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National Park Service
U.S. Department of the Interior

Lewis and Clark National Historical Park
Astoria, Oregon



Fort Clatsop

Review of Summer 2005 Operations



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September 2005

REPORT DOCUMENTATION PAGE				<i>Form Approved OMB No. 0704-0188</i>	
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Report Notes and Acknowledgments

This evaluation was funded by the National Park Service Transportation Management Program under the Federal Highway Administration Federal Lands Highway Program.

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The Volpe project team wishes to acknowledge Chip Jenkins, Superintendent at Lewis and Clark National Historical Park, for his support and cooperation throughout the evaluation. We would also like to thank Pete Field, of the U.S. Department of Transportation Federal Highway Administration, for his assistance in providing data sources and his valuable feedback. In addition, we greatly appreciate the assistance of Glenda Miller, of Lewis and Clark National Historical Park, in providing data sources, and we would like to thank Sunset Empire Transportation District for their willingness to share data and their valuable insights. Finally, we would like to acknowledge the contributions of all the park staff and partners who provided feedback during the evaluation.

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Executive Summary

In 2005, Lewis and Clark National Historical Park celebrates the bicentennial of the winter encampment of the Lewis and Clark expedition at Fort Clatsop. In the summer of 2004 a number of changes in operations were made at Fort Clatsop in anticipation of a large increase in visitation during the Bicentennial. Key changes to systems operations included the opening of Netul Landing as the new gateway to Fort Clatsop; the seasonal closing of the two parking areas near the visitor center; the use of shuttle buses to transport visitors from Netul Landing to the fort, and the expansion of regional bus service to accommodate visitors coming from nearby communities.¹ The Volpe National Transportation Systems Center (Volpe Center) evaluated operations in 2004 and presented a set of recommended changes. With some minor variation, the park implemented these recommendations and requested a follow-on review during 2005.

The goal of this current evaluation is to assist the National Park Service (NPS) in assessing park operations, particularly in light of the changes made for the 2005 summer. NPS and its partners will use the findings from the evaluation to help inform decisions regarding operations for next summer.

A variety of data sources were used in this evaluation, including a site visit to Fort Clatsop in August 2005; qualitative interviews with partners, park staff, transit bus drivers and visitors; and other data collected by Fort Clatsop and its partners on visitation, parking access and transit ridership.

The key findings indicate that:

- Visitors continue to be very satisfied with their visit to Fort Clatsop
- The addition of a shuttle stop at Netul south enhanced the visitor experience
- Enabling tour buses to access the fort visitor center directly during off-peak hours enhanced the visitor experience
- While visitation increased substantially during the summer of 2005, regional transit use declined significantly
- As a result, parking capacity at Netul Landing was insufficient on a number of days throughout the summer, particularly during peak hours.

Based on these findings, the Volpe Center offers a set of recommendations for enhancing the overall visitor experience in 2006. In brief, some of the key recommendations include:

- Maintain the intra-park shuttle to preserve the natural environment near the fort replica.
- Consolidate regional transit service into one route based on the existing route to Fort Stevens (Clatsop route). This will reduce the operating cost of the transportation system, and will enable better focus of marketing efforts for transit.
- Allow tour buses to go directly to the Fort Clatsop visitor center at all times, with the existing tour bus reservation system being used to regulate the number of tour buses during peak periods.
- Maintain current staffing levels at Netul Landing to insure the continued successful management of the visitor experience and the transportation system
- Improve the Netul south shuttle stop by moving the handicapped parking spaces, and creating improved signage to mark the currently-used pickup area on the east side of the parking area.
- Develop a coordinated effort in the community to promote regional transit use.

¹ In 2004, a reservation system with timed tickets was also implemented, but was not successful. It was discontinued after the 2004 summer season.

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Introduction

Background

Fort Clatsop (FOCL) is located in northwest Oregon near the mouth of the Columbia River. It is at this site that the Lewis and Clark expedition built the fort where they spent the winter of 1805-06. In 2005 and 2006, Fort Clatsop celebrates the bicentennial of the Lewis and Clark expedition, with a number of signature events scheduled for November 2005.

Parking near the fort replica is limited, with approximately 55 spaces for cars, buses and recreational vehicles (RVs). Accordingly, an overflow parking area and other amenities were constructed at the River Day Use Area (RDUA), otherwise known as Netul Landing. According to the 2002 environmental assessment, purposes of the RDUA were as follows:

- “Reduce vehicular traffic, noise and local air pollution that currently detract from the desired visitor experience at FOCL
- Provide additional parking and linkage to the regional shuttle system
- Preserve viewsheds along the Lewis and Clark River
- Serve as an interpretive programs staging area
- Provide for visitor day use activities not currently available at FOCL
- Provide for a non-motorized pedestrian connection to link the RDUA to Fort Clatsop
- Expand visitor experience throughout FOCL.”

During the 2004 summer season, Fort Clatsop and its partners implemented a number of significant changes to operations in preparation for an expected large increase in visitation due to the bicentennial. These changes included: the implementation of a new ticket reservation system; the opening of Netul Landing as the new “gateway” to Fort Clatsop; the seasonal closing of the two parking areas near the visitor center and the fort replica during the summer months (June 14 – September 6); the use of an intra-park shuttle that transports visitors from Netul Landing to Fort Clatsop, and the addition of two new transit service routes to transport visitors from neighboring communities to Netul Landing.

During the summer of 2004, the park superintendent requested an evaluation of inaugural alternative transportation system (ATS) operations to identify what changes might be warranted to fine tune the concept of operations prior to 2005, when peak visitation from the bicentennial was anticipated. The U.S. DOT Volpe Center was asked to perform the review. Based on this review, changes for 2005 included the following:

- Discontinue the ticket reservation system,
- Improve parking access at Netul Landing for handicapped visitors
- Make targeted use of the parking areas near the visitor center for tour buses.

Evaluation Objectives

The National Park Service requested that the Volpe Center assist in an evaluation of 2005 operations at Fort Clatsop. The evaluation focuses on the following key questions:

1. Did the changes in operations from the 2004 to the 2005 season have the intended effect?
2. Are there operational adjustments, particularly with regard to the ATS, that might be necessary?

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Data Sources

Several data sources were used in the evaluation of overall park operations (including ATS regional and intra-park shuttle operations). Data sources include observations from a site visit to Fort Clatsop in early August 2005, and findings from qualitative interviews conducted with park staff, transit bus drivers, visitors and partners. Each of these data sources is described in more detail below.

Fort Clatsop Site Visit

A Volpe staff person visited Fort Clatsop on August 5-8, 2005. During the visit, qualitative interviews were conducted with park staff, transit bus drivers, and visitors, as well as some of the partners.¹ As part of the visit, the Volpe staff person observed the visitors' experience at Netul Landing (both Netul south and Netul north), at the visitor center, and at the site of the fort. In addition, the Volpe staff person rode the intra-park shuttle numerous times in order to observe operations and to gauge the visitor experience on the bus.

Qualitative Interviews

Qualitative interviews were conducted with park staff, bus drivers from Sunset Empire Transportation District (SETD), visitors, and partners. In this report, "park staff" refers to permanent park staff, seasonal park staff, interns from the Student Conservation Association (SCA), volunteers, and other staff at Fort Clatsop. Partners include representatives from Sunset Empire Transportation District, Pacific County Transit, American West Steamboat Company, Fort Stevens State Park, and Columbia River Maritime Museum. In addition, partners include staff from the Astoria Visitor Center and Astoria-Warrenton Chamber of Commerce, two locations where visitors could obtain information about their visit.

Discussion guides were developed for all the interviews in order to insure that key topics would be covered. However, the questions were intentionally designed to be very general and open-ended, so as not to lead the respondents. The objective of the qualitative interviews is to obtain different perspectives from a range of stakeholders in order to develop insight and understanding on system operations at Fort Clatsop. However, because of the small number of people interviewed and the non-random method of recruitment, the findings cannot be evaluated quantitatively, nor are they necessarily representative of each of the populations.

Additional Sources

Other data used in this report include:

- Visitor head count for summer 2005
- Transit ridership information
- Tour bus information
- Traffic counts for 2005 and prior years
- Information from the visitor sign-in book
- Bookstore sales

The Park

Fort Clatsop, now part of the Lewis and Clark National Historical Park, is located on Fort Clatsop Road in the outskirts of Astoria, Oregon. Astoria and neighboring communities are a popular tourist destination, as are the area campgrounds (e.g., Fort Stevens, KOA and Kampers West). The

¹ Additional qualitative interviews were conducted by phone after the on-site visit.

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main visitor attraction at Fort Clatsop is the fort replica, the site where Lewis and Clark spent the winter of 1805-6. Throughout the day, park staff dressed in traditional costume lead a variety of educational and historical programs and are on hand to answer visitors' questions. In addition to the fort replica, visitors can stroll the trails, view the canoe landing that overlooks the Lewis and Clark River, utilize the picnic area, and visit the many displays at the visitor center (which also includes a theater and gift shop).

For most of the year (September – June) visitors can access Fort Clatsop directly; from Fort Clatsop Road they turn onto a park road that winds gently up-hill for about half a mile and leads to a circular parking area adjacent to the visitor center. The site of the fort replica is only 100 yards from the visitor center. The parking area contains approximately 29 parking spaces, including 3 handicap spots. In addition, there is a second parking area off the park road (only a few hundred feet from the visitor center) that is used primarily for RVs and tour buses. During the summer months, from June 14 to September 5, the two parking areas near the visitor center are temporarily closed and visitors must start their visit at Netul Landing.

Netul Landing was built to be the new entryway or gateway to Fort Clatsop during the peak summer months (Figure 1). It is located along the Lewis and Clark River, approximately 1.25 miles south of the existing visitor center. Proposed development of the Netul Landing area included transit facilities (consisting of parking, shuttle shelter, restrooms and shuttle bus loading area), a day use and river access area, and a foot trail connecting Netul Landing and the visitor center. To date, the transit facilities have been constructed, but it is expected that a picnic shelter/south restroom and the foot trail to the fort will be completed by November 2005. Visitors can park at Netul Landing (though parking is limited), or during the summer months they can arrive at Netul using the local transit service (the following section of the report discusses the ATS service in more detail).

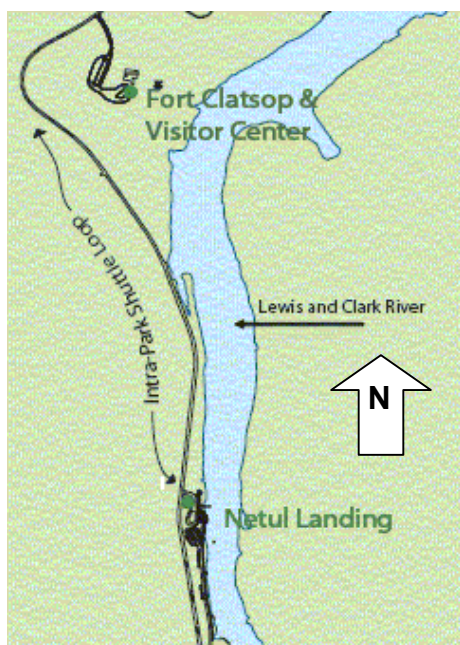


Figure 1 Fort Clatsop and Netul Landing

Ideally, Netul Landing will enhance the visitor experience in a number of different ways. First, in combination with the shuttle service, Netul helps disperse visitation at the fort and results in less overall crowding. Second, with the opening of Netul Landing and the closing of the parking areas

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near the fort, a more peaceful ambience can be created around the fort and visitor center area. The lack of traffic congestion at the fort enhances the visitor experience while also making it a safer environment for visitors.

Netul Landing also provides a place to orient visitors. All visitors arriving at Netul are greeted by park staff and must receive a brief orientation before they can board the shuttle for their visit to the fort. The one exception is that tour groups arriving during off-peak hours (either before 11 am or after 3 pm) can bypass Netul Landing and park in the secondary parking area near the visitor center. The orientation provides general information about the different sites that visitors can enjoy (such as the fort, the canoe landing, the visitor center, and the gift shop); safety requirements (to stay on the trail); the fees; and the need to purchase an entry ticket in order to board the bus for the return trip. The orientation was made mandatory so that all visitors would be sure to hear the safety information and would be aware of the fees associated with their visit. In addition to the orientation, there are a number of informative panels on the walls of the shelter, where visitors can learn more about the Lewis and Clark expedition.

In addition to its role as the new gateway to Fort Clatsop, Netul Landing has appeal as an independent day use area. Netul offers scenic views of the river, with wood pilings that rise from the river (remnants of the logging industry that flourished in the area). The landscape, abundant with native plants, serves to enhance the visitors' experience, as does the opportunity to view birds and other wildlife. Moreover, the canoe landing at Netul south enables visitors to enjoy canoeing and kayaking from the site. Netul will become an even more attractive destination with the construction of the picnic shelter/south restroom and the completion of the Netul River and the Fort-to-Sea trail.

The parking area at Netul contains a total of 76 marked spaces, with space for recreational vehicles (RVs) at the south end of the parking area. A gravel area in the south parking area was used as an overflow parking area, bringing the total capacity at Netul Landing to approximately 95 spaces. The configuration of the parking area – long (one quarter of a mile) and narrow – is largely the result of geographic and ecological constraints. On one side of the parking area is the river and on the other side is Fort Clatsop Road. In addition, there is a salmon-rearing habitat located near the front parking area.¹ Visitors arriving in their vehicles pass the shuttle bus shelter at Netul and drive about a quarter of a mile before reaching the entrance to the visitor parking area. Transit and tour buses have a separate entrance near the shelter at Netul, where they can loop around to drop-off and pick-up visitors.

