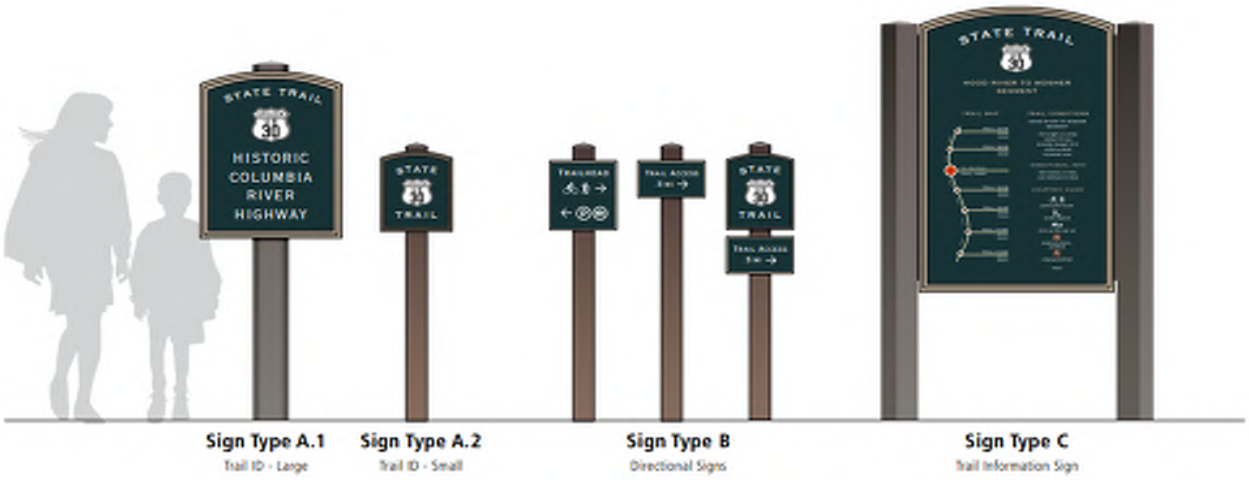
- Potential for vandalization or tampering.
- Were ODFW to collect traffic and parking data manually, dynamic message signs would require staff time to monitor conditions and update messages as needed.
- Dynamic message signs have a high up-front cost compared to static signage.
- Dynamic message sign rentals require ODFW staff time to coordinate and manage (some training will be required).
- Technology may detract from the feel of the rural setting.

Figure 2 - Dynamic Message Board (Source: catrentalstore.com)

Cost Estimate [2]*:*

Cost Per Wayfinding Post, Small - $1,000
Number of Proposed Small Wayfinding Posts – Nine (9)
Cost Per Wayfinding Sign, Large - $2,000
Number of Proposed Large Wayfinding Signs – Five (5)
Cost Per Dynamic Message Board (Own) – $25,000
Number of Proposed Dynamic Message Boards – Six (6)
Cost Per Dynamic Message Board (Borrow from ODOT) – $0
Cost Per Programmable LED Sign - $3,000
Estimated total cost (Static Only) - $19,000
Estimated total cost (Static & LED) - $37,000
Estimated total cost (Static & Dynamic)- $169,000

Figure 3 - Wayfinding Signage Examples (Source: Oregon.gov)



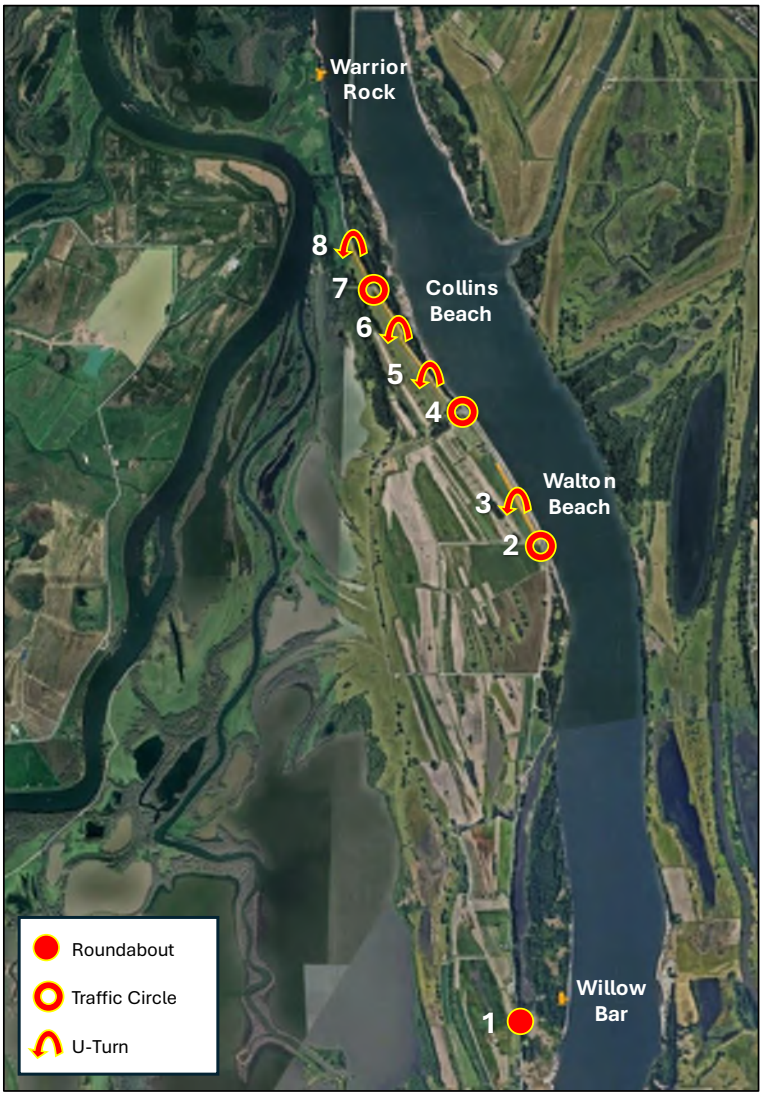
[2] Estimated cost for wayfinding signage based on Northeast Michigan Council of Governments quote for a "Trail Wayfinding Sign Cost Estimates" (https://www.discovernortheastmichigan.org/downloads/cost_est_trail_wayfinding_signs.pdf). Estimate assumed to include design, production, and installation costs.
Estimated cost for programmable LED sign based on LeadLEDs "104 in Custom LED Sign Programmable Outdoor Message Board Multicolor Electronic Display" (https://untsmart.com/products/programmable-outdoor-led-sign?variant=39603769278535&currency=USD&utm_medium=product_sync&utm_source=google&utm_content=sag_organic&utm_campaign=sag_organic&srsltid=AfmBOopWHOrTL2AdQchxw4FKkgEnQyZhKfZHsLSpUxptAS3Knew6PH4ixk&com_cvv=8fb3d522dc163aeadb66e08cd7450cbbdddc64c6cf2e8891f6d48747c6d56d2c.) Assumed approximately $1000 for installation costs, which is included in the estimate.
Estimated cost for dynamic message board based on Parking Zone "Dynamic Message Sign – Silent Messenger" (https://www.parkingzone.com/dynamic-message-sign-silent-messenger.html?srsltid=AfmBOopPqe14OvsJs0piPXCNzvd4IWvblsZnlxoyKTl2iauJM7Yrjcisgyw).

1.3 ROUNDABOUTS, MINI TRAFFIC CIRCLES, AND U-TURNS

Option: Install roundabouts, mini traffic circles, and/or U-turns with aprons at strategic locations along NW Reeder Road to better manage traffic flow. Include signage ahead of these structures so visitors know there are convenient turnaround options available. Coupling these improvements with a roadway median (see 1.4 Roadway Median) would help decrease the number of potential vehicle conflicts by limiting uncontrolled left-turn movements along NW Reeder Road and forcing visitors to continue traveling north to find parking. Proposed locations are as follows (see Figure 4):

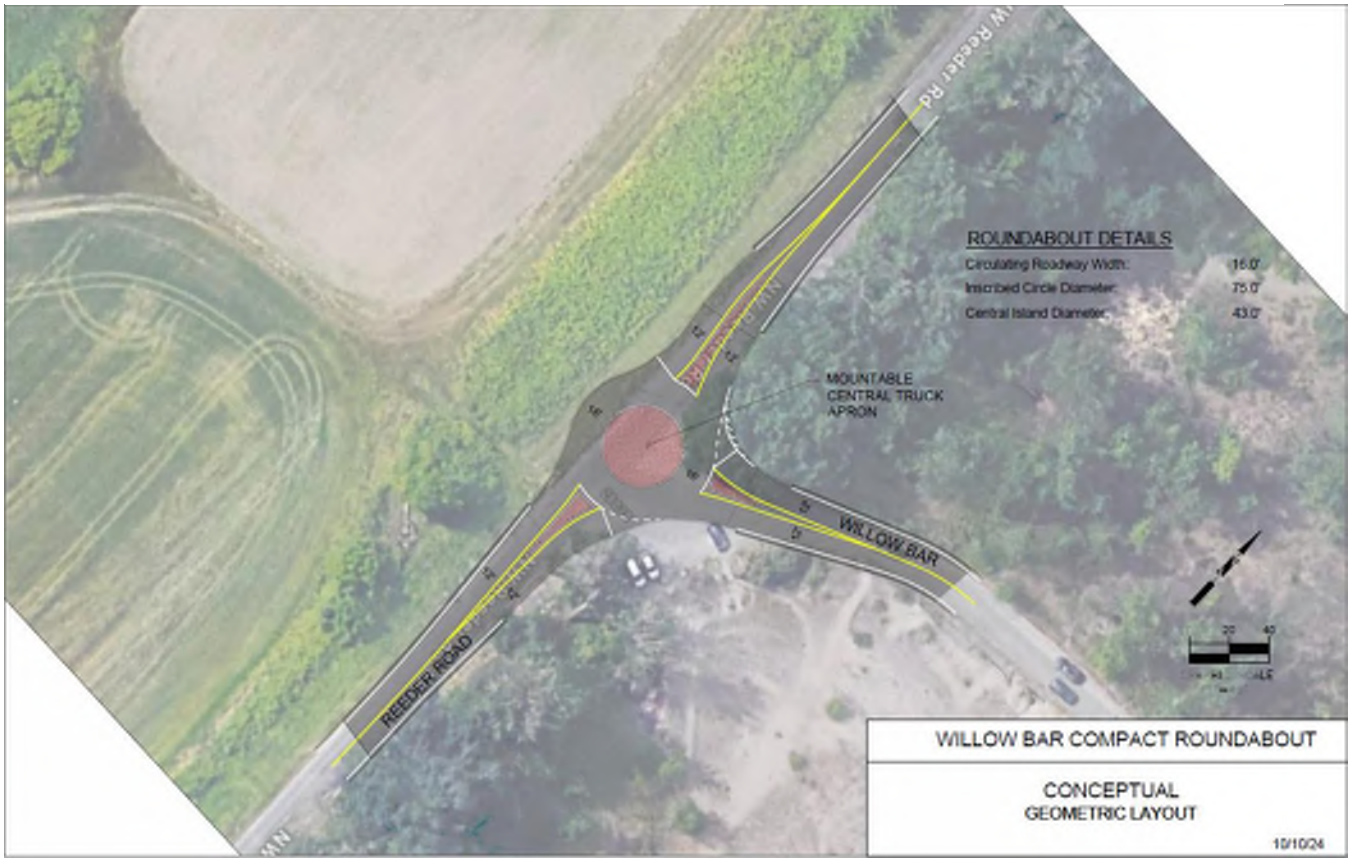
1. Compact roundabout at intersection of NW Reeder Road and turnoff to Willow Bar parking area
2. Traffic circle at southern end of Walton Beach parking area
3. U-turn at halfway point of Walton Beach parking area
4. Traffic circle at southern end of Collins Beach parking area
5. U-turn at first third of Collins Beach parking area
6. U-turn at second third of Collins Beach parking area
7. Traffic circle at intersection of NW Reeder Road and Gilbert Boat Ramp Access Road
8. U-turn at northern end of Collins Beach parking area

