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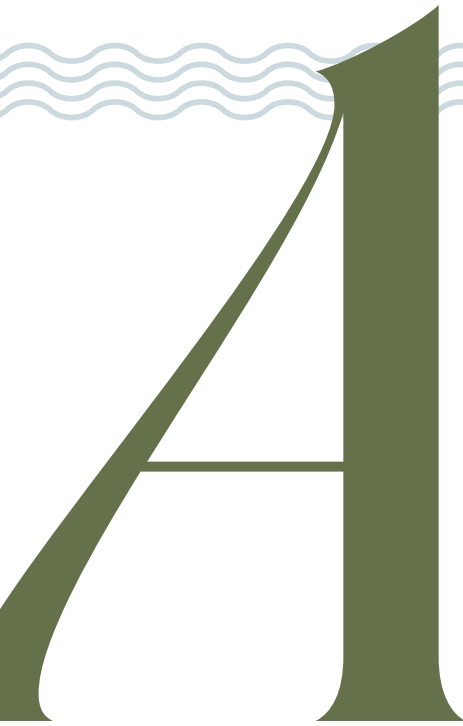


The Potomac River seen from Fort Belvoir, VA, looking northeast, with Fort Washington, MD in the distance.
Photo by Paul Lara—LARA Images.

Re-imagining commuting in the National Capital Region

By Peggy Tadej

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congestion-free and stress-free commute into Washington, D.C. likely is hard to picture for anyone who has traveled I-95 during peak travel times. The experience is congestion at its worst. But imagine hopping on the 6AM ferry from Prince William County to D.C. where you grab a coffee, relax in a leather seat, read the paper, watch TV, use the free Wi-Fi to start your workday, or sleep. The commute to work is consistent, reliable, and safe, and it gets you into the District of Columbia within an hour. As a commuting option, it

helps to avoid local congestion along the Potomac River and the one-way detours for traffic during peak congestion. If you are a tourist, you can view the historical landmarks from the water in a comfortable boat that enables you to see the Marine and Army military museums in the south, and along the way, you take in the beauty as the historical landmarks appear on the horizon. You can use water transportation to get to such out-of-the-way tourist attractions as the National Harbor and Mount Vernon without renting a car.

A new modal system is being proposed to complement the transportation system—a commuter ferry on the Occoquan,

people out of Washington D.C. during emergency situations, a reduction of single occupancy vehicles whose owners will opt for time savings, and a new environmentally friendly commuter option compared to private autos.

The National Capitol Region (NCR) is consistently among the most traffic-congested metro areas in the United States, as noted by the Texas A&M Transportation Institute's annual ranking of metropolitan areas based on how much time they say drivers spend "stuck in traffic" each year during the morning and afternoon commutes. Our transportation infrastructure is aging. Expansion opportunities are limited, and will take years to implement, and the costs are prohibitive. Comparing the cost of building new lanes versus starting a ferry service, the ferry system can be started quickly with lower capital and maintenance costs.

The vision for a successful water transportation system to work is a three-stool model that could include commuters from around the NCR going to the major employment centers; tourists that flock to the NCR in the spring, summer, and fall to see the sites and enjoy the entertainment offered; and casual travel for residents to enjoy the amenities and recreational opportunities provided because of significant new waterfront developments.

The Northern Virginia Regional Commission (NVRC) has been involved in coordinating a regional response to address the congested interstates of I-95, I-395, and I-495 vehicular corridors in Virginia, and I-295 and Route 301 in Maryland, that are operating at or near capacity. With increased congestion, emissions, energy consumption, landside infrastructure maintenance costs, and safety and system resiliency, any incident of regional significance will impact regional mobility.

NRVC formed a stakeholder group that provides the expertise and funding required publishing studies, advocating support, and engaging citizens and the media in support of commuter fast ferry service in the NCR. The more than 250 organizations on the stakeholder list are of the following types: federal government, military installations and federal facilities, state and local agencies, private sector companies, associations and non-profits (local and national), and universities. The stakeholders have provided necessary funding to conduct the first market analysis (completed in 2015) and continue to oversee the business case analysis that will be completed in September.