Visitation

Prior to 2004, visitation was estimated via vehicle counts and assumed occupancy factors. Starting with the 2004 summer season, actual head counts were taken at Netul Landing. Although it is difficult to compare 2004 and prior years, visitation to Fort Clatsop does appear to have increased approximately 18% between 2004 and 2005, with a 13% increase during July. During peak visitation (the first half of August) the park averaged 750 visitors per day. Appendix A gives detailed visitation numbers, and Appendix B gives traffic counts.

Likely Changes in Conditions in 2006

There are several changes in conditions that will affect visitation and that will need to be considered in planning for future park operations. These changes include:

¹ In the original design the front parking area was significantly larger. The salmon-rearing habitat was discovered during construction, so the north parking area was scaled back and parking spaces added to the south parking area.

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- The park Bicentennial will be over
- The regional designation (LEWI vs. FOCL) may make the site more attractive
- Netul River trail and Fort to Sea trail will be complete

The end of the Bicentennial will likely mean a decrease in visitation, as anecdotal evidence suggests that a fair number of visitors were making the trip to Fort Clatsop due to the bicentennial. However, the new designation of Fort Clatsop as part of the Lewis and Clark National Historical Park may make the site more attractive and will increase the national visibility of Fort Clatsop.¹ The net result of these two changes, then, is that visitation from outside the area may increase slightly in the summer of 2006, but it is unlikely to increase dramatically under prevailing conditions.²

In addition, the Netul River trail and the Fort-to-Sea trail (Figure 2) are scheduled to be completed in November 2005, and it is expected that these new trails will alter the nature of a visit to Fort Clatsop. Visitors who chose to hike to the Fort on the Netul River trail (or to hike to Sunset Beach) will stay at the park longer, thus creating an additional strain on parking. With the construction of new picnic shelters and toilet facilities at Netul south, it is possible that the duration of visits also will be extended due to picnicking by visitors.

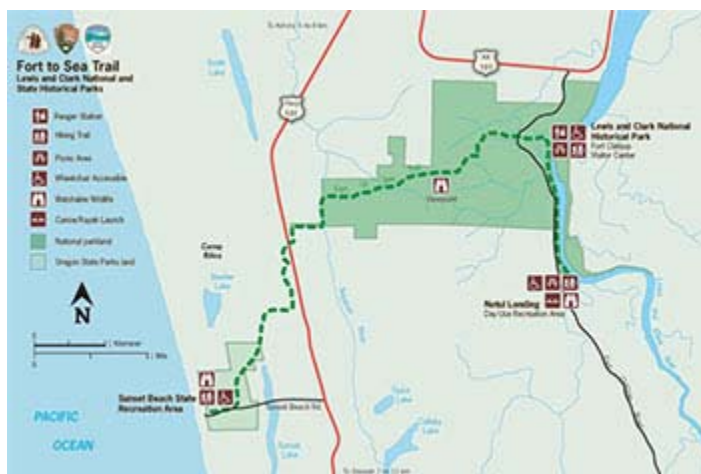


Figure 2 Fort to Sea Trail

The Alternative Transportation System

Sunset Empire Transportation District operates both the intra-park shuttle service from Netul Landing to the fort, as well as the regional transit service from neighboring communities to the Netul Landing. At any given time, a maximum of four buses – the “Explorer Shuttles” – are utilized. The buses are attractively designed with a Lewis and Clark bus wrap. The intent is to appeal to visitors by making the buses more “fun,” and to differentiate the service from other local transit buses. The buses have 40 seats and are front-loading, with a wheel chair lift located in the middle

¹ In November 2004, the Lewis and Clark National Historical Park (LEWI) was created, incorporating Fort Clatsop National Memorial, along with several state parks in Oregon and Washington (including Fort Stevens, Ecola State Park, and Cape Disappointment State Park).

² As stated in the 2004 Evaluation of Operations at Fort Clatsop, the hotels and campgrounds in the area are already at 90%-95% capacity during the summer months, which limits the number of additional visitors that can be accommodated from outside the area.

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of the bus. Sunset Empire has recently acquired two low floor ultra-quiet buses, but use of the new buses began in mid-August 2005 for the intra-park shuttle, hence are not reflected in this review.

The regional transit service provided by Sunset Empire Transportation District includes two regional bus routes, the Astor and Clatsop routes (Figure 3), which operate seven days a week during the summer months only. One bus is used for each the routes with hourly service at each of the stops. For both regional transit routes, visitors are dropped off at Netul Landing, where they receive their orientation before boarding the intra-park shuttle to the fort.

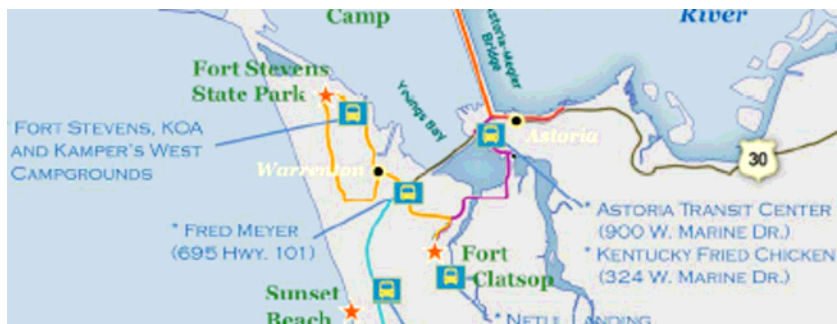


Figure 3 Astor and Clatsop Routes

The Astor route (shown in purple on Figure 3), approximately 9 miles, loops from the Astoria Transit Center in downtown Astoria to Netul Landing, with two stops in Astoria: the Train Depot and the Kentucky Fried Chicken.¹ The first bus of the day departs from the Astoria Transit Center at 8:40 am, with a scheduled arrival at Fort Clatsop at 9:00am, just as the park is opening. The Astor route bus makes its final run of the day from Netul Landing at 6:15 pm. The Clatsop route (shown in orange on Figure 3), approximately 10 miles, includes stops at Fred Meyer (a shopping plaza located in Warrenton), approximately 2 miles from the park), Fort Stevens Museum, and three area campgrounds: Fort Stevens, Kampers West, and KOA. The Clatsop route begins at the Kampers West campground at 8:40 am, arriving at Fort Clatsop at 9:15 am. The final run of the day departs from Netul Landing at 6:25 pm each day.

Sunset Empire also partnered with Pacific County Transit, which provides transit service from Long Beach and Ilwaco (in Washington) to Astoria, where visitors can then access transit to Fort Clatsop. In addition to the year round service Pacific County Transit provides to Astoria (four round trips daily, Monday through Friday), Pacific County Transit received funding to operate the following service during the 2004 and 2005 summer:

- Weekend service to Astoria (five round-trips on Saturday and Sunday)
- Service from Port of Ilwaco to Cape Disappointment (seven days a week)

The intra-park shuttle (designated as Netul A and Netul B) provides service from Netul Landing to the site of the fort. During the off peak hours (9:00am-11:10am and 4:20pm – 6 pm) a single shuttle drives the 2 mile trip from Netul to the fort, with bus departures every 20 minutes. During peak hours, the addition of another shuttle on the route enables buses to depart every 15 minutes. From Netul Landing, the shuttle travels to the fort, stopping at the southern end of the visitor center

¹ The bus service stops at the Train Depot on Friday through Monday only, as train service from Portland to Astoria is limited to those days.

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parking area at a wooden gate, through which visitors have direct access to the fort replica via a footpath. All passengers are required to de-board at the wooden gate.

The bus then drives ahead approximately 50 feet before stopping directly in front of the visitor center. At this stop, passengers who wish to return to the parking area at Netul Landing board the bus. Upon departing from the visitor center, the shuttle drives to Netul south, where it loops around the far parking area and makes a stop, dropping off visitors who are parked in or near the south parking area, and picking up visitors who are just arriving for their visit. From Netul south, the shuttle turns onto Fort Clatsop Road and enters Netul north via the bus loop. At this location, everyone de-boards. Visitors who have completed their visit can return to their cars (or wait for the connecting regional transit bus), and newly arrived passengers de-board in order to hear the orientation (unless they are handicapped, in which case, they are allowed to stay on the bus). Table 1 summarizes the Fort Clatsop routes operated by Sunset Empire.

Table 1
Transit Routes to Fort Clatsop

Route	From-To	Headway	Buses Used
Astor	Astoria – Netul Landing	1 hour	1
Clatsop	Fort Stevens – Netul Landing	1 hour	1
Netul A & B	Netul Landing – Visitor Center	15 – 20 minutes	1 – 2

Table 2 presents several indicators of transit route service and ridership, including bus hours/week and bus miles/week (a measure of the service provided), as well as riders / week, riders / bus hour and riders / bus trip. In 2004, a third regional route, the Column, ran from Astoria to Fort Clatsop.

Table 2
Transit Service Provided and Ridership

		2005			2004			
		ASTOR	CLATSOP	NETUL	ASTOR	CLATSOP	COLUMN	NETUL
Service Provided ¹	Hours/Week	70	70	112	77	63	29	77
	Miles/Week	1300	1900	900	1428	1694	332	1389
	Departures/Week	140	140	462	154	161	32	378
Riders / Week	6/13-7/3	171	83	7397	338	527	147	7528
	7/4-7/31	176	161	10358	659	678	227	9693
	8/1-8/13	210	262	8988	775	741	274	9332
Riders / Bus Hour	6/13-7/3	2.4	1.2	66.0	4.4	8.4	5.1	97.8
	7/4-7/31	2.5	2.3	92.5	8.6	10.8	7.8	125.9
	8/1-8/13	3.0	3.7	80.3	10.1	11.8	9.4	121.2
Riders / Bus Trip	6/13-7/3	1.2	0.6	16.0	2.2	3.3	4.6	19.9
	7/4-7/31	1.3	1.2	22.4	4.3	4.2	7.1	25.6
	8/1-8/13	1.5	1.9	19.5	5.0	4.6	8.5	24.7

¹ Items were estimated from examination of transit service schedules. Miles and hours may be somewhat different from the miles and hours that are used for cost analysis.

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While ridership on the Clatsop route was more-or-less constant for each day of the week (see Appendix C for details), ridership on the Astor route was significantly higher Friday-Monday, the days that train service was available from Portland to Astoria. This suggests that a significant proportion of Astor route riders were train passengers. With the end of the Bicentennial celebration, the train service from Portland to Astoria will be terminated, and as a result, there may be significantly fewer visitors using the Astor bus route.

Mode Split

Mode split (percentage of visitors using regional transit versus percentage of visitors driving) for the regional routes declined significantly in 2005, from approximately 11% in 2004 to approximately 3% in 2005. Similar to the 2004 evaluation, our rough estimate of mode split is based on the following:

- For public transit, assume that 2/3 of the riders on the Clatsop and Astor routes used them to go to Fort Clatsop. Therefore, the transit ridership is 2/3 of 1/2 of the total one-way ridership figures.
- For tour bus and other, make an estimate based on data from 2002 and 2003.
- The Netul total count is the total count at Netul, plus (for 2005) an estimate of tour bus passengers bypassing Netul.

Table 3
Mode Split

	2005			2004		
	7/14-8/13	Daily Persons	Percent	7/15-8/14	Daily Persons	Percent
Public Transit	720	23	3%	2623	85	11%
Private Auto	23359	754	89%	18173	586	79%
Tour Bus	2200	71	8%	2200	71	10%
Total	26279	848	100%	22996	742	100%

In 2004, the local chamber of commerce and visitor centers instructed visitors that they had to take the bus to the fort, as there was no parking at Fort Clatsop. This strong promotion of transit, in combination with the ticket reservation system, served to boost transit use, accounting for the 11% mode share. However, the relatively high mode share for transit came with a price; many visitors arriving at Netul by transit were upset upon discovering that there was parking at Netul (contrary to what they were told). In 2005, visitors were no longer told that there was no parking at Fort Clatsop; the message being communicated to visitors (on the LEWI web site) was that the parking area is full during peak hours so that visitors should take public transit. However, the on-site visit revealed that the community partners did not convey a consistent, strong message encouraging transit use during peak hours.

Impacts of the ATS

The infrastructure at Fort Clatsop (i.e. the roadways and parking areas) accommodates a limited number of visitors. As described earlier, with the introduction of the ATS, the two parking areas near the visitor center are temporarily closed during the summer months, and visitors must ride the intra-park shuttle from Netul to the fort.

Without the ATS, there would have been three major differences in the environment at Fort Clatsop:

- No usage of Netul Landing
- Significant usage of the parking areas near the visitor center
- No Netul shuttle or regional service to Netul Landing.

Impacts of the ATS are evaluated via the following metrics:

- Noise and local air quality
- Regional air quality
- Land Use (e.g. how much land is paved, unendorsed parking)
- Visitor Experience

Noise and Local Air Quality

Prior to 2004 (before the shuttle service was introduced), on a peak summer day, the parking area would fill up and cars would park on the grass shoulder along the road that leads to the fort and visitor center. In addition, cars would continually circle, waiting for a parking space to open up. With the introduction of the ATS, a single bus, arriving approximately every 15 minutes, has replaced the 55 or more cars that were previously allowed to park near the fort. Overall, the buses result in less noise at the fort. Although their engines can be heard from the site of the fort, the bus drivers try to minimize the impact of this noise by turning off the engines when there is a layover at the visitor center. The introduction of the new, ultra-quiet buses (which occurred in mid-August 2005) further reduced the noise level at the site of the fort; the new buses are not heard at the fort replica or inside the visitor center. In addition, the ATS also contributes to a reduction in air pollutants, when compared to emissions from the many cars that would otherwise be permitted in the visitor center parking area.