Figure 4 - Potential Roundabout, Mini Traffic Circle, and U-Turn Locations (Source: DEA)



A compact roundabout (as shown in Figure 5) would work well at Location 1 in Figure 4 (Willow Bar parking area) because there is more space than at other proposed locations. Mini traffic circles would be ideal for smaller, three-legged intersections on NW Reeder Road (for example, Location 2 in Figure 4). U-turns with aprons would be ideal for mainline, midway segments of NW Reeder Road (for example, Location 3 in Figure 4).

Figure 5 - Possible Willow Bar Compact Roundabout (Source: DEA)



Both permanent and rubber modular mini traffic circle options exist. Figure 6 depicts an example of a modular mini traffic circle in conditions similar to the SIWA.

Purpose: Improve traffic flow and allow visitors who may not want to continue north to turn around and exit the SIWA safely and efficiently while not impeding conflicting traffic.

Figure 6 - Temporary Mini-Circle in a Rural Setting (Source: flickr.com)

The U-turn with apron structure would ideally provide a break in the roadway median and a small, paved area to the west of the road that provides extra space for vehicles to safely execute a left turn. Figure 7 and Figure 8 depict an example of a U-turn with apron.

Figure 7 - Street View of U-Turn with Apron (Source: maps.google.com)

Figure 8 - Aerial View of U-Turn with Apron (Source: maps.google.com)

Pros:

- Allows for safer turning movements in a controlled environment that helps reduce vehicle conflicts.
- Promotes lower vehicle travel speeds (traffic calming).
- Low cost, easy-to-install modular traffic circles and permeable pavers provide a low-risk option for experimenting with traffic circle and U-turn number and placement.
- Facilitates option for angled parking along NW Reeder Road in the Collins beach parking areas, making entering and exiting parking spots faster and safer.
- Possible to implement as a pilot program within a single parking area (Walton Beach, for example) to observe impacts on traffic flow.
- Coupling traffic circles with signage (see 1.2 Wayfinding and Informational Signage) indicating that a turnaround point is approaching and whether parking areas ahead have spaces available could improve traffic flow.
- Compatible with all other options presented in this memo.

Cons:

- Less effective if not also implemented with a roadway median at least along the full length of each linear parking area, coupled with static wayfinding signage informing drivers of upcoming turn options.
- Not as beneficial during non-peak days of the year.
- If coupled with a roadway median, would require visitors to drive farther north before being able to turn around or park.
- May decrease response times and efficiency for emergency response vehicles. Installing mini traffic circles with mountable curbs could mitigate this risk.
- Adding paved aprons for U-turns may reduce the number of parking spaces available in Walton Beach and Collins Beach parking areas.

- Environmental constraints and current road width limit traffic circle size, and smaller traffic circles are generally more difficult for large vehicles to navigate.
- U-turns rely on other roadway design elements (widening the road to create a left-turn lane, reduced speed limits, and/or traffic calming devices like speed bumps, for example) to mitigate the risk of rear-ending and injury when a vehicle slows unexpectedly to make a left turn.

Cost Estimate (Compact Roundabout)[3]:

Number of proposed compact roundabouts – One (1)
Estimated cost per compact roundabout - $1,500,000
Estimated total cost - $1,500,000

Cost Estimate (Traffic Circle - Permanent Structure)[4]:

Number of proposed mini traffic circles – Three (3)
Estimated cost per mini traffic circle - $6,000
Estimated total cost - $18,000

Cost Estimate (Traffic Circle - Modular Structure)[5]:

Number of proposed mini traffic circles – Three (3)
Estimated cost per mini traffic circle - $2,017.09
Estimated total cost - $7,000

Cost Estimate (U-Turn with Apron)[6]:

Number of proposed U-turns with aprons – Four (4)
Amount of improved surface needed per apron – 2000 square feet
Dimensions of left turn lane – 12 feet wide x 60 feet long
Amount of improved surface needed per left turn lane – 720 square feet
Cost of asphalt paving per square foot - $13
Estimated cost per U-turn with apron with left turn lane - $35,360
Estimated total cost - $142,000

Estimated total cost (Compact Roundabout, Permanent Mini Circles & U-Turns) - $1,660,000
Estimated total cost (Compact Roundabout, Temporary Mini Circles & U-Turns) - $1,649,000

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[3] Estimated cost generated by DEA.
[4] Estimated cost based on Federal Highway Administration's estimated cost for a "landscaped traffic mini-circle on an asphalt street" (https://safety.fhwa.dot.gov/saferjourney1/library/countermeasures/27.htm#:~:text=Estimated%20cost,circle%20on%20a%20concrete%20street).
[5] Estimated cost based on RubberForm quote for "mini roundabouts" (https://rubberform.com/product/mini-roundabouts/). Cost includes all hardware required and shipping amounts for a 10 foot in diameter roundabout.
[6] Estimated cost based on calculating the turnaround area from the U-turn with apron in Figure 8 and cost of asphalt paving per square foot based on Angi.com article (https://www.angi.com/articles/how-much-does-it-cost-install-asphalt-driveway.htm). Dimensions of a left turn lane based on "Left Turn Lane Design Factors" article (https://www.mikeontraffic.com/left-turn-lane-design-factors/#:~:text=Lane%20Width%20is%20generally%2011,to%20the%20left%20turn%20lane.)

1.4 ROADWAY MEDIAN

Option: Install a median on NW Reeder Road to manage left turns onto the parking areas off NW Reeder Road, especially between the southern end of the Walton Beach parking area and the northern end of the Collins Beach parking area. The roadway median would be installed at strategic places to allow for U-turns along NW Reeder Road (see 1.3 Roundabouts, Mini Traffic Circles, and U-Turns) and could be either permanent or temporary (deployed only during peak season, for example), depending on ODFW's preference. Potential median devices include:

- Roadway delineators/"candlesticks" (see Figure 10)
- Boulders
- Mountable curb
- Logs secured by steel bolts
- Wood posts connected by steel cables
- Split rail fence
- Water-filled Jersey barriers (temporary - see Figure 9)
- Concrete Jersey barriers (permanent)
- Guard rail

Figure 9 - Jersey Barrier (Source: Crowd Control Warehouse)

Purpose: Improve traffic flow, predictability, and safety by limiting conflicting vehicle movements along NW Reeder Road.

Pros:

- Provides traffic calming.
- Reduces the need for in-person enforcement of traffic rules and norms by physically limiting vehicle access.
- Allows for more favorable parking distribution across the SIWA parking areas by managing strategic turnaround areas.
- Would facilitate angled parking at Reeder parking area and Collins parking area, making entering and exiting parking spots faster and safer.
- Some options, such as the rubber curb lane delineators in Figure 10, are mountable by emergency vehicles.
- Possible to implement along a shorter stretch of road in conjunction with a mini traffic circle or U-turn with apron to see how traffic flow responds.
- Combining roadway medians with mini traffic circles, U-turns with aprons, and signage indicating that a

Figure 10 - Rubber Delineators (Source: sealcoating.com)

turnaround point is approaching and whether parking areas ahead have spaces available could improve traffic flow.

- Compatible with all other options presented in this memo.

Cons:

- Some median options, like Jersey barriers, reduce the width of travel lanes.
- Some median options, like rubber delineators, are more frequently used on asphalt roads and may be more challenging to install on a gravel road.
- Poorly placed breaks in the median (vehicle turn opportunities) could limit, rather than improve, traffic efficiency.
- Potential for vandalization or tampering.
- Potential for drivers of larger vehicles to drive over less robust median options.
- Decreases efficiency for emergency response teams and may increase response times.
- Less necessary during less busy times of year.

Cost Estimate (Water-filled Jersey Barrier) [7]*:*

Length of Roadway to Divide – Five (5) miles (Distance from Willow Bar parking area to end of Collins Beach parking area)
Length per Jersey Barrier – 96”
Cost per Jersey Barrier – $300
Jersey Barriers to Cover Total Distance – 3,300
Annual Cost to Install, Remove, and Store
Estimated total cost - $990,000 + Annual Cost to Install, Remove, and Store

Cost Estimate (Concrete Jersey Barrier) [8]*:*

Length of Roadway to Divide – Five (5) miles (Distance from Willow Bar parking area to end of Collins Beach parking area)
Length per Jersey Barrier – 144”
Cost per Jersey Barrier – $1,340
Jersey Barriers to Cover Total Distance – 2,200
One-time Cost to Install
Estimated total cost - $2,948,000 + One-Time Cost to Install

Cost Estimate (Rubber Delineators and Pavement Spikes) [9]*:*

Length of Roadway to Divide – Five (5) miles (Distance from Willow Bar parking area to end of Collins Beach parking area)
Length per Rubber Delineator – 72”
Cost per Rubber Delineator – $140
Rubber Delineators to Cover Total Distance – 4,400
Cost for 4,400 Rubber Delineators – $616,000
23” Steel Spikes per Delineator – Four (4)
Cost per 23” 20 Spikes - $122.99
Total 23” Steel Spikes Needed – 17,600
Cost for 17,600 x 23” Steel Spikes - $108,231.20
One-time Cost to Install
Estimated total cost - $725,000 + One-Time Cost to Install

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[7] Estimated cost for jersey barrier based on Crowd Control Warehouse “Water/Sand Fillable All Purpose Roadway or Airport Barricade” (https://www.crowdcontrolwarehouse.com/products/water-sand-fillable-all-purpose-barricade-24-h-x-96-l-x-16-w?currency=USD&variant=2220782092300&stkn=261316dbe5ee&srsltid=AfmBOoomR_W7prbzJrKhxhANAc1dA47F9UNxpDx9hvB9NUyhCIUrYNM3z0s&com_cvv=8fb3d522dc163aeadb66e08cd7450cbbdddc64c6cf2e8891f6d48747c6d56d2c)

[8] Estimated cost based on Crowd Control Warehouse quote for 12 foot “plain concrete jersey barrier – straight end” (https://www.crowdcontrolwarehouse.com/products/plain-concrete-jersey-barriers?srsltid=AfmBOoqywFG3OXhtCq-lucjRDOVvPezXQ5laqX1itaBvt5nq7N_t5Y5MFF0&com_cvv=8fb3d522dc163aeadb66e08cd7450cbbdddc64c6cf2e8891f6d48747c6d56d2c&variant=39895605477470).