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Anacostia, and Potomac Rivers—that can easily be connected to transit, bike, and walking choices. This would be a robust Potomac River commuter ferry system that is integrated into the current transportation system and will result in a new multi-modal choice to avoid traffic congestion, greater system-wide resiliency, and additional commuter transportation choices. It also will offer an ability to move

Opportunities

Growth. The NCR continues to grow. The total population in the NCR is 6,385,714 (according to the U.S. Census Bureau, (2020). The NCR added 736,016 people between 2010 and 2021. Virginia's population grew by 630,369, of which 50.7% of that growth was in Northern Virginia. The gross domestic product (GPD) in the NCR is \$607.6 billion (2021). The GDP

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in the NCR is higher than 39 states and, if it were an independent nation, it would be the 23rd largest economy in the world. The NCR has the fifth largest GDP out of all metropolitan areas in the U.S. The only higher metro areas are New York, Los Angeles, Chicago, and San Francisco. The NCR is home to many Fortune 1000 companies and has several large multi-national firms. The District of Columbia is the capital of the U.S.

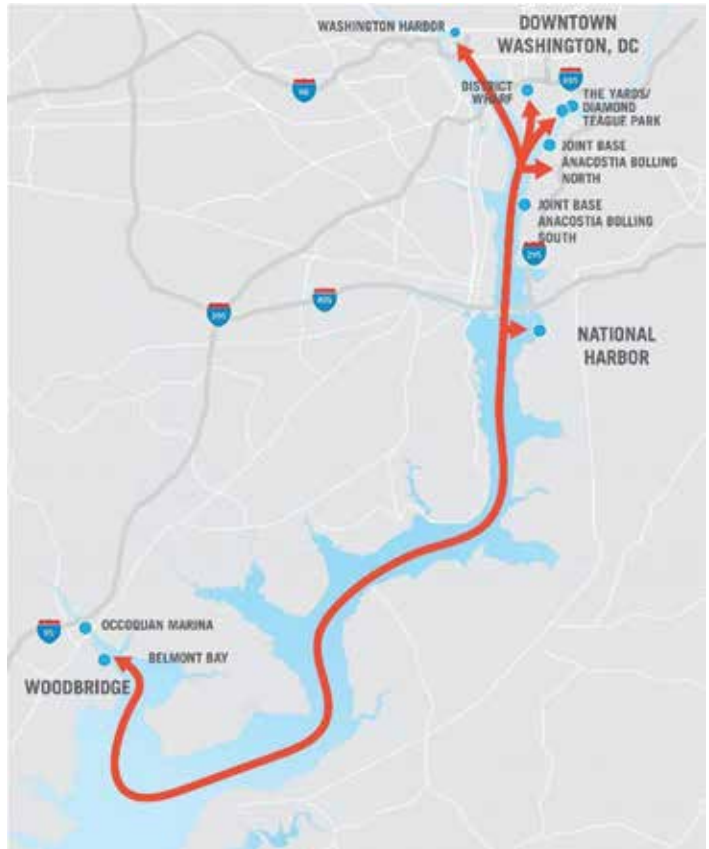
Studies completed. There have been numerous studies completed since 2000. These have shown that the ferry market exists and is sustainable for fast and frequent commuter ferry service on the Occoquan, Anacostia, and Potomac Rivers. Currently, a business case is being conducted that will help address how to incorporate a ferry system into the region's transportation system. It also will identify specific landing sites for each route, suitable vessel types, and what shore-side (docks, parking, and so forth) infrastructure is needed.

Waterfront developments. The Wharf and Audi Field did not exist 10 years ago, and Nationals Park (opened in 2008) was the founding piece of a remarkable redevelopment of the capital riverfront. The level of residential, commercial, retail, and recreational activity along the District of Columbia's waterfront has exploded over the past decade. As communities and work centers continue to evolve along the shoreline, incorporating the river back into our region's transportation system provides a cost-effective solution to providing easy cross-river connections. The stakeholder's goal has been to connect waterfront communities and work centers, and to help alleviate congestion.