Regional Air Quality

Given the low ridership on the regional transit routes, the ATS has had virtually no impact on regional air quality.

Land Use

By closing the parking areas at the visitor center, the park is able to better preserve the natural environment in and around the site of the fort. When visitors had access to parking at the visitor center, there were many times during peak visitation in the summer, when visitors would park in undesignated areas along the side of the road. This results in damage to the natural vegetation. The park's commitment to the use of intra-park shuttles helps preserve the natural landscape of the park. The construction of additional parking at the visitor center to accommodate the growing number of visitors to the park would require the removal of dense forest, resulting in severe physical impacts to the environment. The existence of wetlands near the fort also limits the extent to which the land could be used to accommodate additional parking.

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Visitor Experience

Visitor experience is assessed through the on-site visit and the qualitative interviews. Interviews with visitors reveal that they continue to enjoy their experience at Fort Clatsop. When visitors were intercepted after their visit and asked to assess their experience, all visitors said they had a very positive experience. They mentioned the ranger interpretation at the fort replica and the displays at the visitor center as contributing to a very enjoyable visit.

Park staff, local partners and bus drivers all agreed that the discontinuation of the ticket reservation system has eased the process of visiting Fort Clatsop and has resulted in fewer visitor complaints. As one ranger reported, last year there were an average of 3-4 written complaints per day, many of which focused on problems with the ticket reservation system. This year, however, there have been only 2-3 written complaints in a month. Stakeholders commented that the operation worked more smoothly this summer, thanks in large part to the discontinuation of the ticket reservation system. One ranger also noted that this maybe due to more effective communication as well; that is, park staff has gotten better at explaining the process to visitors.

In addition, the introduction of shuttle access at Netul south has addressed the problem that some visitors (particularly the elderly and physically handicapped) had with the long walk from Netul south to Netul north. Finally, during the 2004 summer season complaints were received from a smaller number of visitors about the fee that Parks Pass holders were being charged to visit the fort (a \$4 fee at the beginning of the summer, which was later reduced to \$2). In 2005, Parks Pass holders (and anyone in their group) were not charged a fee, as is the norm in most national parks, and so this was no longer a source of discontent among visitors.

The following sections describe the visitor experience with regard to four different aspects of the visit to Fort Clatsop: Netul Landing; Netul North; Netul Landing: Signage and Parking; Tour Buses; and Transit Service. Each of the following sections also includes a brief set of recommendations for ways to enhance the visitor experience.

Netul Landing: Netul North

Overall, the visitor experience at Netul Landing, the new gateway to Fort Clatsop, is a positive one. Visitors appeared to enjoy the informative panels located in the shelter, as well as the landscaping and the scenic views offered by the river. The park staff reported that some of the most frequently asked questions at Netul concerned the purpose of the wood pilings in the river and the names of the flowers located around the shelter (along with questions about the shuttle service). In addition, there is ample space at Netul for visitors to wander about, so overcrowding is not an issue (at current visitation levels).

The success of operations at Netul Landing is largely due to the role that park staff and the SCA interns play in welcoming visitors and in managing parking and the shuttle system. During off-peak hours, two park staff members are assigned to Netul Landing – one to welcome visitors and one to provide the orientation. During peak hours, an additional person usually joins the two who are already stationed at the shelter at Netul Landing, and another person is assigned to direct and manage incoming traffic at the entrance to the park at Netul south (this will be discussed in greater detail in the following section on parking). Netul Landing is a labor-intensive operation, and during peak hours in particular, the success of the site is dependent on the effectiveness of the park staff.

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One of the key functions of the park staff is to address visitors' questions regarding the visit process, and in particular the shuttle system. Similar to 2004, qualitative interviews with park staff and visitors indicate that many visitors were arriving at Netul Landing confused about where they were and the process of visiting the fort. As some park staff related, visitors often arrived at Netul asking, "Is this the fort?" The park staff set the tone of the visit by greeting every incoming group of visitors to describe the visit process and to explain the reason for the shuttle system (to those visitors questioning the need for the service). The park staff also must insure that the orientations are performed on schedule and that all visitors receive an orientation. The use of professional, knowledgeable staff at Netul is essential to insure that the needs of the visitors are being met.

According to park staff, Netul Landing is the most difficult work assignment at Fort Clatsop, as the park staff at Netul bear the brunt of visitors' complaints. While all the park staff agreed that there are significantly fewer complaints this summer, there are still a number of visitors who are upset upon learning that they have to ride a shuttle to visit the fort. In particular, returning visitors, who recall being able to park at the fort, are the ones most annoyed by the change in operations. Given that this was only the second season of shuttle operations, it is not surprising that there continues to be some resistance among returning visitors. However, it is anticipated that the number of complaints about having to ride the shuttle will decrease as the number of visitors with previous experience on the shuttle increases. That is, over time, the shuttle system will become more widely accepted as part of park operations.

During off-peak hours visitors were able to board a shuttle bus within 15 minutes of their arrival; however during peak hours (11 am – 3 pm), Netul Landing becomes extremely busy; it is not unusual for a shuttle to fill up, and for visitors to have to wait for the next shuttle. While some visitors were annoyed at the wait, most seem to take it in stride. Park staff reported that visitors became frustrated if they arrived at the shelter just as the orientation finished and people were boarding the bus. Since they had not received the orientation, these newly arriving visitors were not allowed on the bus, even if there was space available.

The park staff at Netul Landing is also critical in managing the transportation system. In particular, effective management is critical when tour buses arrive at Netul, and an additional 40 or more tour group visitors require shuttle service to the fort. During peak hours, the park staff is also responsible for maintaining the "poker chip" system. The park implemented this system as a means for tracking the visitors boarding each bus. Each shuttle bus departing from Netul Landing is assigned a particular color – blue, orange, green, or yellow. For example, the bus departing at 11:25 is orange, the 11:40 bus is green and the 11:55 bus is yellow. To know the color assignment for any given bus, the park staff simply refers to the "Netul Landing Daily Sheet," which shows the departure time for each bus as well as its color assignment (the main purpose of the daily sheet is to record the number of adults, youth and infants who board each bus). As visitors approach the shelter at Netul north, the "welcome" staff person gives them the color chip for the next bus. Once 40 chips have been distributed (the capacity of the bus), the park staff begins handing out the color chip assigned to the next bus. As the visitors board the bus, they hand in their chips.

The park staff feels that the poker chip system works well. As one person related, the visitors like having something they can hold onto, something tangible that assures them they have a seat on the bus, whether it is the current bus or the next bus. During the on-site evaluation, it was observed that the chips also served as an ice-breaker, a source of jokes between park staff and the visitors.

Other improvements to Netul Landing since 2004 have enhanced the visitor experience. These include:

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- Large sandwich boards with the name of the route, the scheduled stops, and the time at which the bus departs (i.e. :25 after the hour) now marks the spot where visitors should wait for the regional buses.
- The addition of a glass-enclosed case placed on the south side of the shelter provides important information and was widely used by visitors.
- Bus drivers turn off the bus engines while the ranger is giving the orientation, so that the visitors do not have trouble hearing (if the bus driver needs to leave in order to stay on schedule, however, he or she will start the engines as a cue to the ranger to wrap up the orientation).

Recommendations: Netul Landing (Netul North)

- Maintain current staffing levels at Netul Landing to insure the continued successful management of the visitor experience and the transportation system
- Move the glass-enclosed case on the north side to join the existing case on the south side, where it is more likely to be seen by visitors
- Add one or two more benches to provide additional seating

Netul Landing: Signage and Parking

Signage in the surrounding communities directing visitors to the parking area at Netul Landing is quite good; signs are large and easy to read. In qualitative interviews, several visitors noted that they had simply followed the signs to the parking area and had no trouble finding Fort Clatsop. Only one couple were confused by a sign in Warrenton directing visitors to the Lewis and Clark National Historical Park. They did not make the appropriate turn because the sign did not mention Fort Clatsop, and the couple was unaware that Fort Clatsop was now part of the Lewis and Clark National Historical Park.¹

Signage at the entrance to the parking area at Netul Landing (Netul south), however, is a problem. While efforts were made to improve the signage at Netul south many park staff complained that the new signage is confusing. The new signage says “Netul North” and “Netul South” and relies on pictures to convey information, but park staff indicated that the pictures are not particularly meaningful to visitors. As one ranger commented, “people stop to read the sign and then they still don’t know what to do.” In addition, one of the new signs (“Welcome to Netul South”) is located behind a parking spot, so if the spot is occupied by a vehicle (as is often the case during peak hours), the sign is not clearly visible.

During off-peak hours, parking at Netul Landing is generally sufficient for the number of visitors arriving at the park. However, during peak hours of visitation, the traffic volume increases significantly, and there are numerous times when the parking area is full. The increase in visitation (over 10%) since last summer and the decreased use of regional transit have combined to place greater stress on the parking at Netul.

During peak hours a park staff person is assigned to monitor traffic in the south parking area. This “traffic director” must perform several tasks at the same time:

¹ Other signage in the community and closer to Fort Clatsop includes references to both LEWI and Fort Clatsop.

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- **Inform incoming visitors of parking conditions and availability:** as visitors enter the parking area in their cars and see the traffic director, many will roll down their windows and immediately seek information on where to proceed.
- **Monitor the departure of visitors:** if cars are leaving from the north area, the traffic director then directs new arrivals to those parking spots
- **Insure that cars are properly parking in the overflow parking area:** if drivers are not told where to park in the overflow parking, they tend to park in a haphazard fashion, making inefficient use of the available space.

The traffic director's task is somewhat complicated by the fact that he or she does not have a full view of the entire parking area at Netul. The traffic director stands at Netul south, at the entrance to the parking area, but from this spot it is not possible to see if there is parking available in the north area. If the traffic director is uncertain about parking availability at Netul north, he or she will tell visitors to circle around the north area and take the closest available parking spot. Generally, the traffic director assigned to the south area has a radio, so they can communicate with the park staff at the north end of Netul. The park staff at the shelter can accurately inform the traffic director about parking conditions at the north area. During the on-site visit, there was an occasion when the traffic director did not have a radio, and this made the job significantly more challenging. In addition, the traffic director has access to a bicycle and can quickly ride to north Netul to determine parking availability (though the traffic director is too busy to use the bicycle during peak visitation hours).

When the parking area is full, park staff indicated that they tell visitors to either return during off-peak hours or to take regional transit service from the neighboring communities. However, the park staff do their best to find parking for everyone who arrives. If a park staff-person sees that visitors are preparing to leave, he or she will tell newly arriving visitors to wait a moment for the space.

Park staff who work at Netul south agrees that it is a difficult job, and one park staff referred to it as a "law enforcement position." Given the physical demands of the traffic director assignment (i.e. constant standing in the direct sun), not all park staff is able to perform the job. Moreover, in addition to managing parking and traffic, the traffic director is now the visitors' first point of contact at the park. Many visitors arrive not knowing what to do or where to go, and as previously described previously in the report, the signage at the south area confuses more than it clarifies. While some visitors will simply drive in without stopping to ask questions, others are confused and seek information from the traffic director. Visitors who are upset to learn that they have to take a shuttle to visit the fort (about a handful each day) will vent their frustration with the traffic director.

The increased volume of cars at Netul, especially during peak visitation hours, results in a number of problems, as observed during the on-site visit. These include:

- Cars (2-3 at a time) are lined up on Fort Clatsop Road, awaiting entry into the parking area. This creates a potential safety hazard for other vehicles traveling on the road.
- RV spots in the south area fill up.
- Cars occupy RV spots (i.e. some visitors are able to escape the watchful eye of the traffic director and park where they should not).
- Due to the full parking in the south area, the intra-park shuttle has limited maneuverability as it loops around the south area to drop off and pick up visitors.

As previously stated, the addition of the Netul River trail and the Fort to Sea trail (Figure 2) will create an additional strain on parking in 2006 due to the longer length of stay. One way to offset the reduced turnover in parking is to increase transit ridership. If the number of visitors arriving on

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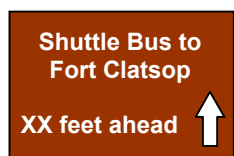
the regional bus increases, this will reduce the pressure on parking. Volpe conducted an analysis (Appendix D) to determine the level of transit ridership needed to offset the decreased turnover at the park due to the new trails. Depending on the fraction of visitors using the new Netul River and Fort-to-Sea trail (scenarios ranged from between 20% to 30% for the Netul River trail and from between 5% to 15% for the Fort-to-Sea trail), between 67 and 157 visitors will need to shift from automobile to regional transit in order to keep parking occupancy at 2005 levels. If this shift in transit does not occur, and visitation remains the same, one can expect that the parking problems mentioned above will become more severe in 2006 than they were in 2005.

Recommendations: Parking at Netul

- Promote regional transit use more aggressively, as this presents a feasible means for reducing the demand for parking at Netul Landing. Increasing ridership on the regional transit service will also serve to offset the decrease in parking turnover likely to result from the Netul River and Fort-to-Sea trails.
- Improve signage at Netul south in order to move visitors into the park more efficiently. The key information that needs to be conveyed to visitors upon entry to Netul Landing (as simply and clearly as possible) is where to park. Consider replacing the current signs at the entrance with the following¹:



Once parked, the visitors need information on where to proceed. For visitors who find parking in the north area, it is obvious that they should proceed to the shelter. However, for visitors who park at or near the south area, signage is required. One sign at Netul south and one sign on the pedestrian walkway to Netul north (perhaps at the midpoint of the walkway) should direct visitors to the shuttle pick-up point at Netul north. The signs might read:



- Continue to use the overflow parking area and monitor its use during peak visitation hours.
- During times of extremely high traffic volume, consider having a second staff person assist the traffic director, so that cars do not back up on Fort Clatsop Road.
- During peak visitation hours, insure that the traffic director is moving vehicles through the parking area as quickly as possible.
- Consider messaging to disperse Fort-to-Sea visitors to other locations (i.e. Sunset Beach) for trail access.
- Use Intelligent Transportation Systems (ITS) technology, such as a Park Highway Advisory Radio, to inform visitors of parking conditions at Netul Landing, and to advise them on other options.