[9] Estimated cost based on Sealcoating.com “Rubber Curb Lane Delineator System: Yellow Curb and Yellow Delineator Post (with hinge and bracket)” (https://www.sealcoating.com/products/rubber-curb-lane-delineator-system) and Amazon.com “23-Inch Long Rebar Stakes” (https://www.amazon.com/JPOIP-23-Inch-Long-Rebar-Stakes/dp/B0CDBRYTWT?source=ps-sl-shoppingads-lpcontext&ref_=fplfs&smid=A657HW7IS9SRU&th=1).

1.5 PAVE NORTHERN PORTION OF NW REEDER ROAD

Option: Currently, when traveling north, NW Reeder Road changes from asphalt to gravel at the southern end of the Collins Beach parking area near or at the Multnomah County and Columbia County. One option is to pave NW Reeder Road between the Multnomah County line and the northern end of the Collins Beach parking area (see Figure 11). Paving NW Reeder Road would require coordination with Columbia County who maintains this currently unimproved roadway segment. Ending the new pavement just north of the Collins Beach parking areas will likely minimize the number of vehicle trips north to the Warrior Rock parking area.

Purpose: Extending the pavement on NW Reeder Road north could increase the attraction of the Collins Beach parking areas, which are currently underutilized. It is likely that visitors prefer driving on pavement based on comfort and may be willing to drive farther north for parking if it does not require them to navigate the bumpier gravel terrain, given the option.

Figure 11 – Potential Segment to Pave (Source: DEA)

Pros:

- More favorable parking distribution across the SIWA parking areas. Specifically, this option could encourage more parking in the Collins Beach parking area and shift parking from the often-oversaturated Willow Bar and Warrior Rock parking areas (because pavement will end before reaching Warrior Rock).
- Provides additional pavement area that can encourage additional roadway improvement options such as traffic circles (see 1.3 Roundabouts, Mini Traffic Circles, and U-Turns) in the future.
- Potential for SIWA traffic and parking operation improvement as a standalone option.
- Compatible with all other options presented in this memo.

Cons:

- Substantially high costs associated with paving and maintaining over time.
- Requires coordination with Columbia County.
- Less necessary during less busy times of year, making significant monetary investment and recurring maintenance costs less desirable.
- May have stormwater impacts due to increase in impermeable surface.

Cost Estimate [10]:

Length of section to pave – approximately 1.2 miles
Number of lanes – Two (2), no shoulders
Estimated cost per mile - $4,100,000
Estimated monthly maintenance cost per mile - $375
Estimated total cost - $4,920,000 + $1,000/month

[10] Estimated cost for initial paving based on Florida Department of Transportation cost per mile model reports for "New Construction Undivided 2 Lane Rural Road with 5' Paved Shoulders: R01" (https://fdotwww.blob.core.windows.net/sitefinity/docs/default-source/programmanagement/estimates/reports/cost-per-mile-models-reports/rural/rural-01.pdf?sfvrsn=fc6fd6e1_7).
This website provides a chart that breaks down costs into line items.

Estimated cost for maintenance based on Environmental Protection Agency's "Appendix D: When to Pave a Gravel Road" (https://www.epa.gov/sites/default/files/2015-10/documents/2003_07_24_nps_gravelroads_appd_0.pdf).

2 PARKING AREA IMPROVEMENTS

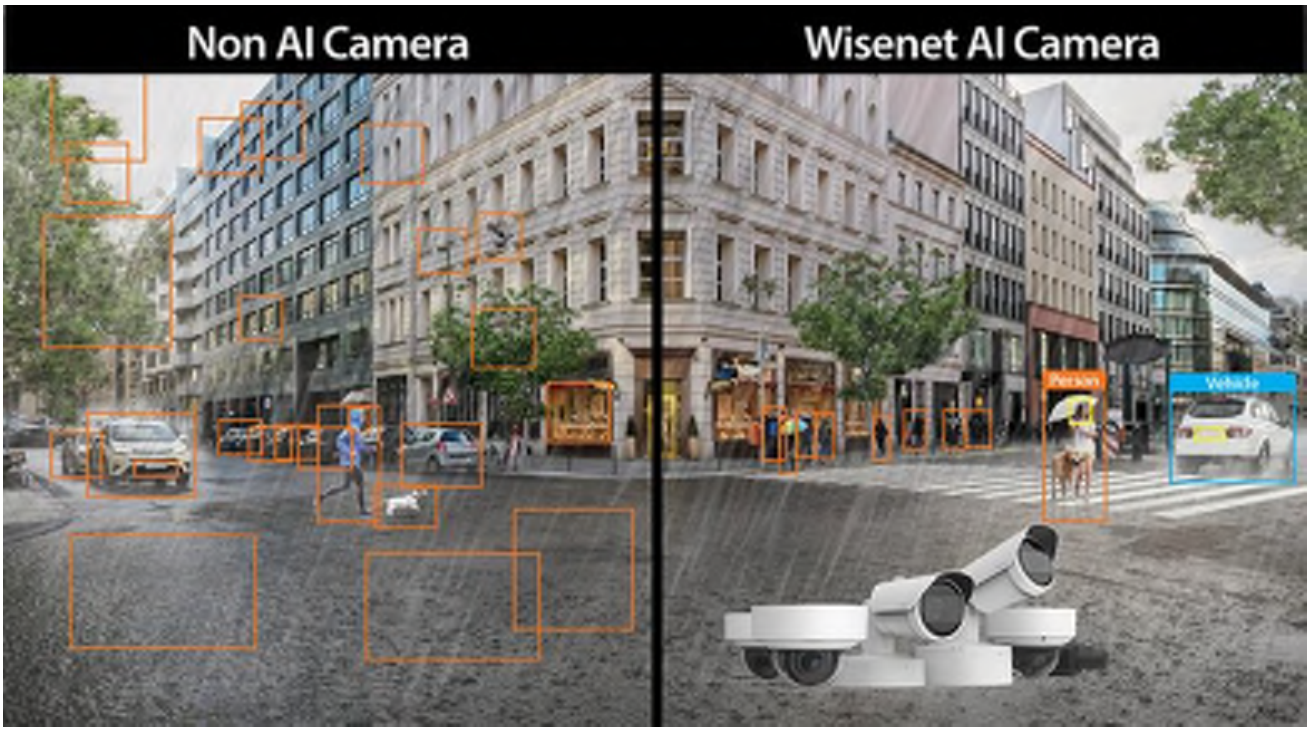
This section describes parking area improvements intended to increase parking capacity and ensure that parking is defined, quantifiable, and manageable.

2.1 CAMERA DETECTION

Option: Install traffic monitoring cameras (see Figure 12) at the entrance to the SIWA and in each parking area. This system could be similar to ODOT's Trip Check cameras. ODFW could choose between or combine the capabilities of standard surveillance cameras and those enabled with artificial intelligence (AI) software. Figure 13 and Figure 14 show proposed locations for both types of cameras.

Purpose: Allow ODFW to monitor parking lot utilization in real time and provide the ability to post live video footage via the SIWA website and social media sites. Based on video feed, ODFW could update informational resources regularly to inform beach visitors of real-time conditions.

Figure 12 - Traffic Monitoring Camera (Source: prnewswire.com)



Pros:

- Provides real-time parking information that ODFW can share/broadcast.
- Can provide the added benefit of monitoring security of parking areas.
- AI-enabled camera systems could automatically detect/count traffic and parking demand, reducing the demand on ODFW staff for on-site monitoring. Posting an AI-enabled camera at the intersection of NW Reeder Road and NW Gillihan Road would allow ODFW to estimate lot utilization by counting the number of vehicles entering the SIWA. This would minimize the need to install AI-enabled cameras at each parking area.

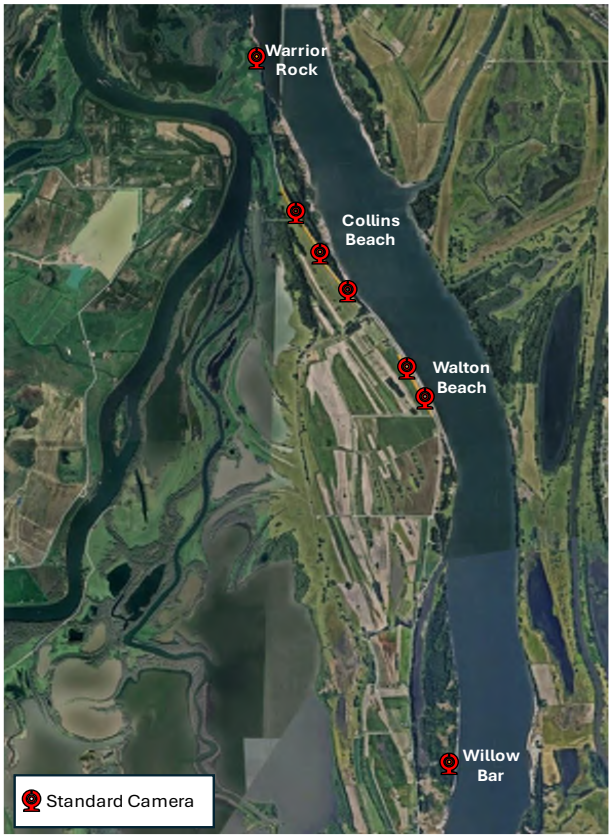
- Eliminates the need for parking attendants, smart parking meters, smart parking sensors, or mobile device parking apps to collect parking and traffic data.
- Possible to implement in a single parking area first (Willow Bar, for example) to see how traffic flow and parking operations respond.
- Potential to partner with Portal, the region's data portal, to manage AI camera data.

Cons:

- Potential for privacy concerns.
- Potential for vandalization and tampering.
- Technology may detract from the feel of the rural setting
- Non-AI enabled cameras require an ODFW employee to monitor and interpret video feed to determine parking utilization (if the video feed is not live-streamed to the public).
- Long stretches of parking (Walton Beach and Collins Beach parking areas) require more cameras to analyze parking conditions accurately.
- Technology may take time to learn to operate and maintain if not outsourced to a service-provider. Subscription to a service-provider for camera operation and maintenance adds a recurring fee to this option.
- Cameras are most useful during the busier times of year, making recurring year-round fees less desirable.