Benefits. A water transportation system would create numerous benefits that currently do not exist. The number one benefit would be connectivity along the waterfront where transit currently does not exist. Mobility by water will alleviate the gridlock and traffic congestion experienced on land. The system provides an environmentally friendly transit option where none exists and a system of redundancy that adds diversity to the region's travel options.

Additional benefits include the following:

- Time savings. In many cases, ferry crossing time can be made competitive, even shorter than travel by auto. Some of the opportunities are due to the more direct pathway offered by the waterways and some are due to traffic congestion.
- Reliability and viability. Ferry travel has similar market attractiveness to commuter rail, such as VRE and MARC.
- Job creation. An active ferry service will create many year-round moderate-income job opportunities, as well as training opportunities for people wanting to advance a career in marine transportation.



Potential routes and terminals along the Potomac River. Map by Nelson Nygaard.

- Low barrier to entry. Compared with other transportation modes, a network of ferries has lower startup costs, is faster to operationalize, is more scalable, and has lower maintenance costs. An example: in less than three years, a ferry could provide new, faster connection between Georgetown and D.C. waterfront development compared to Metrorail expansion. This would not be in lieu of the expansion; a ferry network could be an interim solution to improve mobility choices now that could be eventually replaced with a Metrorail expansion.
- Economic development, commuter transit, and tourism/recreation. It can be built around current and planned employment centers, and it can provide a reverse commute option for the exurbs or those living in areas beyond the District of Columbia, along with access to retail, recreation and tourist sites, events on the water (soccer stadium, National's Park), and new residential developments. Surrounding counties have tourism potential as telling and experiencing the founding and evolution of the country.
- Expanded military and homeland security capabilities. A functional ferry operation could also be a tool to conduct water evacuations, and to mobilize personnel and supplies in emergency situations.

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- Resiliency and redundancy. The network of terminals and vessels also provides an additional option that improves overall emergency preparedness.
- Emergency preparedness. Ferries on the water all of the time creates an expanded evacuation and rescue capability, such as what happened in 2009 in the “Miracle on The Hudson.”
- First transit system operating following a natural disaster emergency such as Hurricane Sandy in New York City or the Loma Prieta earthquake in San Francisco.

The market. The studies that have been undertaken have proved that a travel market exists for commuters that would enhance tourism options with connections from the South to the North. The proposed terminal areas are growing and developing rapidly with significant new residential and mixed-use development. Speed and distance on some of the legs make this an ideal application for low-emission ferry vessels.

The proposition

Various attempts have been made to start a water transportation business. Most of these are focused on a niche tourist market and were not geared to the commuter market. All were private sector-led ventures. The private sector needs a governance structure to accept federal funding, broker relations with the military, and handle issues on the water where none exist today. During Metrorail shutdowns for repairs (May-September 2019

The concept being proposed here is to have a sustainable water transportation system that can grow with demand. Research on what other cities and states have done points to a private/public/military partnership. This model is an important ingredient to creating a successful ferry system in the NCR.

The role of the private sector would be to provide a repair/maintenance facility, ferry vessels, and operational expertise. The fleet would consist of moderate-speed vessels (15 to 20 knots); they would have passenger capacity of 150 and low or no emissions (lo-no) propulsion, and they would target a higher frequency of service, 15 to 30 minutes, for shorter trips.

The fleet also would include a higher-speed (35 to 40 knots) ferry with conventional propulsion and a capacity 250 to 300 passengers. Ideally, all vessels would be lo-no, but for higher speed/capacity vessels, there remains a technology challenge that has not yet been solved.

In addition, the private sector would provide a ship repair/maintenance facility. Currently, no large vessel marine repair and maintenance facility exists in the NCR. The closest maintenance facilities are in Baltimore, MD or Norfolk, VA—a one day, 150 nautical mile trip. The region needs a local repair/maintenance/lo-no energy transfer facility. The NCR’s nautical market currently encompasses 5,000 vessels, including 15 commercial vessels, which have no large-vessel repair options in the NCR. The need for this facility will grow as The Yards, The Wharf, and other water-oriented development projects continue to build up.