¹ Exact sign layout should be checked against Park Service standards and the Manual on Uniform Traffic Control Devices before the signs are produced.

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- Insure that the traffic director always has a radio so he or she can communicate with the park staff at Netul north.
- Provide a shelter (even a small canopy tent), where the traffic director can escape the sun during less busy times.

Tour Buses

Tour operators reported that they had a very positive experience at Fort Clatsop during the 2005 summer. A number of the tour groups took advantage of the fact that they could go directly up to the fort during off-peak hours, and this significantly enhanced the experience of their customers. According to data provided by American West Steamboat Company, the ratings for Fort Clatsop rebounded this summer, after having dropped significantly in 2004. Between 1999 and 2003, the scores for Fort Clatsop, on a scale of 1 to 5 (with 1 being the worst and 5 being the best) were consistently high, ranging from 4.1 to 4.5. In 2004, the score for Fort Clatsop dropped to 3.1, but in 2005 the visitors rated their experience at Fort Clatsop 4.1.

During peak hours, tour buses currently drop off visitors at Netul north and then park their buses in the RV parking area at Netul south. This has two adverse impacts at Netul Landing:

- Parking spaces at Netul south that could otherwise be used by RVs are being occupied by tour buses
- The arrival of a tour group results in increased shuttle waiting times for other visitors.

Recommendations: Tour buses

- Allow tour buses with reservations to drop off visitors at the visitor center at all times of the day (rather than only during the off-peak). The success of this recommendation is dependent on the regulation (through the reservation system) of the number of tour buses arriving at the visitor center at the same time during peak hours. More than one or two tour groups during peak hours will result in overcrowded conditions at the site of the fort.

Transit Service

Overall, the transit service operated smoothly over the summer, and stakeholders commended the bus drivers for being courteous and friendly. Bus drivers and park staff worked together to insure effective ATS operations. Detailed findings for transit service are divided into two sections: the regional bus service and the intra-park shuttle service.

Regional Service

In general, the transit bus drivers enjoyed their experience driving the Fort Clatsop feeder routes. Similar to 2004, they did not hear many complaints from visitors using the service; rather, visitors tended to have questions about the frequency of service and where the bus stops, etc. All the transit bus drivers agreed that the number of visitors using the regional transit service was low this summer. While they noticed an up-tick in usage during the last week in July and the first week in August, the number of visitors riding the bus was much lower than the previous summer.

In the qualitative interviews, stakeholders discussed several reasons for the low ridership. One factor mentioned by a number of bus drivers and partners was the lack of effective marketing. They felt that visitors were not being actively encouraged to use transit. This finding was confirmed during the researcher's visit to several of the hotels and the local campgrounds (along the regional bus routes), as well as the chambers of commerce. Each of these locations had a plentiful supply of bus schedules; however, at some of the sites transit was not being actively

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promoted. During visits to 3-4 sites, the researcher asked staff how to get to Fort Clatsop, and in every single case, the person on duty pulled out a map and provided driving directions; their first instinct was to send the visitor to the fort by car. The researcher was given a bus schedule only when she explicitly asked if there was bus service to the fort. In two instances, the researcher was discouraged from taking the bus and told it was easier to drive, and at another location, the employee did not provide accurate information regarding the bus service.

In rural areas such as northwest Oregon, most visitors arrive by car and depend on that mode of transportation for visiting different attractions. Moreover, for most of the year (September through mid-June), visitors can only arrive at Fort Clatsop via their personal vehicle, so it is sensible and appropriate (during those months) for community partners to provide visitors with driving directions to the park. During the summer months, however, a “seasonal” change in mindset is required within the community, whereby community partners actively encourage the use of transit.

During the 2005 summer, several incentives were offered to visitors to encourage use of the regional service. First of all, the bus ride to Fort Clatsop was free. And similar to 2004, visitors who rode the regional bus to Fort Clatsop and purchased an entry ticket could then use that ticket as a free, 3-day regional bus pass. In addition, transit users were rewarded with a free ticket to ride the trolley in downtown Astoria. Unfortunately, these incentives were not very effective. Apparently only a few visitors redeemed their free trolley ticket or used their Fort Clatsop entry ticket as a 3-day bus pass.

As reported in the 2004 evaluation, the stakeholders felt that the lack of adequate bus stop signage and bus shelters in the community continues to be a problem. For example, there is no shelter at the Kentucky Fried Chicken (KFC) stop on the Astor route, or at the KOA or Kampers West stops on the Clatsop route. And while there is a shelter at the Warrenton Fred Meyer, it is not conveniently located, and it is not attractive.

For some of the stops, the LEWI park staff have made small sandwich boards (about one foot tall) that indicate the name of the route and the time at which the bus stops. The bus drivers put the sandwich boards out in the morning and then collect them in the evening when they are completing their last route for the day. The sandwich boards are located at the Fred Meyer, Fort Stevens and KFC stops. The sandwich board at KFC, for example, is placed on the sidewalk directly in front of the KFC and identifies where the bus stops and the hour of the day at which it leaves. These signs provide some assurance to visitors that they are indeed at the right spot for the bus, and so alleviate some of the confusion about where to wait for the bus. However, the sandwich boards are so small that they are not visible to motorists and would not serve to attract new customers to the service.

At Fort Stevens a new bus shelter was installed in July 2005. The shelter is in a good location (parking area near the ranger station) and should be convenient to those camping at Fort Stevens who can easily ride the bus rather than drive their RV's or campers to the fort. A small sandwich board next to the shelter tells when the bus will arrive. However, it would be more useful to visitors to have the Sunset Empire map and the schedule posted at the shelter (perhaps in a glass case), so that visitors can see the bus route and plan their trip.

Given the low ridership on the bus, parking availability (i.e. to park and ride) has not been a problem this summer. The Astoria Transit Center, a major node, still offers only six parking spots for visitors, and on-street parking in the vicinity of the Transit Center is limited to only two hours, which does not provide sufficient time for a visit to the fort. If the number of transit riders were to increase to the levels seen during the summer of 2004, parking would again become an issue. In addition, while the Highway Advisory Radio (1650 AM) indicates that there is free parking at the train depot next to the Columbia Maritime Museum, the Astor route only provides limited service to that site; on certain days of the week a visitor would have to take one of the fixed route buses

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from the Train Depot parking area to the Astoria Transit Center, where they would transfer to the Astor route.

Recommendations: Regional Service

- Front-line staff in the community and at the area campgrounds must actively promote the use of transit among visitors, effectively communicating: 1. how transit will enhance their experience at the park, and 2. transit is FREE. Need to have aggressive training and marketing plan for the hospitality industry in the spring and early summer 2006. A pre-packaged regional shuttle kit (3 day pass and trolley ticket) can be provided to the hospitality industry and area campgrounds so that front-line staff are distributing the “positive message” themselves to Fort Clatsop visitors.
- Provide shelters at bus stops and insure that they are clean and well-maintained.
- Provide adequate signage at the bus stops, preferably making schedules available.
- Consider a targeted approach to regional transit service looking for locations that have the highest opportunity to encourage ridership. For the regional route, Fort Stevens is considered one of the best locations for regional service, as well as Young’s Bay Plaza in Warrenton. The Clatsop route should consider improving the link into the KOA campground near Fort Stevens.
- If the Astor route is continued, ensure that adequate parking is available in Astoria, both for cars and recreational vehicles. Approximately 30 to 40 spaces will be needed. This could take the form of an established Park & Ride near the Maritime Museum, or the designation of on or off-street spaces (with a time limit of no less than 4 hours) for parking near the transit center. Any spaces would need to be well marked and easy to find for visitors who are not familiar with Astoria (i.e. near tourist attractions).
- Consider the use of additional incentives to encourage transit use. One example is to provide transit users with reduced admission into the park. While this may not be feasible due to the NPS fee structure, it may prove effective in increasing ridership. Another option is to allow the regional transit service to pick-up visitors (who have completed their visit) directly at the fort, rather than at Netul Landing. This eliminates a transfer for visitors using regional transit and thus simplifies the visit process for them.
- Use Intelligent Transportation Systems (ITS) technology, such as a Park Highway Advisory Radio, to inform visitors of parking conditions at Netul Landing, and to advise them on other options.

Intra-park Shuttle Service

Overall, the on-site visit and the qualitative interviews reveal that the intra-park shuttle has operated quite smoothly this summer. The service is generally able to maintain its schedule, though there are occasions when a bus is thrown off schedule. The bus drivers agreed that delays usually occur due to the boarding of a handicapped person. Having to operate the wheelchair lift, especially during peak hours, when there are lots of other visitors to board, sometimes results in delay. However, all the bus drivers felt that there is enough slack in the schedule that they are able to get back on schedule fairly quickly. Moreover, the new low floor buses reduced any delay associated with the loading and unloading of handicapped persons.

The intra-park shuttle offers a comfortable ride and the interpretive tapes that are played during the short ride to and from the fort are informative and set the appropriate mood for the visit. On the trip to the fort, the tape, narrated by Richard Bash, A Native American, describes some of the sites at the fort, and reminds visitors of the need to stay on the trails. On the return trip to Netul Landing, the interpretive tape describes other attractions in the area that might be appealing to visitors, such as Ecola State Park and Long Beach.

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The qualitative interviews revealed that overall, the majority of visitors are neutral with regard to the shuttle system; they accept it as part of park operations. For the most part, when visitors question the need for the shuttle system, the park staff and bus drivers are able to explain why the shuttle system is necessary. A minority of visitors support the move toward shuttle buses and enjoy the experience of riding the bus to the fort. Another minority (in particular returning visitors) grumble about having to take the intra-park shuttle and would rather be able to park at the fort.

One of the changes to the intra-park shuttle service implemented in 2005 was the addition of a shuttle stop at Netul south (the far end of the parking area), due to complaints from visitors who had difficulty walking the length of the parking area to access the intra-park shuttle. Overall, the qualitative interviews revealed that visitors, park staff and bus drivers all feel the stop at Netul south was a positive change, and since implementing the change, there have been no complaints from visitors about problems accessing the north area.

During the on-site visit, the researcher observed significant use of the shuttle stop at the south area. Oftentimes, a group of visitors who had just parked in the south area saw the bus coming and chose to wait for it rather than walk to Netul north. During peak hours, there were several occasions when the bus was filled to capacity after stopping at Netul south, for in addition to those visitors who had completed their visit and would be de-boarding at Netul north (to return to their cars), there was a large group of new visitors riding the shuttle to Netul north to receive their orientation. While this resulted in crowded conditions on the bus, the ride from Netul south to Netul north is so short (approximately 1 minute) that visitors did not seem to mind, and in fact, they were appreciative that they did not have to walk from Netul south to the shelter at Netul north. In addition to providing increased convenience to the visitor, this change has the added benefit of clearing the parking area more quickly and making parking spaces available to arriving visitors in a more timely fashion.

While the shuttle stop at Netul south was originally intended as a courtesy for visitors with physical disabilities, the service is also widely used by visitors who are capable of walking. Some of the park staff has told visitors that the bus is primarily for those with physical disabilities, and if they are capable, they should walk. The bus drivers, however, do not feel comfortable telling visitors they cannot ride the bus. They tend to pick up anyone who needs a ride to the north area, provided there is room on the bus (first priority is given to visitors with physical disabilities).

One issue that will need to be considered for the summer of 2006 and beyond is the location of the shuttle stop at Netul south. As the buses loop around the south area, there is a small handicapped sign on the west side of the parking area where the buses are supposed to load and unload handicapped passengers. Since this loading zone is not well marked, however, passengers tend to congregate on the east side, by the sidewalk. Moreover, there are safety issues with having visitors cross the parking area in order to access the shuttle stop. When asked about where they pick up visitors in the south area, the bus drivers reported that they pick up visitors at either location (the east or the west side of the area), depending on where visitors happen to be waiting for the bus. However, most of the bus drivers will drop off visitors on the east side of the area, as they feel that this is a safer drop-off point.

While the new shuttle stop at Netul south has been perceived as an improvement to the service, park staff and bus drivers reported that some visitors who boarded at the south area did not want to de-board at Netul north for the orientation. Visitor complaints regarding this issue have subsided somewhat since the beginning of the summer. One bus driver reported that once passengers board at Netul south, she explains that this is a courtesy pick-up, and that they need to de-board at Netul north, check in with a ranger, and receive the orientation before re-boarding the bus. By fully explaining the procedure at the outset, the bus driver found that she received fewer complaints.