Figure 13 - Proposed AI Surveillance Camera Location (Source: DEA)

Figure 14 - Proposed Standard Surveillance Camera Locations (Source: DEA)



Cost Estimate (Standard Surveillance Camera) [11]*:*

Number of Standard Surveillance Cameras – Seven (7)
Cost Per Standard Surveillance Camera – $2,000
Cost to Install Each Camera - $2,000
Estimated total cost - $28,000

Cost Estimate (AI Surveillance Camera) [12]*:*

Number of AI Surveillance Cameras – One (1)
Cost Per Standard Surveillance Camera* – $750
Cost to Install Each Camera - $2,000
*Some systems require a subscription – Price varies
Estimated total cost - $3,000 + Any monthly subscription cost

Estimated total cost (7 x Standard & 1 x AI) - $31,000 + Monthly Subscription Fees

[11] Estimated cost for standard surveillance cameras based on Security Camera King "4MP Elite Series AI Traffic Enforcement Camera" (https://www.securitycameraking.com/product/4mp-elite-series-ai-traffic-enforcement-camera/?srsltid=AfmBOoqLwFotgalK14DVZabDB4VIMBB6BTkR-uKDKctcc_B72y0aZjudBA0).

[12] Estimated cost for AI surveillance cameras based on Milesight "AI Outdoor Parking Management Pro Bullet Plus Camera" (https://www.gowifi.co.nz/video-surveillance/pmc8266-fpc.html).

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2.2 SMART PARKING SENSORS

Option: Install smart parking sensors (see Figure 15 and Figure 16) in each parking space (requires parking spaces to be clearly delineated).

Purpose: Allow ODFW representatives to monitor parking availability in real time. Based on sensor data, ODFW could update informational resources regularly to inform potential visitors of the most current conditions and direct them to parking areas with parking availability.

Figure 15 - Smart Parking Sensor (Source: chirpiot.medium.com)

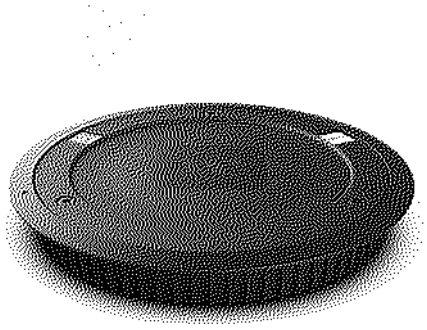
Pros:

- Provides real-time parking information that ODFW can share/broadcast.
- Does not require an ODFW employee to monitor and interpret data to determine lot capacity.
- Eliminates the need for surveillance cameras, parking attendants, smart parking meters, or mobile device parking apps to collect parking and traffic data. Possible to implement in a single parking area first (Willow Bar, for example) to see how traffic flow responds.

Cons:

- Potentially expensive to install a sensor in every parking spot.
- May be easily damaged, vandalized, or stolen.
- May not work as well with gravel or permeable pavers.
- Technology may detract from the feel of the rural setting.
- Not a standalone option - works best when implemented with clearly delineated parking.
- Technology may take time to learn to operate and maintain if not outsourced to a service-provider.
- Sensors are most useful during the busier times of year, making installation and recurring maintenance fees less desirable.

Figure 16 - Smart Parking Sensor (thethingsnetwork.com)



Cost Estimate [13]:

Estimated Parking Area Parking Spaces (see Figure 19) – 928
Cost Per Smart Parking Sensor – $350

Estimated total cost - $325,000

[13] Estimated cost for smart parking sensors based on Nwave "G4 Car Parking Space Sensor – Flush Mount" (https://www.securitycameraking.com/product/4mp-elite-series-ai-traffic-enforcement-camera/?srsltid=AfmBOoqLwFotgalK14DVZabDB4VIMBB6BTkR-uKDKctcc_B72y0aZjudBA0).

2.3 PERMEABLE PAVEMENT PAVERS WITH PARKING SPACE MARKERS AND PARKING STOPS

Option: Install permeable pavers with parking delineation devices (see Figure 17) and rubber wheel stops (see Figure 18) to define parking spaces.

Purpose: Clearly delineate parking spaces so that ODFW has a well-defined parking capacity number and to help visitors park as efficiently as possible, reducing the potential for double parking and blocking of drive aisles.

Pros:

- Improved delineation helps parking efficiency and management
- Works well in gravel lots.
- Facilitates safe and efficient visitor parking.
- Facilitates management and broadcasting of parking capacity.
- These options are compatible with all other options presented in this memo.
- Delineating parking spaces can be useful to visitors at all times of the year.
- Possible to implement in a single parking area (Willow Bar, for example) to see how traffic flow responds.

Figure 17 - Permeable Pavement Markers (Source: blog.bimsmith.com)

Cons:

- Large parking areas require a large number of permeable pavers and wheel stops.
- Potential for vandalization or tampering.
- May require regular maintenance.

Figure 18 - Six Foot Parking Stop (Source: uline.com)

Cost Estimate (Permeable Parking Pavers) [14]*:*

Estimated Parking Area Parking Spaces (see Figure 19) – 928
Parking Space Dimensions – 10 feet x 18 feet
Parking Space Area – 180 square feet
Total Parking Area Square Footage – 180 square feet x 928 = 167,040 square feet
Sets of 40 Square Foot Parking Pavers Required – 167,040 square feet / 40 square feet = 4,176
Cost Per 40 Square Feet of Parking Pavers - $175
Estimated Cost - $731,000

Cost Estimate (Paver Parking Markers) [15]*:*

Estimated Parking Area Parking Spaces (see Figure 19) – 928
Parking Space Dimensions – 10 feet x 18 feet
Number of Parking Spaces plus Additional Parking Lines – 1,000
Number Paver Parking Markers Per Parking Space Delineator (1 per Foot) – 17
Number of Paver Parking Markers Required – 1,000 x 17 = 17,000
Cost Per 25 Pack of Paver Parking Markers – $40
Sets of 25 Packs of Paver Marking Markers Needed – 17,000 / 25 = 680
Estimated Cost - $28,000

Cost Estimate (Rubber Wheel Stops and Pavement Spikes) [16]*:*

Estimated Parking Area Parking Spaces (see Figure 19) – 928
Cost per Rubber Wheel Stop - $75
Number of Rubber Wheel Stops Needed – 928
Cost of 928 Rubber Wheel Stops – $70,000
Number of 23" Pavement Spikes per Wheel Stop – Four (4)
Cost per 20 x 23" Pavement Spikes - $122.99
Number of 23" Pavement Spikes Needed – 3,712

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[14] Estimated cost for parking pavers based on TRUGRID "PRO Plus Permeable Pavers" (https://www.amazon.com/dp/B01D3Q85BS/ref=sspa_dk_detail_0?psc=1&pd_rd_i=B01D3Q85BS&pd_rd_w=ZDga1&content-id=amzn1.sym.7446a9d1-25fe-4460-b135-a60336bad2c9&pf_rd_p=7446a9d1-25fe-4460-b135-a60336bad2c9&pf_rd_r=HPVZE95MAABCH7BYWN8F&pd_rd_wg=dZ8CI&pd_rd_r=0d76a5df-6016-45a4-93e5-dc520c917301&s=industrial&sp_csd=d2lkZ2V0TmFtZT1zcF9kZXRhaWw**).**

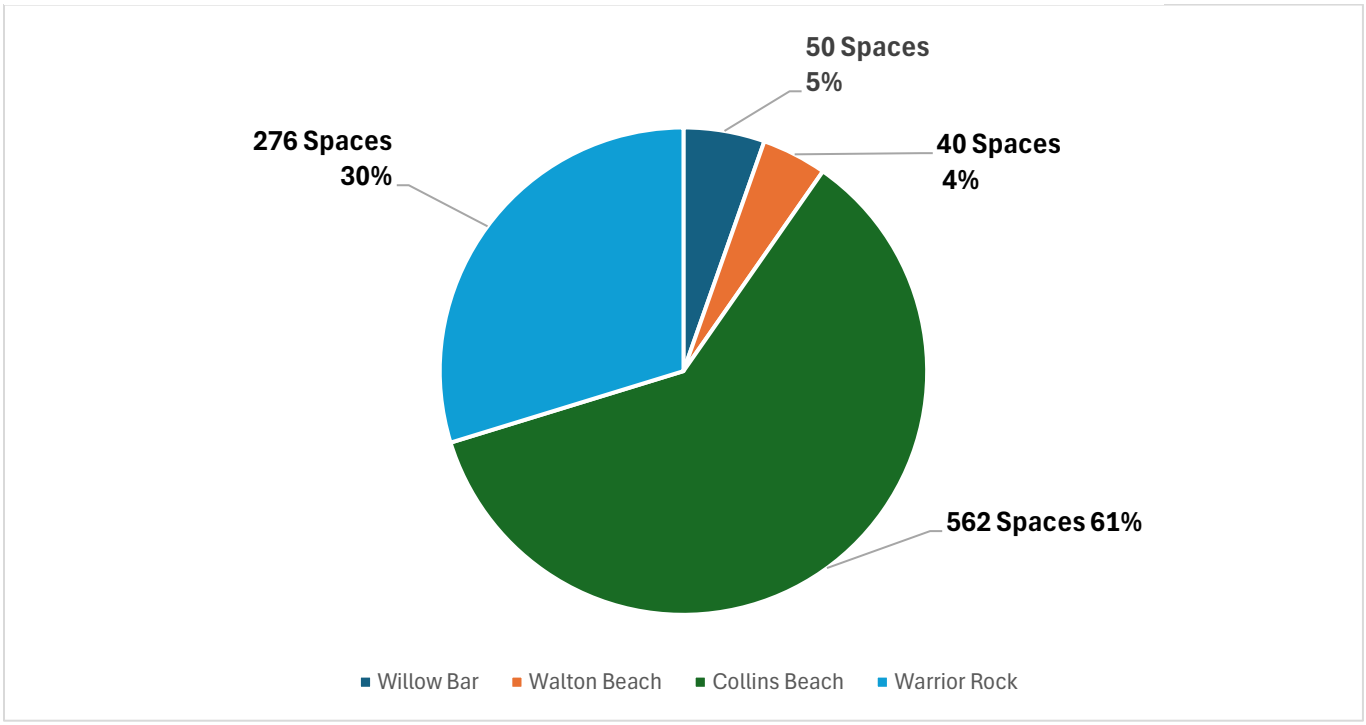
[15] Estimated cost for paver parking markers based on Vodaland "EasySpots – Paver Marking System" (https://vodaland-usa.com/products/easyspots-25-pack?currency=USD&variant=39508542455897&utm_source=google&utm_medium=cpc&utm_campaign=Google%20Shopping&stkn=5bd9f224f556).

[16] Estimated rubber wheel stop cost based on ULINE's "Parking Stops – 6', Rubber, Black/Yellow" (https://www.uline.com/Product/Detail/H-4608B~Y/Parking-Lot-Safety/Parking-Stops-6-Rubber-Black-Yellow?pricode=WA9372&gadtype=pla&id=H-4608B%2FY&gad_source=1&gclid=EAIaIQobChMIoa3-1onpiQMVaSytBh1cUxeREAQYASABEgJdMfD_BwE)**.**
Estimated Pavement Spike costs based on Amazon.com "23-Inch Long Rebar Stakes – ½ Inch Diameter Heavy Duty Galvanized Steel Ground Asphalt Anchors for Speed Bump…" (https://www.amazon.com/JPOIP-23-Inch-Long-Rebar-Stakes/dp/B0CDBSQW48/ref=sr_1_23?dib=eyJ2IjoiMSJ9.x2kgfFhdCcCYbc3JKZcmYf4aV9qvXtDPttSjrconzECcOprKRpYBh7wxbdyAltg0q2T_JdUbA76xVzYpr4LGZCmE9kX3xK0f-fFGuz1Rieyhj6ZRqhBZ7SAYN2pNTLKdX8Gu7GofuDvrG4n6kNqoMPE2tJVLPD1MT3uGCCtH-aqz4nCXBLrzsPXJzXYb3x9pYdudZjGWncymV1iP2ZS9RGWucFCjLu7qya4cmlzQ-IX_YrylqWgo_KLTBzT85l_iI2S3sDHQfA9y0BSohNBGDiQ1aPhAHNR4U0-Cc1rU34Q._KNoHuAyGe7SS6Uatg_EY3Wb0yUsy6f06esG8vj4FqY&dib_tag=se&keywords=asphalt%2Bspikes&qid=1732042468&sr=8-23&th=1).

Cost for 3,712 x 23" Pavement Spikes – $23,000
Estimated Cost - $93,000

Estimated Total Cost for All Components - $852,000

Figure 19 - Parking Capacity Estimate in the SIWA (Source: DEA)



3 PARKING OPERATIONS IMPROVEMENTS

This section describes strategies to help manage parking operations in the SIWA. These improvements generally have monthly or annual costs associated with them and require more oversight than the physical improvements described above.

3.1 WEBSITE AND SOCIAL MEDIA ALERTS

Option: Use ODFW's SIWA website (see Figure 21) and social media accounts like Facebook, X, Instagram, or YouTube (see Figure 20) to create alerts when the temperature is forecasted to be above 90 degrees Fahrenheit, during a designated seasonal window (e.g. June through August), and/or when parking areas are reaching capacity. Social media posts could include links to helpful resources, such as live video feed of parking areas and current parking regulations for the area.

Purpose: Enable ODFW to distribute information to subscribers and followers quickly and efficiently as conditions change.

Pros:

- Potential capability to automate the notification system with standardized messages.
- Enables those interested to subscribe or follow and receive updates automatically.
- Low cost and low maintenance.
- Compatible with all other options included in this memo.

Cons:

- To provide alerts based on traffic conditions, ODFW would need to implement additional options that allow it to gather real-time traffic data. Options that would facilitate this include camera detection, parking attendants, parking meters, smart parking sensors, and/or mobile device parking apps.
- Requires ODFW staff time to provide regular updates as needed.
- Traffic conditions can change rapidly, making recent posts quickly obsolete. Could result in frustration for potential visitors who feel that they have been misinformed.
- Potential visitors must "subscribe to" or "follow" ODFW to receive updates.

Figure 20 - ODFW Facebook Page (Source: facebook.com)

Cost Estimate:

Low Cost – Administrative and Staff Time

Figure 21 – ODFW Sauvie Island Wildlife Area Website (Source: myodfw.com)

3.2 LINK TO LIVE VIDEO FEED

Option: Provide online access to parking area camera feed on the SIWA webpage and in relevant social media posts. This option is similar to Oregon's TripCheck website (See Figure 22).

Purpose: Allow potential SIWA visitors to view current conditions and judge for themselves whether they want to make the trip or postpone.

Figure 22 - ODOT Trip Check Footage (Source: tripcheck.com)

Pros:

- Places the burden of assessing congestion and parking availability on the potential visitor rather than ODFW.
- Does not require (but, if desired, could still be implemented with) parking attendants, smart parking meters, smart parking sensors, and/or mobile device parking apps to collect parking and traffic data.
- Allows potential visitors to see current conditions before deciding to make the trip.
- Potential to coordinate with ODOT to set up a system like TripCheck.
- Possible to implement in a single parking area first (Willow Bar, for example) to see how traffic flow responds.

Cons:

- Without other parking management measures, people may still choose to visit the SIWA despite observing high levels of congestion.
- May be underutilized by potential visitors, especially if they are not aware that this resource exists.
- Potential for privacy concerns.
- Potential for vandalization and tampering of cameras.
- Technology may detract from the feel of the rural setting
- Long stretches of parking (Walton Beach and Collins Beach parking areas) require more cameras to observe parking conditions accurately.
- Technology may take time to learn to operate and maintain if not outsourced to a service-provider.
- Subscription to a service-provider for camera operation and maintenance adds a recurring fee to this option.
- Cameras are most useful during the busier times of year, making recurring year-round fees less desirable.

Cost Estimate [17]:

Number of Surveillance Cameras – 7
Cost Per Surveillance Camera – $2,000
Cost to Stream – Minimal, assuming partnership with ODOT TripCheck program.
Low Cost – Administrative and Staff Time
Estimated total cost - $14,000

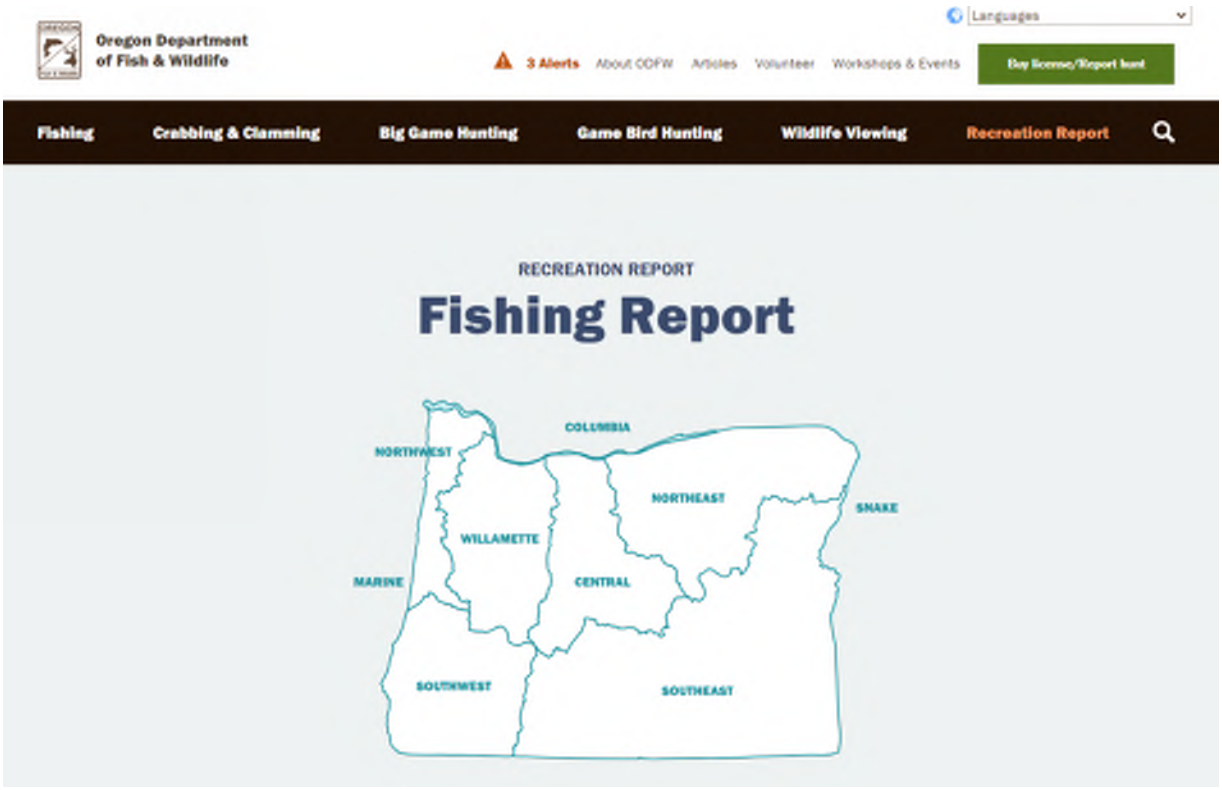
[17] Estimated cost for surveillance cameras based on Security Camera King "4MP Elite Series AI Traffic Enforcement Camera" (https://www.securitycameraking.com/product/4mp-elite-series-ai-traffic-enforcement-camera/?srsltid=AfmBOoqLwFotgalK14DVZabDB4VIMBB6BTkR-uKDKctcc_B72y0aZjudBA0).

3.3 SIWA HOTLINE

Option: Set up a hotline with a pre-recorded message playing information relevant to parking and traffic congestion at the SIWA. This option is similar to ODFW's shellfish safety hotline (see Figure 23). ODFW could post the hotline number on the SIWA web page and in any relevant social media posts.

Purpose: Provide another way for potential visitors to gain information on current conditions at the SIWA and make informed travel decisions.

Figure 23 – ODFW Fishing Report Web Page (Source: myodfw.com)



Pros:

- Potential capability to automate the notification system with standardized messages.
- ODFW already uses the hotline system for shellfish updates.
- Enables those interested to call at any time.

Cons:

- Requires ODFW staff time to monitor parking and traffic conditions and record messages as needed.
- To provide alerts based on traffic conditions, ODFW would need to implement additional options that allow it to gather real-time traffic data. Options that would facilitate this include camera detection, parking attendants, parking meters, smart parking sensors, and/or mobile device parking apps.
- Traffic conditions can change rapidly, making recorded messages obsolete quickly. Could result in frustration for potential visitors who feel that they have been misinformed.
- May be underutilized by potential visitors, especially if they are not aware that this resource exists. Potential visitors must know to call ODFW for the updates.