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Other observations during the on-site visit revealed the ways in which effective communication among park staff, bus drivers and visitors can contribute to an enhanced visitor experience. Communicating information to the visitor in advance prepares them for what lies ahead and may result in fewer visitor complaints regarding the service. Examples of effective communication (observed during the on-site visit) include the following:

- Upon approaching Netul south, the bus driver announces to visitors that they will be stopping at the south area so that visitors can de-board, but that they will then proceed to the north area so that visitors can de-board there as well. Without this information, it is likely that some visitors will be confused about when they need to de-board.
- When a large number of passengers board at Netul south, the bus driver radios the park staff at Netul north to inform them that a large group is arriving. This prepares the park staff, and if there is a large group of visitors already waiting to take the shuttle to the fort, then the bus driver can inform the new passengers that they will have to wait about 15 minutes for the next shuttle.
- When passengers board at Netul south, the bus driver explains that this is a courtesy pick-up, and that they need to de-board at Netul north, check in with a ranger, and receive the orientation before re-boarding the bus.
- Upon departing from Netul, if bus drivers are carrying a passenger who needs the motorized scooter during their visit, they radio this information to the park staff at the visitor center. When the bus arrives at the fort, the ranger is already there to greet the passenger with the scooter.
- The shuttle bus driver leaving the site of the fort and returning to Netul asks if there are any visitors on board who will be riding the Astor or Clatsop bus from Netul. If yes, the bus driver radios the Astor or Clatsop bus driver and asks him or her to wait for the connecting passenger(s).
- Before departing from Netul Landing, bus drivers on the regional bus routes announce where they will be traveling (i.e. Astoria or Hammond). If there are visitors who boarded the wrong bus, they have the opportunity to de-board before the bus departs.

As observed during the on-site visit, communication between the bus drivers and the park staff is very good; the bus drivers and park staff act as partners, working together to enhance the visitor experience. Some bus drivers, however, were more willing than others to communicate information to the visitors and to use the microphone when doing so. In cases where the bus driver did not use the microphone, passengers at the rear of the bus had difficulty hearing the information.

Recommendations: Intra-park Shuttle

- Improve the operation of the shuttle stop at Netul south. This can be accomplished by moving the two handicapped spaces in the Netul south parking area about 25 feet north (i.e. closer to the park entrance), so that the shuttle bus can safely loop around and stop immediately in front of the handicapped spaces. There should be a bench and signage on the sidewalk indicating the spot where the bus stops. Visitors can wait for the bus on the sidewalk and then walk out to the bus when it arrives. Since the handicapped spaces are larger than the other parking spaces, there is sufficient room for visitors to walk out to the bus between parked vehicles.
- Continue to provide adequate park staffing at Netul to insure the smooth operation of the shuttle system.
- Continue to maintain effective communication among park staff, bus drivers, and visitors to insure smooth operations.

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- Continue to allow all visitors to board at Netul south, with first priority given to the physically-disabled.

Financial Impacts

Since transportation-related capital costs are largely either already paid (Netul Landing) or have been paid by other parties (the new buses), this brief discussion focuses on operating revenue and cost. It outlines the cost/revenue picture for 2005, and makes projections for several operating scenarios in 2006.

Revenue for transportation comes from a \$2 seasonal increase in the entrance fee that is imposed during the summer months. Park pass holders do not pay this increase, therefore, the actual revenue increase per visitor was \$1.27. In summer 2005, there were 56,000 visitors with available transportation revenue of \$70,506.

Table 4 shows transportation expenses for 2005, broken down by bus route.

Table 4:
Transportation Costs (2005; 85 days of service)

Route	Transportation Cost
Astor	\$39,519
Clatsop	\$46,493
Netul Shuttle	\$37,383
Total	\$123,395

Table 5 shows a predicted annualized surplus/shortfall for several 2006 transit scenarios. Each scenario assumes the same visitation as in 2005, the same transportation revenue, but a 3% increase in transportation cost due to inflation.

Table 5:
2006 Scenarios

Scenario	Transportation Cost (from 2005)	3% Inflated Trans. Cost (for 2006)	Transportation Revenue	Surplus/Shortfall (2006)
Astor and Clatsop routes plus Netul Shuttle	\$ 123,395	\$ 127,097	\$ 70,506	\$ (56,591)
Clatsop only, plus Netul Shuttle	\$ 83,876	\$ 86,392	\$ 70,506	\$ (15,886)
Astor only, plus Netul Shuttle	\$ 76,902	\$ 79,209	\$ 70,506	\$ (8,703)
Netul Shuttle Only	\$ 37,383	\$ 38,504	\$ 70,506	\$ 32,001

Table 5 shows that continuing to run both routes will create a shortfall in the transportation budget of nearly \$60,000. Of the options for running only one regional route, running only the Astor route would be less expensive than running only the Clatsop route. However, as explained in the *Alternatives* section below, the termination of train service from Portland to Astoria will likely result in reduced ridership on the Astor route beginning in 2006. Running only the Netul shuttle

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would create a transportation surplus that could be used for signage, Intelligent Transportation Systems technology to provide improved transit and parking information to visitors, and improved transportation facilities.

Finally, it should be noted that the partnership with SETD provides a favorable cost structure to the park. SETD has provided the vehicles, and the operating cost structure (\$18 per hour plus \$1.15 per mile) is lower than the “typical” cost of \$45 - \$55 per bus-hour that is used for planning purposes in the National Park Service Alternative Transportation System pro-forma. In the absence of a partnership, it might be expected that transportation costs would increase significantly.

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2006 and Beyond

This part of the report is organized into the following subsections:

- Presentation of alternatives
- Evaluation of alternatives
- Recommendations

Alternatives

For summer 2006 there are a number of potential options with regard to both transit and parking that LEWI will have to consider. Four transit options are briefly outlined below, followed by a park-and-ride option, and finally by a potential option for parking at Fort Clatsop.

Transit Options:

1. **Status Quo (2 regional route and 2 intra-park shuttle buses).** This option maintains the current service, with 2 regional buses and 2 intra-park shuttle buses. The parking areas at the visitor center would remain closed, with the exception of tour buses during off-peak hours.
2. **Consolidated Regional ATS service (1 regional route and 2 intra-park shuttle buses), with improved outreach and marketing. Parking at the visitor center limited to tour buses.** This option maintains the 2 intra-park shuttle buses but only operates a single regional route. During the summer of 2005, the Astor and Clatsop routes had roughly equal ridership. However, the termination of train service from Portland to Astoria will likely result in reduced ridership on the Astor route next year. Therefore, we recommend that any single route be based primarily on the existing Clatsop route. Considerations in planning the route include:
 - Continued accommodation of visitors at the area campgrounds, including Fort Stevens, KOA, and Kampers West
 - Connections to existing SETD services
 - If one-way hikes on the Fort to Sea trail become an important factor in future years, it may be necessary to improve transit between Sunset Beach and Netul.

This option is only worth considering if an improved transfer point in Warrenton could be provided, with pick-ups outside the Astoria-Warrenton Chamber of Commerce, rather than at Fred Meyer. This would make the waiting area more attractive for tourists and would provide easy access from a tourist-frequented location (the Chamber of Commerce visitor center). It would also encourage transferring passengers to look at the tourist-oriented information there. Furthermore, there appears to be better parking availability for automobiles and recreational vehicles at the Chamber of Commerce visitor center.

Under this option, the regional bus would drop off visitors at Netul Landing, where it would layover.¹ During the layover, transit riders and others would

¹ If timed connections are to be provided to other SETD services in Warrenton, it may not be possible to have a substantial layover at Netul Landing. In this case, the passengers from the regional bus would receive their orientation at Netul Landing, and then take one of the regular intra-park shuttles to the visitor center.

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receive their orientation. The transit bus would then proceed to the visitor center where it would drop off the inbound visitors and pick-up visitors who have completed their visit and return them to the community (i.e. allowing those visitors to bypass Netul Landing when leaving the park). The parking area at the visitor center would remain closed to the public, with the exception of tour buses.

With buses to multiple destinations (both a regional route and the intra-park shuttle) serving the visitor center, effective communication from drivers and signs on the buses would become essential so that passengers are clear as to which bus they are boarding.

3. **Intra-park shuttle only (2 buses).** This option would eliminate the regional bus service to Fort Clatsop and would only provide bus service between Netul Landing and the visitor center. The parking area at the visitor center would remain closed to the public, with the exception of tour buses.
4. **No ATS.** This option eliminates all bus service, and opens the parking areas near the visitor center to all visitors. Visitors could either park at the visitor center or park at Netul Landing and hike to the site of the fort.

Park-and-Ride Option:

- I. **Park & Ride in Astoria.** Visitors coming from the east on US-30 pass through Astoria on their way to the park. This suggests that a park-and-ride option in Astoria could be attractive. Criteria for a successful park-and-ride include
 - Space for approximately 30 automobiles and 10 recreational vehicles
 - Is easy to find for visitors who are unfamiliar with the area
 - The regional bus can stop there
 - Has facilities (staff, information, restrooms)
 - Is within walking distance of a visitor attraction.

A location that appears to meet all these criteria is the Maritime Museum. This museum is an attraction, and appears to have ample parking available. Using it for Park & Ride would work best with transit option (1) above. Under transit option (1), the Astor route would be extended to the Maritime Museum. This option was considered early on in the development of the regional route structure. There may be unused earmarked funds available to improve Maritime Museum parking. LEWI, SETD and the Museum should coordinate to determine the status of these funds.

Another possible location in Astoria is the block between 2nd and 3rd streets. While this area may not have all the advantages of the museum, it apparently has unused capacity.

Parking Options:

- I. **Handicapped Parking at the Visitor center.** This option enables visitors with handicapped plates/placards to park at the visitor center (in addition to the tour buses that are allowed to park at the visitor center during off-peak hours). This parking option could be combined with transit options 1, 2 or 3 described above.

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Alternative Evaluation

This section of the report considers the advantages and disadvantages of each of the potential transit and parking options presented above.

Transit Options:

1. **Status Quo (2 regional bus routes and 2 intra-park shuttles, with parking at the visitor center limited to tour buses)**

Advantages	Disadvantages
No adverse environmental or safety impacts at the site of the fort; preserves peaceful ambience.	High cost to LEWI to maintain 2 regional bus routes. Significant effort is required to run the buses, provide management oversight and coordination, and conduct marketing.
With renewed aggressive marketing and incentives, regional service may relieve some of the strain on parking at Netul Landing.	If ridership continues to be low, the regional routes do not provide a direct benefit to the park. Costs are high, but traffic and parking congestion are not significantly mitigated and air quality is not improved.
Provides alternate form of transportation to the park (access for visitors without vehicles)	

2. **Consolidated ATS service (1 regional route and 2 intrapark shuttle buses) with improved outreach and marketing. Parking at the visitor center limited to tour buses.**

Advantages	Disadvantages
No adverse environmental or safety impacts at the site of the fort; preserves peaceful ambience.	If regional ridership continues to be low, the regional route does not provide a direct benefit to the park (i.e. by easing the strain on parking).
With renewed aggressive marketing and incentives, regional service may relieve some of the strain on parking at Netul Landing.	One regional route cannot serve as many locations in the community as two regional routes. It is most likely that passengers from Astoria would have to transfer in Warrenton or at Fort Stevens.
The Clatsop route serves Fort Stevens State Park. Oregon State Parks have a single point of contact for marketing efforts, thus reducing the effort required on the part of LEWI to market the one-route regional service.	More bus traffic at the visitor center
Saves time and a transfer for transit users leaving Fort Clatsop	Slightly more complex transit operation
Provides extra bus capacity from Netul Landing to the visitor center	
Cost savings to LEWI (expense of operating ATS reduced by approximately 33%)	

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Provides alternate form of transportation to the park (access for visitors without vehicles), and connectivity to existing SETD services.	
It provides an ATS link between two key units of LEWI (Fort Stevens and Fort Clatsop)	

3. Intra-park shuttle only (2 buses)

Advantages	Disadvantages
No adverse environmental or safety impacts at the site of the fort; preserves peaceful ambience.	No alternate transportation is provided for those in the community.
Cost savings to LEWI (expense of operating ATS reduced by approximately 70%)	No potential alternative exists for easing the strain on parking

4. No ATS

Advantages	Disadvantages
No ATS operational expenses incurred by the park	Adverse environmental impacts at the site of the fort, due to the increased pollutants and noise from vehicular traffic.
Some visitors – those who are able to find a parking spot at the visitor center with no trouble - will be happier.	Adverse safety impacts at the site of the fort, due to increased traffic congestion and the intermingling of cars and pedestrians at the site of the fort.
	During peak hours, parking at the visitor center will be insufficient, and visitors will be turned away.
	Park staff will need to manage parking and traffic at the visitor center.

Park & Ride Option

I. Park & Ride at the Maritime Museum

Advantages	Disadvantages
Because a successful park & ride would require a coordinated effort on the part of the City of Astoria, SETD and the Maritime Museum, it puts some energy behind alternative transportation from Astoria	The Park Service can support the effort, but can't do it alone (significant coordination is required). More specifically, it would be necessary to evaluate the ability of Astoria, SETD, and the Museum to put together a working park-and-ride by next June.
The location is near a key visitor attraction, and can serve as a base for visiting a number	

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of attractions (museum, trolley, downtown Astoria, Fort Clatsop)	
Is on the way into Astoria for visitors from the east, and is easy to find.	
Can accommodate visitors arriving in RVs	

Parking Options

2. Handicapped parking at visitor center

Advantages	Disadvantages
Eases the visit process for the disabled	There is still a need to offer handicapped parking spaces in the Netul parking area, so there is no relief of parking pressure.
Might decrease the need for a shuttle stop at Netul south.	There may be some confusion among visitors as to who may park where, and where they should go.
Maintaining the bus schedule may be somewhat easier as there should be no loading or unloading of handicapped persons. However, with the new, low floor buses, such delay has been reduced significantly.	In addition to the staff at Netul Landing, park staff will be required to monitor the park entrance and insure that only those with handicap plates or placards can enter, and to manage visitor confusion.
	Some visitors will complain that access to visitor center parking is restricted only to handicapped visitors.
	Enabling vehicles to park at the visitor center will result in at least a minimal increase in noise and air pollutants at the site of the fort.
	Some intermingling of buses and cars at the site of the fort may result in added safety risks.
	People who bypass Netul do not receive the orientation to the park.