Cost Estimate:

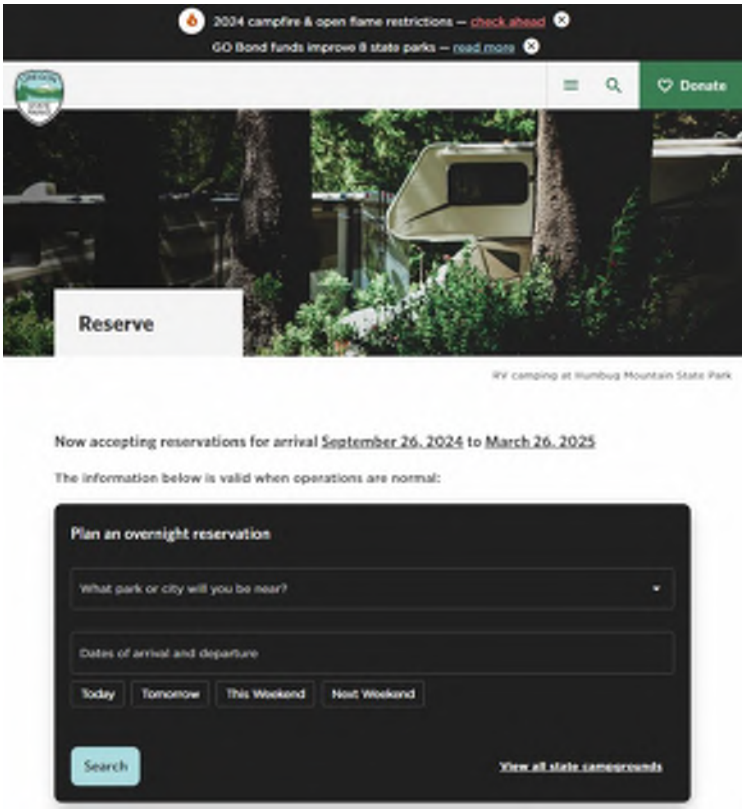
Low Cost – Administrative and Staff Time

3.4 ADVANCE RESERVATION SYSTEM

Option: Implement a visitor reservation system during a designated seasonal window (e.g. June through August). ODFW could allow a certain number of reservations to be made weeks or days ahead of a visit while holding some for "day of" reservations. ODFW could add the SIWA to the Oregon State Parks reservation website (https://stateparks.oregon.gov/index.cfm?do=reserve.make). Another potential site to facilitate reservations is Your Pass Now (https://yourpassnow.com/r1s/). ODFW could either provide reservations for free or charge a fee.

Purpose: Reduce traffic and parking congestion at the SIWA by requiring potential visitors to plan ahead by securing a reservation.

Figure 24 - Oregon State Parks Reservation System (Source: stateparks.oregon.gov)



Pros:

- Reduces "wasted" visitor trips to the SIWA (trips that end in visitors leaving without parking and getting out of their cars).
- Reduces traffic and parking congestion in the SIWA.
- Opportunity to partner with another state agency to simplify reservation system setup (see Figure 24).
- Potential to collect additional funds for ODFW. Additional funds could be used to cover the costs of parking management in the SIWA.
- Requiring reservations automatically limits the number of vehicles authorized to access the SIWA, reducing the need for traffic monitoring technology such as cameras, parking meters, mobile device parking apps, and smart parking sensors.

Cons:

- Possibility of unused reservations, especially if reservations are free.
- Requires enforcement of reservation system with either physical barriers (gated entry, for example), printed parking passes on dashboards, or ODFW staff checking reservations at an identified access point.
- Frustration for visitors who are unfamiliar with the new system and are denied access because they do not have a reservation.

Cost Estimate:

Low Cost – Administrative and Staff Time
Reservation System Cost – Minimal, assuming partnership with Oregon State Parks or other peer agencies that will share their experience and potential purchase/administrative costs.

3.5 SHUTTLE SERVICES

Option: Operate a shuttle service (see Figure 25 and Figure 26) during a designated seasonal window (e.g. June through August). The shuttle could run from the Gillihan Layover Terrace Parking Lot (and potentially other state-owned parking areas on the island since the Gillihan Layover Terrace Parking Lot has very limited capacity) to Warrior Rock and stop at points of interest along the route. Were ODFW to implement Park and Ride areas, the shuttle route could also include stops at these locations. ODFW could either buy and maintain its own vehicle or rent a vehicle for a few months of the year.

Purpose: Make it easier for visitors to access the SIWA by transit (TriMet Bus Route 16 has a stop near Gillihan Layover Terrace Parking Lot), allow visitors arriving by car to visit multiple points of interest while only needing to park once, and increase transportation options for visitors using potential Park and Ride lots.

Figure 25 – Potential Shuttle Routes and Stops (Source: DEA, TriMet)

Pros:

- Facilitates access to the SIWA by transit.
- Potentially reduces number of cars accessing and driving through the SIWA.
- ODFW may be able to reserve vans from OR Department of Administrative Services for a lower price than from other rental agencies.
- Compatible with all other options presented in this memo.
- Ability to operate for only the months when it is most needed, reducing year-round costs.

Cons:

- Expensive to maintain and operate.
- Gillihan Layover Terrace Parking Lot has limited parking spaces. Shuttle service alone (not implemented in tandem with other Park and Ride locations) would allow people using transit to access the beaches but would not accommodate many visitors who drive.
- Unpredictable demand, especially if not implemented in tandem with Park and Rides.
- May be difficult to accommodate large parties and beach gear.

- May be difficult to navigate larger vehicles (a bus for example) through tight areas, especially if ODFW chooses to implement traffic circles.
- May be impractical to operate smaller vehicles (a 12-passenger van, for example) if there are large numbers of people needing transport at once.
- Shuttle stopping points could slow down traffic if on the roadway or reduce the number of vehicle parking spaces if ODFW designates pull-out stops in parking areas.
- Heavy traffic on NW Reeder Road could negatively impact shuttle efficiency, reducing the number of round trips possible in a day, reducing cost effectiveness of the service, and causing uncertainty and frustration for shuttle passengers.

Figure 26 – Washington County Ride Connection Shuttle (Source: wikipedia.com)

Cost Estimate [18]:

Monthly Shuttle Operation Hours – 248 (Eight (8) hours per day for one (1) month)
12-Passenger Van Monthly Rental Fee - $390-$963
12-Passenger Van Fuel Capacity – 16 miles per gallon (highway)
Miles Travelled per Trip – 15 miles one way (Gillihan Layover Terrace Parking Lot to Warrior Rock)
Time per Trip – 30 minutes one way (Gillihan Layover Terrace Parking lot to Warrior Rock)
Total Trips per Day – Eight (8)
Cost per Gallon of Fuel – $4.42
Van Operator Pay - Low Cost – Administrative and Staff Time
Estimated Monthly Total Cost per Shuttle – $4,000

[18] Estimated van fuel capacity and average cost per gallon of fuel based on Oregon Department of Administrative Services daily rental cost calculator (https://www.oregon.gov/das/fleetpark/Documents/rates_flt_2325.pdf)**.**
Estimated van rental fee based on Oregon Department of Administrative Services long-term monthly rental fee for a 12-passenger van (https://www.oregon.gov/das/fleetpark/Documents/rates_flt_2325.pdf).

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3.6 PARK AND RIDE

Option: Use nearby parking areas already owned by the state and coordinate with managers of industrial locations and marinas south of Sauvie Island along Highway 30 to designate "Park and Ride" lots where SIWA visitors can park their vehicles and coordinate for other means of transportation to SIWA beaches (carpooling, for example).

Parking areas already owned by the state on Sauvie Island include (see Figure 27):

- Sauvie Island Wildlife Eastside Viewing parking area
- Bills Crossing parking area

Businesses and organizations with lots that could be used as Park and Ride locations include (see Figure 28):

- Columbia Farms U-Pick
- Delta Farms
- Bella Organic Farm
- Cracker Barrel Grocery
- Gillihan Layover Terrace Parking Lot
- Miller Truck Salvage
- Channel Island Marina
- Larson's Moorage
- Marina Way Moorage
- Multnomah Yacht Harbor
- Fred's Marina
- Knife River – Portland
- Owens Corning Trumbull Asphalt - Linnton
- St Birgitta Catholic Church

Purpose: Provide convenient alternatives and opportunities for SIWA visitors to coordinate transportation (other than personal vehicles) to desired locations.

Figure 27 – Potential Park and Ride Locations Already Owned by the State (Source: DEA)

Pros:

- Coordinating with managers of pre-existing lots reduces need to construct additional parking.
- Would partner well with a shuttle service.

- Businesses may see partnering with ODFW to provide parking as a potential benefit. Businesses could make extra money by charging a fee for parking spaces. They could also see an increase in visitors since beachgoers choosing to park in these lots may be more likely to stop in and buy something.
- Ability to coordinate Park and Ride locations for only the months when it is most needed, reducing year-round costs.
- Compatible with all other options presented in this memo.

Cons:

- Managers of pre-existing lots may be reluctant to share the space. This is especially true if busy times at the SIWA overlap with busy times for businesses/organizations ODFW wishes to partner with (St Birgitta Church, for example, likely needs all its parking spaces on Sundays).
- Visitors may be unwilling to use the park and ride if coordinating the final leg of the journey is too complicated/inconvenient.
- If paired with shuttle service, would increase the length (time, distance, and number of stops) of a round trip and reduce the number of round trips possible per day.

Figure 28 – Potential Business and Organization Park and Ride Locations (Source: DEA)

Cost Estimate [19]*:*

Monthly Parking Area Rental – $0-$205 per parking spot per month (depends on agreement with parking provider)

Estimated Monthly Total Cost (Average) – $14,000 per 100 parking spaces rented

[19] Estimated monthly cost per parking spot based on SpotHero average (https://spothero.com/city/monthly/portland-parking). This estimate is for downtown Portland, so it is possible that the areas suggested in this memo would cost less.

3.7 PARKING ATTENDANT

Option: Coordinate for ODFW staff or police cadets to direct parking operations (see Figure 29) in each SIWA parking area during a designated seasonal window (e.g. June through August). Each parking manager could communicate to an ODFW representative responsible for updating dynamic message boards, websites, social media posts, and hotline recordings with current parking conditions.

Purpose: Allow ODFW to monitor parking conditions so that it can update dynamic message boards, websites, social media posts, and hotline recordings accordingly and more efficiently direct visitors to parking locations with availability.

Pros:

- Improves parking efficiency compared to current system.
- Provides ODFW with parking data to facilitate dynamic message board, social media post, and hotline message updates.
- Provides a low-tech option. Reduces the need for surveillance cameras, parking meters, parking sensors, and/or mobile device parking apps.
- Facilitates parking fee collection and enforcement.
- Ability to coordinate parking attendant staffing for only the months when it is most needed, reducing year-round costs.
- Possible to implement in a single parking area (Willow Bar, for example) to see how traffic flow responds.

Figure 29 – Parking Attendant (Source: tracsisevents.com)

Cons:

- Requires ODFW or OSP staff to physically be in the parking lots.
- Potentially challenging to staff parking attendant positions consistently.
- Parking attendants may face hazardous conditions. Busy days at the SIWA are often the hottest, which could lead to heat injuries. The potential for conflict between parking attendants and beachgoers could also lead to staff injuries.

Cost Estimate:

Low Cost – Administrative and Staff Time

3.8 MOBILE DEVICE PARKING APPS

Option: Subscribe to a parking app service such as Parkable, Parking Pass, ParkMobile (see Figure 30), Parking Kitty, or Flash to help manage parking at the SIWA.

Figure 30 - ParkMobile App (Source: parkmobile.io)

Purpose: Allow visitors and potential visitors to monitor parking conditions from their phones and navigate more efficiently to locations with parking availability.

Pros:

- Parking management by an outside agent (a parking app service like ParkMobile) reduces burden on ODFW staff.
- Provides an efficient option to collect parking fees.
- Some apps allow potential visitors to view parking availability, which increases parking efficiency and can reduce unnecessary trips.
- Provides ODFW with parking data to facilitate dynamic message board, website, social media post, and hotline message updates.
- Does not require (but, if desired, could still be implemented with) parking attendants, smart parking meters, smart parking sensors, and/or mobile device parking apps to collect parking and traffic data.
- Possible to implement in a single parking area first (Willow Bar, for example) to see how traffic flow is impacted.
- May be possible to limit service subscriptions to a few months a year, reducing total cost.

Cons:

- This option would work best if the SIWA had clearly delineated parking spots.
- Requires visitors to have a smart phone and dependable cell service unless ODFW also provides onsite parking meters.
- Technology may detract from the feel of the rural setting.
- Requires regular enforcement to be effective.
- Technology may take time to learn to operate and maintain if not outsourced to a service-provider.
- Subscription to a service-provider for operation and maintenance adds a recurring fee to this option.

Cost Estimate [20]:

Monthly Parking Management Application Subscription Fee - $1,000
Estimated Monthly Total Cost – $1,000

[20] Estimated cost for monthly subscription to parking management apps and software based on ParkingPass website (https://www.parkingpass.com/#:~:text=Digital%20Parking%20Permit%20Management%20Software&text=Subscriptions%20starting%20as%20low%20as%20%24100%2Fmonth!).

3.9 PARKING METERS AND SOFTWARE

Option: Install smart parking meters (see Figure 31) with associated software in each parking area. An example of such service is ParkingBoxx (https://parkingboxx.com/smart-parking-meters).

Purpose: Allow ODFW to monitor parking conditions through product software so that it can update dynamic message boards, websites, social media posts, and hotline recordings accordingly and direct visitors to parking locations with availability more efficiently.

Figure 31 - Parking Meter (Source: parkingboxx.com)

Pros:

- Tracking parking utilization using a physical meter and software reduces burden on ODFW staff.
- Provides an option to collect parking fees efficiently.
- Provides ODFW with parking data to facilitate dynamic message board, website, social media post, and hotline message updates.
- Some product packages have the option to include an integrated phone app for an additional fee.
- Does not require (but, if desired, could still be implemented with) parking attendants, smart parking meters, smart parking sensors, and/or mobile device parking apps to collect parking and traffic data.
- Possible to implement in a single parking area first (Willow Bar, for example) to see how traffic flow responds.

Cons:

- This option would work best if the SIWA had clearly delineated parking spots.
- Potential for vandalization and tampering.
- Purchase and maintenance of parking meters can be expensive.
- Technology may detract from the feel of the rural setting.
- Requires regular enforcement to be effective.
- Technology may take time to learn to operate and maintain if not outsourced to a service-provider.
- Subscription to a service-provider for operation and maintenance adds a recurring fee to this option.
- Parking meters are most useful during the busier times of year, making recurring year-round fees less desirable, especially if parking fees are in effect only during a three-month seasonal window.

Cost Estimate [21]*:*

Cost per Parking Meter - $7,150
Installation - $2,000 for first machine, $250 for each additional
Monthly Software Fee (5-Year Term) - $99
Transaction Fee – 35 cents per transaction
Monthly Integrated Phone App Fee - $49
Low Cost – Administrative and Staff Time
Parking Meters Needed (0.1 mile spacing) – 16

- Willow Bar Parking Area – One (1)
- Walton Beach Parking Area – Six (6)
- Collins Beach Parking Area – Eight (8)
- Warrior Rock Parking Area – One (1)

Estimated Total Installation/Hardware Cost – $121,000
Estimated Monthly Software Fee - $99 + $49 + (0.35 x # of Transactions) - $6,000

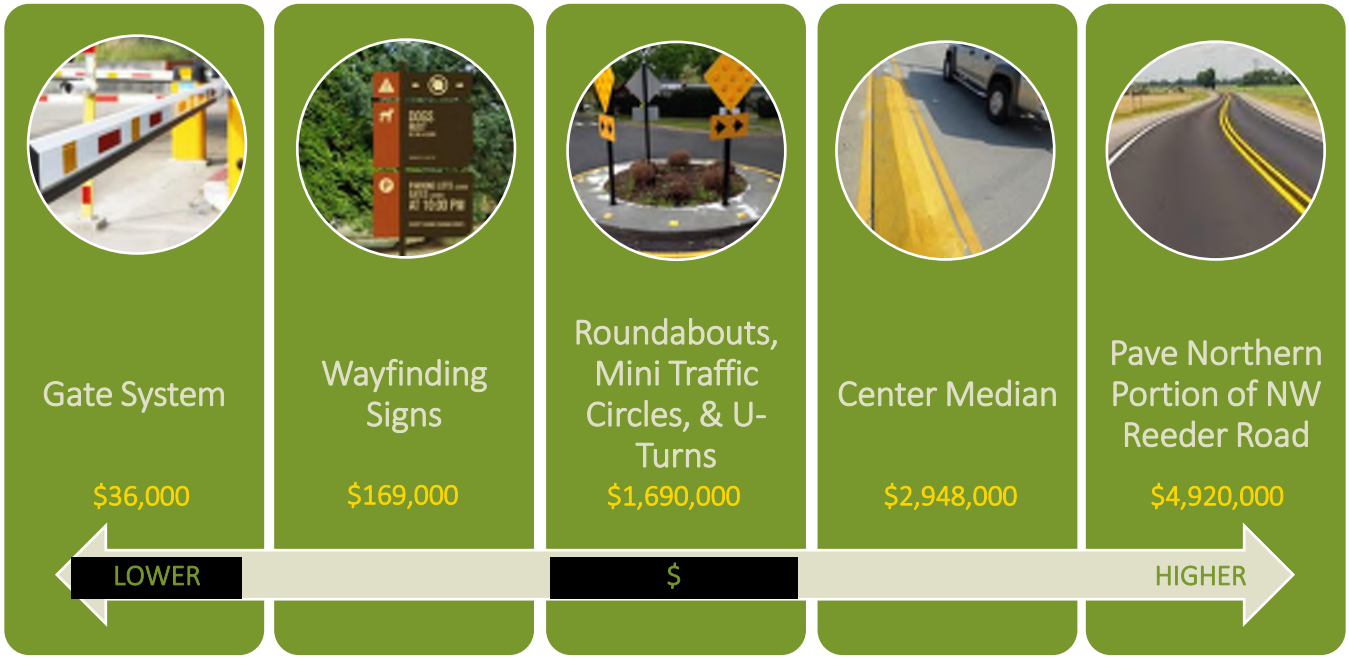
Estimated Total Cost Assuming 9,600 Transactions per Month - $127,000

[21]Estimated cost for parking meters and software based on ParkingBoxx "Smart Parking Meter" (https://store.parkingboxx.com/SMART-PARKING-METER-p429198826).

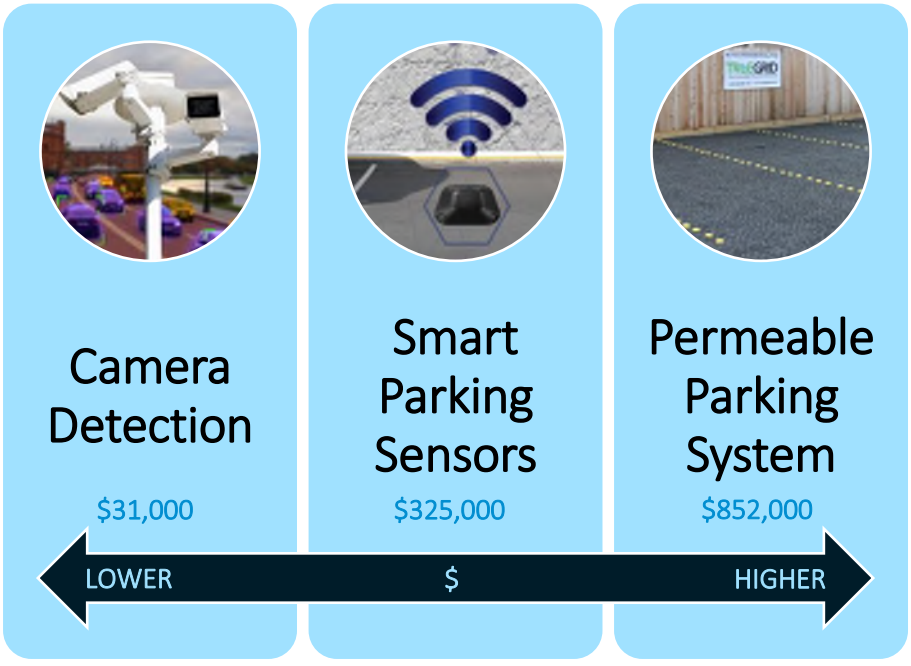
4 COST SUMMARY

A graphical summary of options ranging from low cost to high cost is presented below.