Recommendations

In making recommendations for park operations in 2006 and beyond, a number of important goals need to be balanced, including management of the park to preserve natural resources while at the same time providing a good visitor experience. The regional transit service was introduced to assist the park in achieving these goals in two key ways:

1. Due to limited parking at Netul, the regional service would provide an alternate means for visitors to arrive at the park, thus decreasing pressure on the parking situation.
2. The regional service would enhance the visitor experience, providing hassle-free transportation from convenient locations in the community

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Maintaining the two regional bus routes requires significant management effort on the part of the park and Sunset Empire as well as a significant financial investment. Given the extremely low ridership on the regional transit buses during the summer of 2005, the service provided very little direct benefit to the park; that is, it did not assist the park in achieving its goals. As a result, transit option 1 -- the status quo -- is not a desirable option.

At the other extreme, transit option 4 – No ATS – is also not a desirable option. Given that visitation in 2006 is expected to be similar to 2005, the intra-park shuttle system is critical in controlling the flow of visitors to the fort. Moreover, by closing the parking areas at the visitor center, the new system serves to decrease the amount of noise and pollutants at the site of the fort, preserving the natural resources and creating a safe, pedestrian-friendly environment.

While transit option 3 – Intra-park shuttle only – is a viable alternative, this option provides no relief for the parking situation at Netul, and as stated previously, the strain on parking is expected to increase in 2006 as some visitors hike the Netul River trail and the Fort-to-Sea trail.

For these reasons, Volpe recommends transit option 2: **Consolidated ATS service with improved outreach and marketing. Parking at the visitor center limited to tour buses.** Volpe recommends that any single route be based primarily on the existing Clatsop route, though Sunset Empire will need to determine the most effective design of this route. Three key features of this option, as stated previously in the report, include:

- Moving the location of the Warrenton shuttle stop from the Fred Meyer/Costco to the Chamber of Commerce building (in the Young's Bay Plaza).
- Allowing visitors who have completed their visit to board the regional service at the visitor center (i.e., bypassing Netul Landing). This should make the regional transit service a more attractive option. However, additional incentives to encourage transit use should also be considered.
- Allowing tour buses to go directly to the visitor center parking area at all times (not just off-peak).

The success of the regional service will depend on a significant, coordinated effort on the part of the community to promote transit use. The message needs to be communicated to visitors that during peak hours the transit bus is the best way for visitors to arrive at the park. As stated previously in this report, during peak hours, there were numerous days when the parking area at Netul was full and visitors had to be turned away, or visitors had to wait for parking. The experience of those visitors would have been significantly improved had they or others taken transit to the park.

Another technique for easing the pressure on parking at Netul is to require that visitors who are hiking the Fort-to-Sea trail to park at Sunset Beach, rather than Netul Landing. In other words, the message to visitors is: "If you want to hike the Fort-to-Sea trail, the most convenient spot to park your car is Sunset Beach." This message can be communicated to visitors through a number of different venues: the website, brochures/pamphlets, and staff at the Chamber of Commerce and visitor center.

In order for Lewis and Clark National Historical Park to make reasoned, informed decisions regarding operations in 2006 and beyond, Volpe also recommends that the park systematically collect data on visitation, transit ridership and parking capacity. In particular, consideration should be given to collecting the following data:

- Head count of the number of visitors boarding the shuttle

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- Head counts of the number of visitors using the Netul River trail to the fort
- Head counts for the number of visitors using the Fort-to-sea trail
- Number of daily riders on the regional transit service (by route)
- Parking survey during the summer (parking counts and turnover rates, separately for cars, RVs and Handicapped)

Analysis of this data will assist the park in future decisions regarding ATS and parking. For example, should transit ridership continue to be low in 2006, LEWI will have to evaluate the feasibility of continuing with the regional transit service in the future. In addition, the data will assist the park in assessing the adequacy of its fee collection method. Currently all visitors must pay their entrance fees at the visitor center. With the new Netul River trail, however, it will be possible for visitors to hike to the fort (and back) without paying their entrance fee. With accurate data on head counts and revenues generated by the entrance fees, LEWI will be able to estimate whether there is a significant number of visitors who are accessing the park without paying their entrance fee. If such is the case, LEWI will need to consider alternate fee collection methods.

Conclusions

Major changes from 2004 included the following:

- Allowing off-peak tour buses to travel directly to the parking area near the visitor center
- A bus stop at Netul south
- Discontinuation of the ticket reservation system.

These changes were well received by visitors, park staff and partners in the community, and improved the visitor experience.

The message about parking at Netul was also changed, from one of “no parking is available at Fort Clatsop” to one of “parking is available, but scarce during peak periods.” Although the latter message is more correct, it may have contributed to a drop in regional transit ridership for 2005.

The significant disappointment was the substantial decrease in regional transit ridership from 2004 to 2005. This, combined with increased visitation, contributed to a significant strain on parking at Netul Landing during peak periods. Lessons learned from the 2005 experience include the following:

- Given the high demand for, and limited supply of, parking at Netul Landing, park staff at Netul have a critical role in maintaining visitor satisfaction and safety. They direct incoming traffic, welcome visitors, and provide an orientation to the park and the shuttle system.
- Marketing the regional shuttle system is both a park and community responsibility. The park’s marketing efforts will be ineffective if front line staff in the community (for example, hotel desk clerks) are telling people to drive.

The pressure on parking is not expected to decrease in 2006, and may even increase. The regional transit system offers a means for relieving some of the pressure, by providing an alternate means of transportation to the park. However, given the high cost to the park of operating the regional transit service, and the low direct benefit (due to low ridership), Volpe recommends both a reduced ATS service, and a more aggressive marketing of that service to those who might be likely to use it.

Appendix A: Detailed Visitation

In 2004, visitor counts were gathered between 6/14/2004 and 8/29/2004. The peak period was the first 1/2 of August, with an average of 750 visitors per day. These visitor counts are shown in Figure A-1.

(See NetulDailySheet_midJuly.xls)

In 2005, visitor counts were gathered between 6/13/2005 and 9/4/2005. These are shown in Figure A-2.

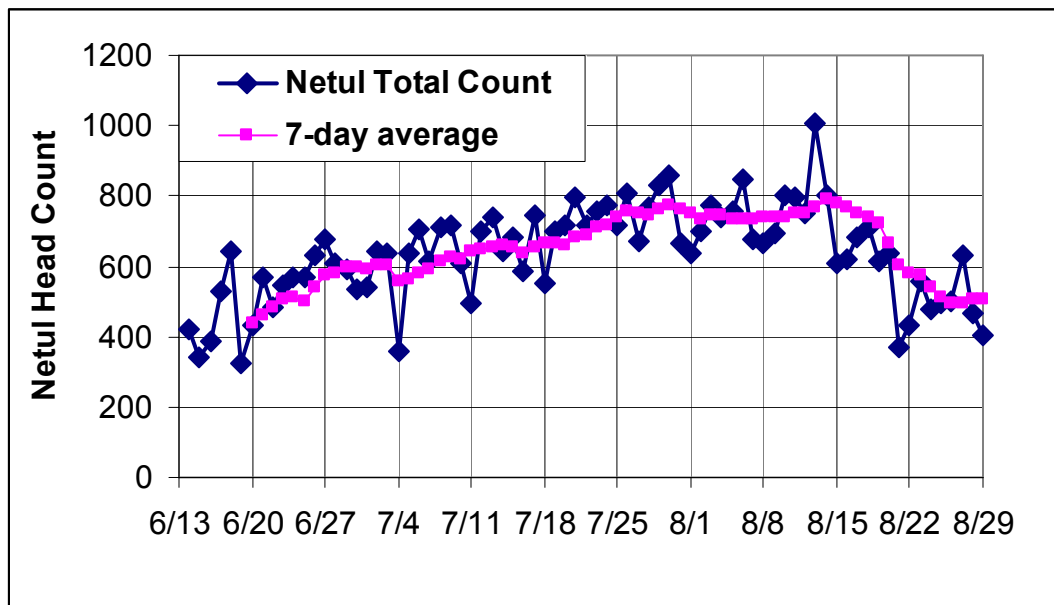
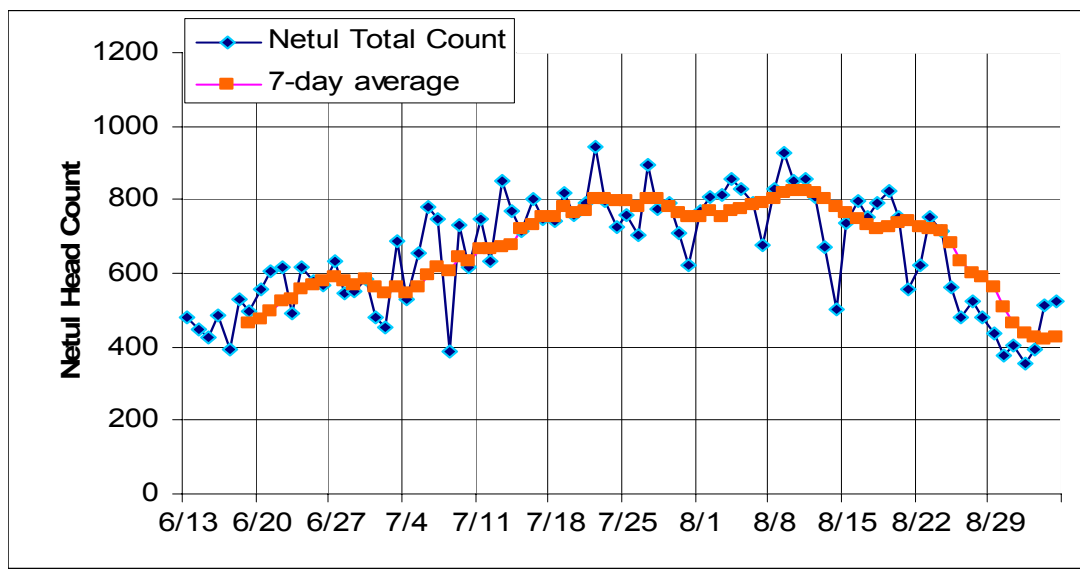


Figure A-1: Netul Daily Head Count, Summer 2004



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Figure A-2: Netul Daily Head Count, Summer 2005

Table A-1 compares total visitation (Netul head count plus tour bus passengers bypassing Netul) between 2004 and 2005 for both the summer (second half of June through August) and for the month of July.

Table A- 1 Visitation

	2004		2005	
	July	6/14-8/29	July	6/13-8/28
Netul Landing head count	21,115	48,791	22,152	52,073
Tour bus passengers bypassing Netul		0	1,829	5,552
Total	21,115	48,791	23,981	57,625

Visitor Sign-In Book

Information from the visitor sign-in book is available from July 2003 through August 2005. This information includes time and date of visit, number of people in the party, where visitors are staying, and where visitors live. It does not include all visitors, only those who choose to use the sign-in book. For example, during the peak month from mid-July to mid-August 2004, there were approximately 23,000 visitors according to the Netul head count, but 2,700 entries in the sign-in book, accounting for approximately 9,000 of those visitors.

Appendix B: Detailed Traffic Counts

Daily traffic counts were available, either for the entrance to the visitor center (2002, 2003) or for the entrance to Netul Landing (2004, 2005). Figure B-1 indicates a slightly lower traffic volume in 2004 compared to previous years, while in 2005, traffic was higher for most days of the season.

Overall, the strategy of reducing traffic volume by having visitors use transit appears to have worked in 2004. Decreased traffic volumes in 2004 do not seem to indicate a decrease in total visitor levels. During the peak month of 7/16 – 8/15, some 85 passengers per day arrived by public transit, leading to a reduction from an average of 326 vehicles per day in 2003 to 286 vehicles per day in 2004. Had these transit passengers arrived by car (with each car holding 3 people), there would have been approximately 30 more cars per day in 2004, yielding a total of 316 automobile equivalents in 2004, approximately equal to the traffic volume observed in 2003.

In 2005, average traffic volumes were up, with an average of 374 cars arriving daily. Table B-1 shows a comparison of total seasonal traffic and average daily traffic over the course of 7/13-8/22 (the only dates for which daily counts are available for all relevant years).

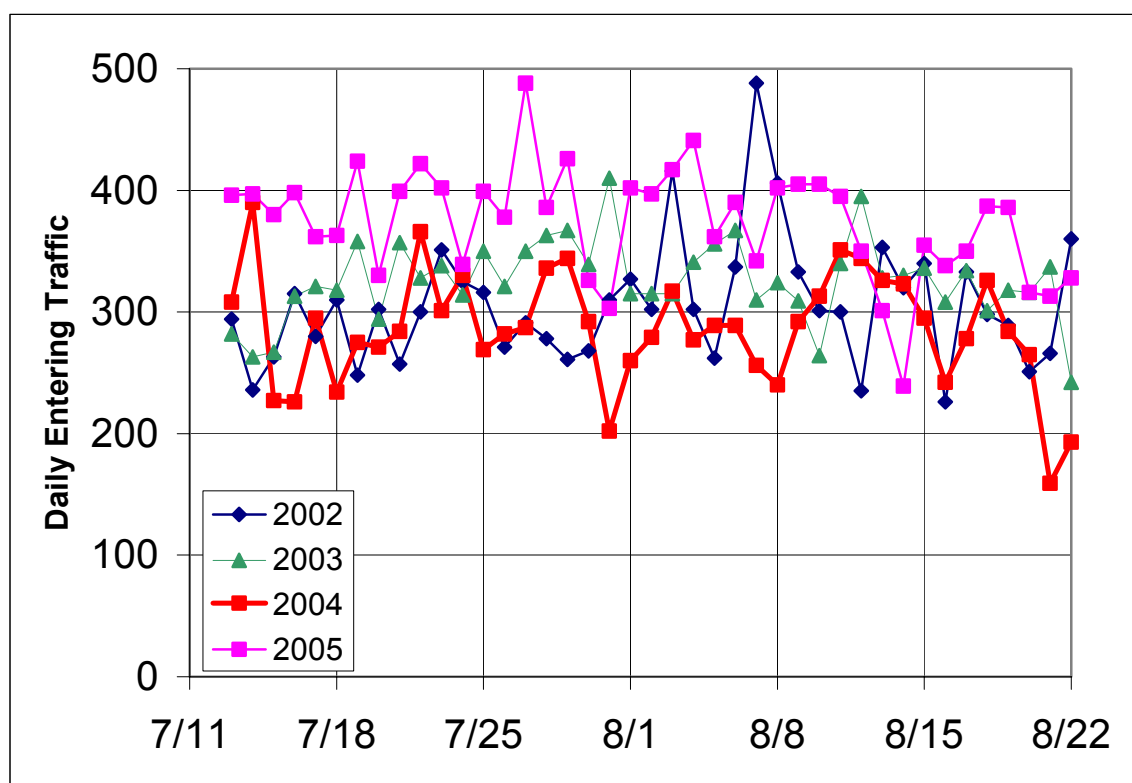


Figure B-1: Daily Traffic Counts

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Table B-1: Comparison of total traffic counts, 7/13-8/22

Year	Total traffic count	Average daily traffic
2002	12,521	305
2003	13,354	326
2004	11,717	286
2005	15,339	374

In 2004, 15-minute counts to Netul Landing were also gathered between 9 AM on Friday 8/27/2004 and 8 PM on Tuesday 8/31/2004. Figure B-2 shows the hourly averages from these counts, both inbound and outbound to Netul Landing.

In 2005, 15-minute counts were gathered twice:

- Between 8:30 AM on Friday, 7/29/2005 and 8:30 PM on Wednesday, 8/3/2005 (Figure B-3), and
- Between 8:30 AM on Friday, 8/12/2005 and 8:00 PM on Wednesday, 8/17/2005 (Figure B-4).

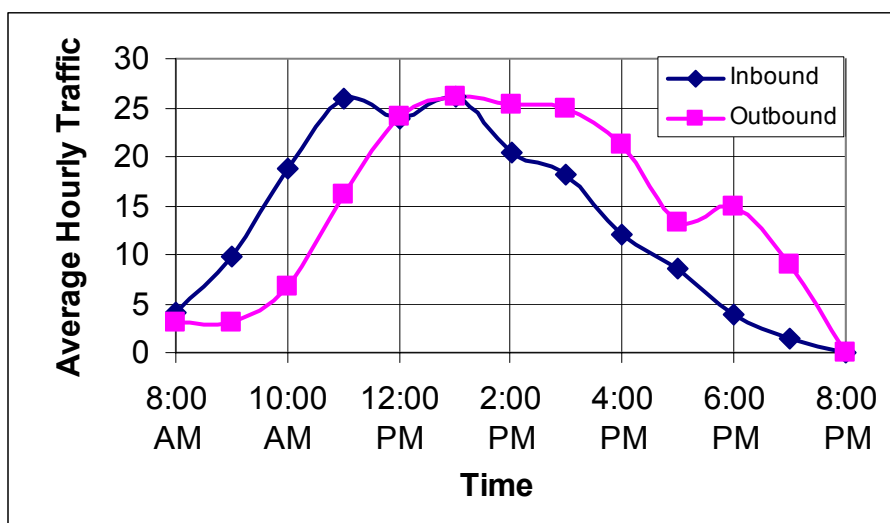


Figure B-2: Hourly Traffic, 2004

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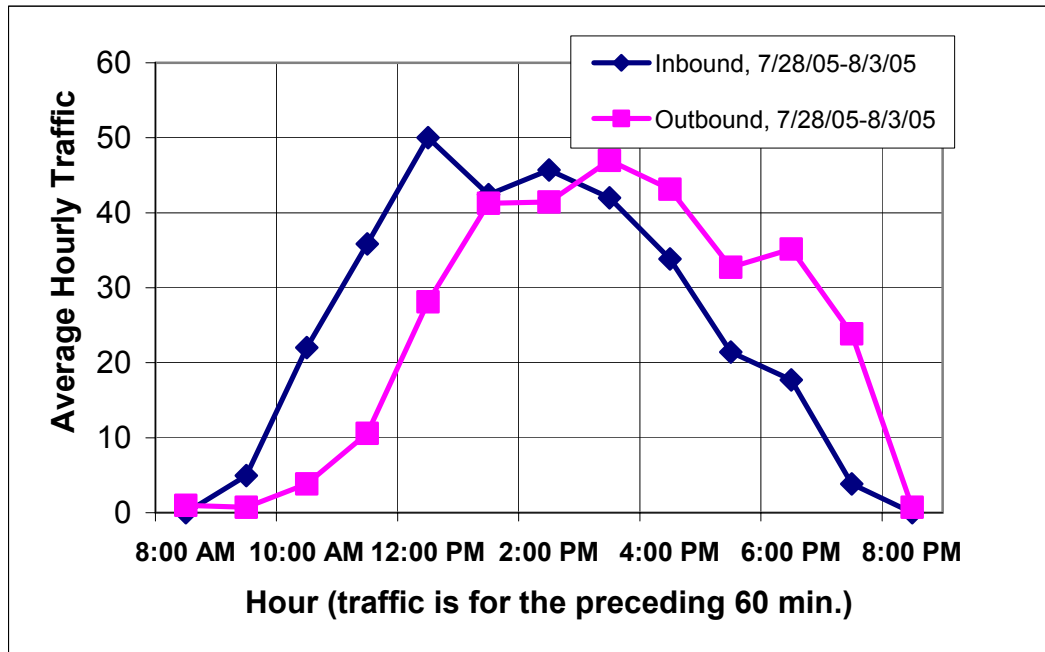


Figure B-3: Hourly Traffic, 7/29-8/3/2005

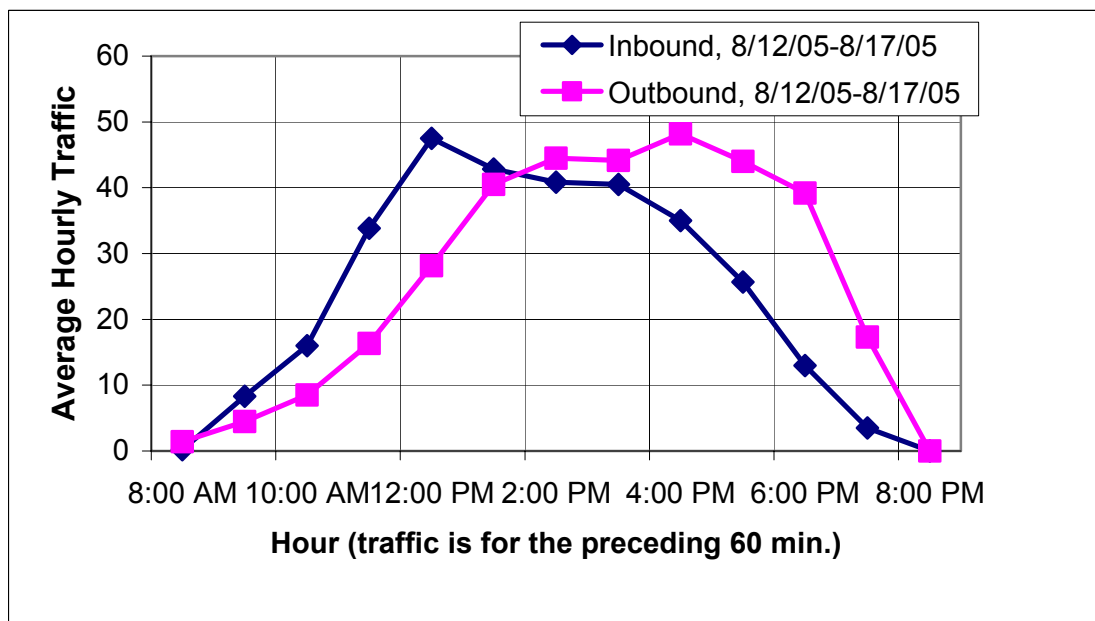


Figure B-4: Hourly Traffic, 8/12-8/17/2005

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In mid-July 2004, the Park also collected information on parking area occupancy and turnover. Average length of stay was a bit under 2 hours, and peak parking occupancy tended to occur between noon and 1 pm, consistent with figure B-2.

Appendix C: Detailed Transit Ridership

For 2004 and 2005, the transit operator reported one-way ridership on a daily basis. This was divided by 2 to obtain round-trip ridership, and is summarized by week is plotted in Figure C-1. The “2004 Regional” line is the sum of 2004 reported ridership for the Astor, Clatsop, and Column routes, while the “2005 Regional” line is the sum of 2005 reported ridership on the Astor and Clatsop route (the Column route did not operate in 2005).

2005 weekly ridership for each week from 6/13 through 8/7 was from 67 to 84 percent lower than for the corresponding week in 2004.

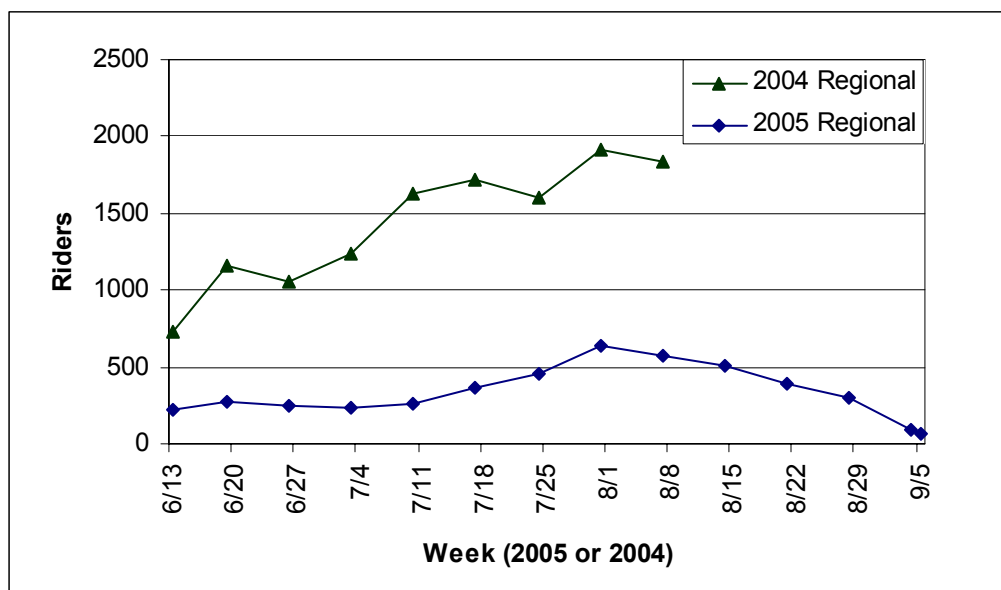


Figure C-1: Weekly ridership on SETD regional routes, 2004 and 2005

Figure C-2 shows ridership on each of the 2004 and 2005 regional routes by day of week from mid-June to mid-August, while Table C-1 shows the percentage of each route’s total ridership occurring on each day of the week. (The Column route did not run on Tuesdays through Thursdays in 2004.)

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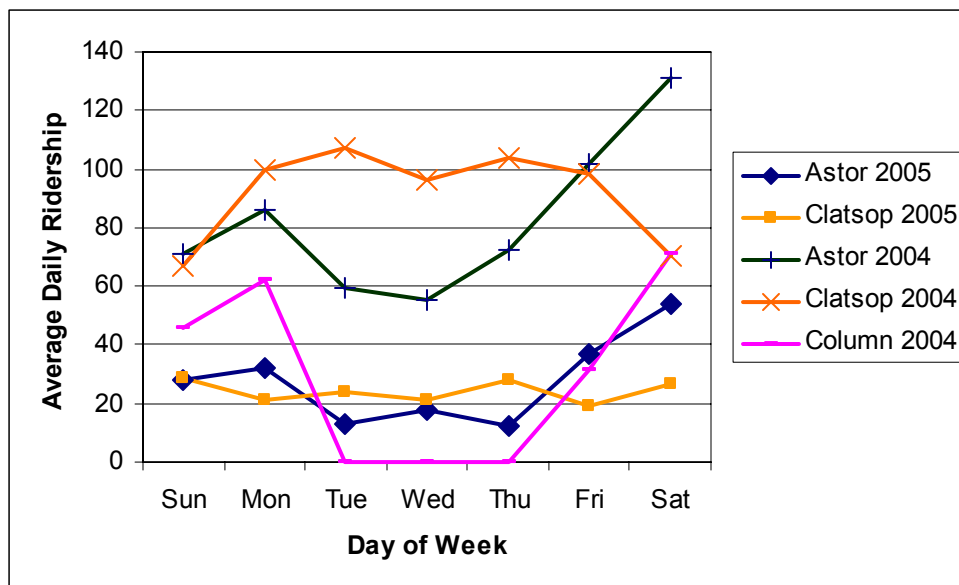


Figure C-2: Ridership on SETD regional routes by day of week, 2004 and 2005

Table C-1: Percentage of route's ridership by day of week, 2004 and 2005

	Astor05	Clatsop05	Astor04	Clatsop04	Column04
Sunday	19%	17%	12%	10%	22%
Monday	16%	16%	15%	16%	29%
Tuesday	7%	15%	10%	17%	0%
Wednesday	9%	13%	10%	15%	0%
Thursday	5%	17%	13%	16%	0%
Friday	17%	10%	18%	15%	15%
Saturday	26%	13%	23%	11%	34%

In 2005 especially, the Astor route carried notably more passengers on Fridays through Mondays than during the middle of the week. Since this route serves the train depot and the train runs only Fridays through Mondays, this suggests that a large number of Astor riders came to the area by train. Ridership on this route may thus be greatly affected if train service is cut beginning in 2006.