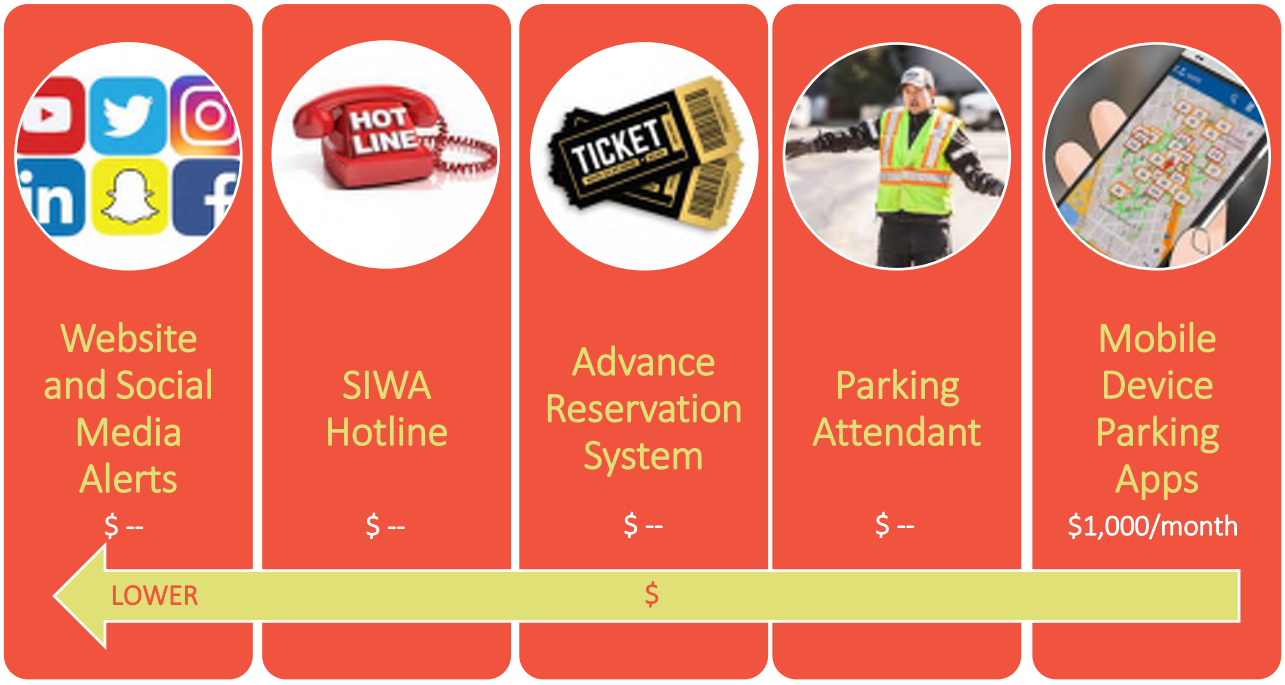
ROADWAY IMPROVEMENTS

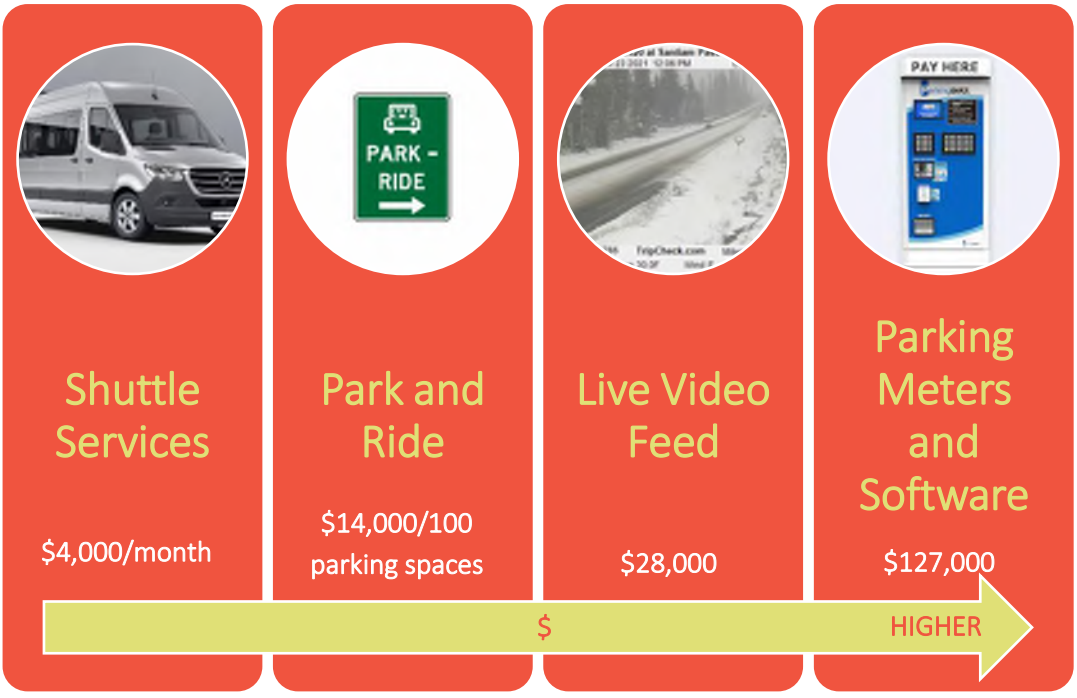


PARKING AREA IMPROVEMENTS



PARKING OPERATIONS IMPROVEMENTS





5 SUMMARY

The options described above range in cost from low to high and offer options that will prevent traffic congestion and better manage parking utilization in a proactive manner, as well as react to changing conditions as traffic congestion and parking demand increase. The following chart summarizes proposed options based on scales of high cost versus low cost as well as proactive versus reactive options:

Table 2- SIWA Traffic and Parking Management Options Summary (Source: DEA)

Relative Cost	Proactive Measures	Reactive Measures
Low Cost	Website and Social Media Alerts (Temperature)	Website and Social Media Alerts (Traffic)
	SIWA Hotline (Temperature)	SIWA Hotline (Traffic)
	Wayfinding and Informational Signage	Park and Ride
	Links to Live Video Feed	Parking Attendants
High Cost	Pave Northern Portion of NW Reeder Road	Gated Entry
	Roundabouts, Mini Traffic Circles, and U-Turns	Shuttle Services
	Roadway Median	Mobile Device Parking Apps
	Permeable Parking Pavers and Parking Stops	Parking Meters and Software
	Advance Reservation System	Camera Detection
		Smart Parking Sensors

The traffic and parking management options described in this memo will be discussed with ODFW staff. Once ODFW selects its preferred options, we recommend initiating a small-scale pilot program to be started in late Spring/early Summer 2025 to monitor traffic and parking conditions with some level of improvements. This will help the project team determine how the selected options are impacting parking and traffic conditions in the SIWA to best select and implement long-term solutions.

APPENDIX C:
SHORT- AND LONG-TERM SOLUTION PACKAGE SUMMARY

Sauvie Island Wildlife Area (SIWA) Traffic, Access, and Parking Study: Short- and Long-Term Solution Packages

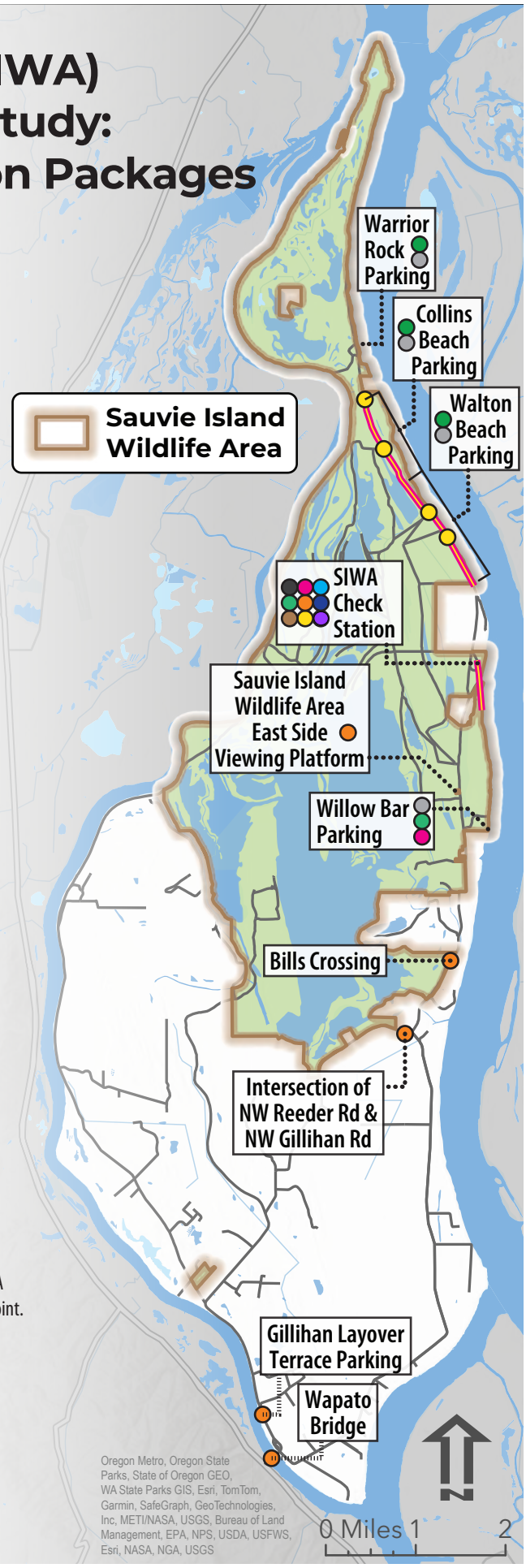
SIWA Traffic & Parking Solution	Solution Type: Short-Term (1 yr)			Long-Term (2+ yr)		
	Infrastructure	Operations	Technology	Infrastructure	Operations	Technology
Gated Entry	✓	✓		✓	✓	✓
Wayfinding & Informational Signage	✓	✓	✓	✓	✓	✓
Roundabouts, Mini Traffic Circles, U-Turns	✓			✓		
Permeable Parking Pavers with Parking Space Markers & Spots	✓			✓		
Website & SM** Alerts*		✓	✓		✓	✓
Link to Live Video Feed			✓			✓
Parking Attendant		✓			✓	
Mobile Parking Apps		✓	✓			
Parking Meters/Software		✓	✓		✓	✓
Roadway Median				✓		
SIWA Hotline*					✓	✓
Advance Reservation					✓	✓

*These solutions do not lend themselves well to placement on a map. They are shown at the SIWA entrance because it is assumed that staff members managing these systems will be located at this point.
** Social Media

Pilot Program

Improvements

- Infrastructure
- Operations
- Technology



APPENDIX D:
ROUNDABOUT CONCEPT

ROUNDABOUT DETAILS

Circulating Roadway Width:	16.0'
Inscribed Circle Diameter:	75.0'
Central Island Diameter:	43.0'

MOUNTABLE CENTRAL TRUCK APRON

NW Reeder Rd

REEDER ROAD

WILLOW BAR

12'

16'

0 20 40

GRAPHIC SCALE
1"=40'

WILLOW BAR COMPACT ROUNDABOUT

CONCEPTUAL
GEOMETRIC LAYOUT

10/10/24

APPENDIX E:
PARKING CAPACITY ESTIMATES

PARKING CAPACITY - WILLOW BAR

Parking Length: 153+(102x2)+39+70+41 = 507 feet
507 feet/10 feet per vehicle = **50 vehicles**

PARKING CAPACITY - WALTON BEACH

Parking Length: 2,758 feet
2,758 feet/10 feet per vehicle = **276 vehicles**

PARKING CAPACITY - COLLINS BEACH

Parking Length: 1,456+1,525+318+2,320= 5,619 feet
5,619 feet/10 feet per vehicle = **562 vehicles**

PARKING CAPACITY - WARRIOR ROCK

Parking Length: 89+68+47+87+104 = 395 feet
395 feet/10 feet per vehicle = **40 vehicles**