Appendix D: Analysis of Parking Occupancy and Transit for 2006

With the pending completion of the Netul River trail and the Fort-to-Sea trail, a portion of visitors are predicted to increase the length of their visit to LEWI in order to explore these trails, and hence the length of time their cars are parked in the Netul Landing parking area will increase. Assuming that the number of arriving cars throughout the day remains unchanged, this will increase parking area occupancy levels.

15-minute traffic counts of vehicles entering and exiting Netul Landing for a five-day period in mid-summer 2005 were used to establish approximate average length of stay for this summer during peak visitor season, to be used as a base for examining potential changes for 2006. Approximate occupancy of the Netul parking area was calculated by subtracting average cumulative outbound traffic from average cumulative inbound traffic throughout the day. Figure D-1 compares parking area occupancy approximated using actual traffic counts with occupancy approximated by assuming that length of stay is always 1.5 hours (in other words, predicting outbound traffic by shifting inbound counts 1.5 hours later).

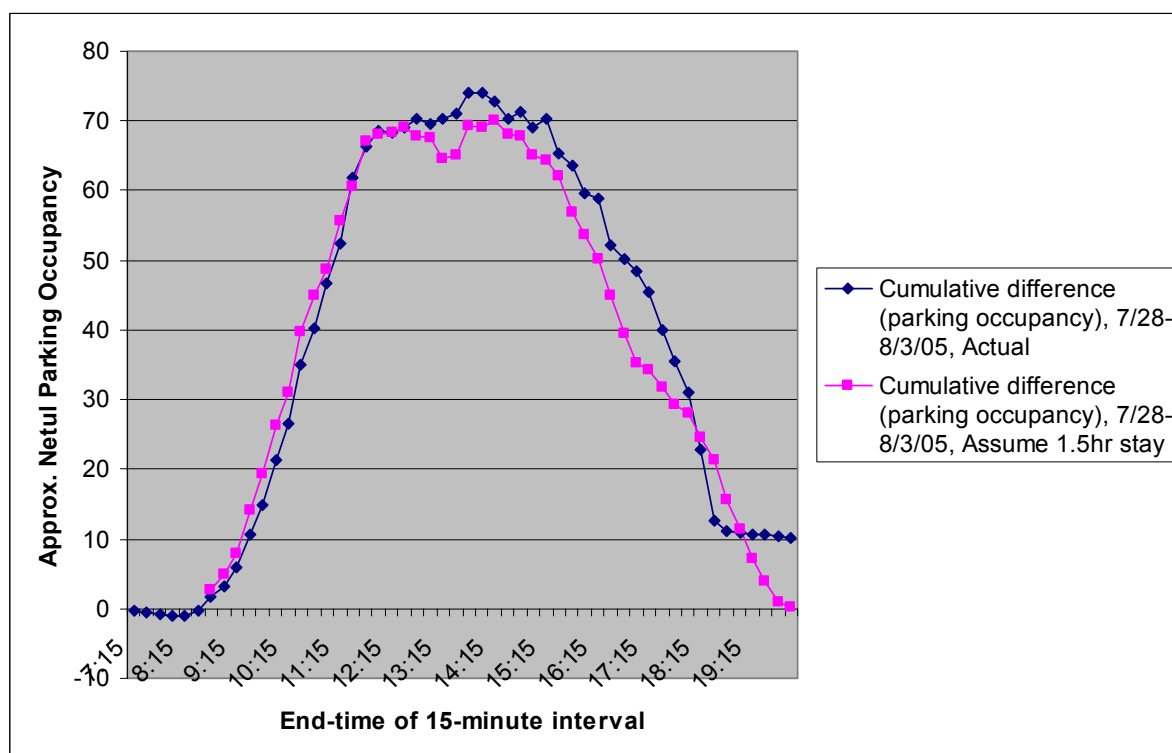


Figure D-1: Approximate Netul parking area occupancy for 7/28-8/3/2005, actual and modeled by assuming 1.5-hour stay

Mid-summer 2005 data is reasonably well modeled by assuming a 1.5-hour stay (this offers noticeably better fit to actual data than assumption of a 2-hour stay).

Using 1.5 hours as the average visit time during the summer before trail construction is complete, it was assumed that visitors making use during 2006 of the Netul River trail to access the fort replica would have a length of stay of about 2 hours (0.5 hour extra), while those exploring the Fort-to-Sea trail would leave their cars in the Netul Landing area for about 5 hours (3.5 hours extra).

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Since it is unknown exactly what portion of visitors will avail themselves of these opportunities in 2006, four scenarios were tested. Table D-1 lists these in order of increasing use of the new trails:

Table D-1: Tested scenarios for percentage of visitors choosing each option and stay-length in 2006

Scenario	Visitor's option, and percentage of visitors choosing each option		
	Fort replica only (1.5-hr stay)	Netul River trail (2-hr stay)	Fort-to-Sea trail (5-hr stay)
75-20-5	75	20	5
65-30-5	65	30	5
65-25-10	65	25	10
60-25-15	60	25	15

Figure D-2 shows the approximate parking occupancies likely to result in mid-summer 2006 under each of these scenarios, assuming the same visitation levels as 2005 and no additional transit mode share (in other words, the same inbound traffic pattern). These scenarios were created by taking average 2005 inbound traffic and shifting the stated percentage of visitors from Table D-1 by the stated number of hours of stay length to create a component of simulated outbound traffic. (All vehicles entering less than the stated number of hours before 8 pm are assumed to leave at that time.) For instance, for the 75-20-5 scenario, 75% of 2005 inbound traffic was shifted 1.5 hours, 20% was shifted 2 hours, and 5% was shifted 5 hours to create components of outbound traffic at each time interval. These components were summed for each time interval and the cumulative outbound subtracted from cumulative inbound to create the 75-20-5 line in Figure D-2.

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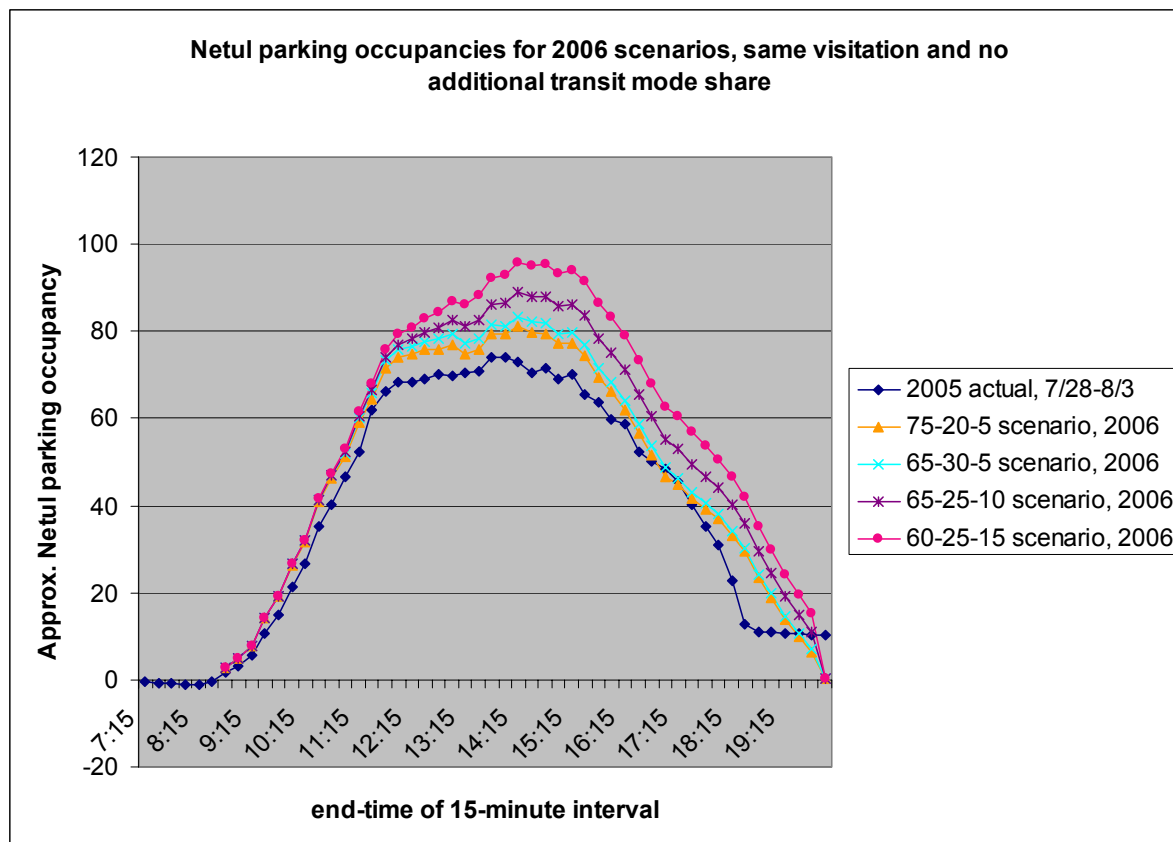


Figure D-2: Approximate Netul parking occupancies under 2006 scenarios, assuming same average visitation as 2005 and no additional transit share

Since the Netul Landing area has only 76 marked spots and only about 95 spots when all gravel overflow areas are included, it is clear that some of these scenarios could present difficulties for visitors looking for spaces, especially since Figure D-2 is based on five-day averages and actual occupancies are higher at times.

An analysis was conducted to determine, under each of the four 2006 scenarios, what additional percentage of visitors (on top of the approximately 3% transit mode share in 2005) would need to arrive at Netul by regional transit in order to reduce average parking area occupancies to the 2005 level. Minimization of root-mean-squared error in the peak 10 am-to-4 pm period was used to determine the percent reduction in arriving traffic necessary under each 2006 scenario to provide the best fit between that scenario and 2005 average parking area occupancy. Table D-2 lists the results:

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Table D-2: Percent reduction in arriving traffic (additional percentage of visitors who must arrive by transit) under each 2006 scenario to reduce parking area occupancy to 2005 level

2006 scenario	Requisite percent vehicle reduction necessary/ additional percentage transit mode share
75-20-5	9%
65-30-5	11%
65-25-10	16%
60-25-15	21%

By considering that the daily average number of visitors arriving by private vehicle during the mid-summer peak period in 2005 (7/14-8/13) was 754 (see Table 3), and continuing the assumption that visitation rates will stay similar for 2006, it is possible to scale each of these percent reductions in car arrivals and corresponding increases in transit mode share into approximate numbers of additional riders on the SETD regional routes (over 2005 ridership).

Table D-3 summarizes the breakdown of visitors arriving by private vehicle and on transit under each 2006 scenario's corresponding requisite vehicle reduction:

Table D-3: Summary of number of visitors arriving by private vehicle and by transit under requisite percentage vehicle reduction/additional transit mode share, for each 2006 scenario

Daily average visitation for mid-summer peak period is 754		Requisite percent vehicle reduction/ additional percentage visitors on transit, above 2005 levels	Daily visitors arriving by private vehicle (=remaining %, times 754)	Additional visitors arriving by transit, above 2005 levels (= % additional visitors on transit, times 754)
7/28-8/3/05 actual		--NA--	754	--NA--
2006 scenario	75-20-5	9%	687	67
	65-30-5	11%	672	82
	65-25-10	16%	634	120
	60-25-15	21%	597	157

Furthermore, it was assumed that the average number of daily inbound private vehicles to Netul between 7/28 and 8/3/05 was 295. (The number of private vehicles was the average inbound traffic count, 320, minus an assumed 25 to allow for 20 regional transit vehicle arrivals per day, plus several park vehicles.) Reducing 295 by the necessary percentage vehicle reduction rates from Table D-4 gives the approximate daily inbound private vehicle traffic flow that Netul could accommodate under each 2006 scenario without exceeding 2005 parking area occupancy levels. The difference is in each case the potential additional number of private vehicles belonging to transit riders that may require parking at the transit stops in local communities. These numbers are summarized in Table D-4.

[It is worth noting that an average auto occupancy rate of 2.56 (754 divided by 295) is thus determined for the 2005 peak mid-summer period.]

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Table D-4: Summary of approximate daily inbound private vehicles accommodated by Netul, and potential private vehicles requiring accommodation at local transit stops, for each 2006 scenario

Daily average visitation for mid-summer peak period is 754		Requisite percent vehicle reduction/ additional percentage visitors on transit, above 2005 levels	Daily private vehicles accommodated at Netul (=295 minus % vehicle reduction)	Potential additional private vehicles belonging to transit riders requiring parking elsewhere
7/28-8/3/05 actual		--NA--	295	--NA--
2006 scenario	75-20-5	9%	268	27
	65-30-5	11%	263	32
	65-25-10	16%	248	47
	60-25-15	21%	233	62

It seems very likely that the actual number of vehicles that transit riders will need to park at the bus stops will be less, since a number of riders will be able to walk to the stops from their campground or hotel. Still, careful consideration of park-and-ride availability will be necessary as a part of encouraging these increased levels of transit ridership.



As the nation's principal conservation agency, the Department of the Interior has the responsibility for most of our nationally owned public lands and natural resources. This includes fostering sound use of our land and water resources; protecting our fish, wildlife, and biological diversity; preserving the environmental and cultural values of our parks and historic places; and providing for the enjoyment of life through outdoor recreation. The department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people by encouraging stewardship and citizen participation in their care. The department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.