The role of the public sector would be to integrate the routes selected with the existing onshore public transit network at each end to provide a new transit alternative to driving. The public sector would be responsible for the docks and landings, including construction of new facilities as necessary, as well as maintenance and upkeep. It should be noted, however, that some facilities are under the control and maintenance of the private sector. There is, in specific locations, a role for the development community in the provision and maintenance of docks, as well.

The public sector provides the most probable and feasible governance structure. Aside from capital, there would be a need for marketing funding to engage sufficient ridership from the onset of operations. There have been significant discussions to provide a subsidy, at least as part of a start-up plan. For government employees, the Federal Mass Transit Benefits provides up to \$300 per month; for those workers, higher fares may be less of an issue. However, many private sector companies do not participate in the program. The estimated trip costs vary based on the location. Here’s an example to demonstrate the concept: with a \$30 round-trip fare with the Federal Mass Transit stipend of up to \$300 a month, the net cost to the rider would be approximately \$18 round-trip. There are potential

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and September-October 2022), Alexandria provided funding to expand ferry operations from the city that enabled commuters to take the ferry into the district. Alexandria city officials were pleasantly surprised with the results, as close to 5,000 riders per month took advantage of the service while it was offered.



opportunities related to additional federal funding opportunities that will require assessment as the details of the project move forward. The governance structure would be the logical arm of the project to apply for grants, including options to apply for funding to offer a fare subsidy.

The role of the military would, of course, include the NCR military installations that are the largest employment centers in the region. Military personnel, Department of Defense (DoD) employees, DoD contractors, and family members who live throughout the NCR frequently travel to one of these installations or federal facilities, many of which are accessible by water. Of the more than 200,000 cars traveling up and down I-95 per day, about one-fourth is part of the DoD personnel.

In total, there are six military sites along the Potomac River to include. In Northern Virginia, there are the Pentagon, Fort Belvoir, and Marine Corps Base Quantico. In Maryland, there is the Naval Support Facility Indian Head. In the District of Columbia, there are the Navy Yard, Joint Base Anacostia/Bolling, and Fort Leslie McNair, including the War College hosted on that installation. Over time, the concept of water access to military bases has evolved from significant skepticism with concerns about security risk, to outweighing the risks involved, to considering the benefits in terms of mission readiness, resilience, and reduced roadway congestion around land-based gates. It is important to provide quality-of-life

benefits to military personnel with increased access to some of the region's most desirable urban locations. Due to security, most military installations have developed without transit options, creating a "transit desert." Direct transit access to the installations is limited and is further challenged by a lack of "last mile" connections or services that link transit stations to places of work on an installation. This lack of connectivity is a disincentive for transit use and needs to be addressed to make future transit a viable alternative to driving.

NVRC has been advocating for increased transit options to support the needs of military personnel, including the development of last mile connection services within the installations. A demonstration of an automated vehicle was conducted at Joint Base Myer-Henderson Hall in summer 2019 to help address the "first-last mile" issue from Metrorail. While the technology was not ready, the concept is promising. Additional research is being conducted in San Diego, CA and Carson, CO. Water transportation makes sense with six installations and the Pentagon on the river's edge.

Barriers and challenges

Prior ferry service and land ownership. The NCR has not seen a regularly scheduled ferry service along the Potomac and Anacostia Rivers since the 1920s. The majority of the land ownership is federal public lands. As previously indicated,



Boats are winterized and locked in by ice at The Wharf.
Photo by Nelson Nygaard Consulting Associates, Inc.

there are six military installations along the Potomac, with only a few having water access. The National Park Service owns much of the land, and they have concerns about conflict and/or displacement of current water-related recreational activities. The Metropolitan Washington Airport Authority owns the land between Alexandria at the mouth of Four Mile Run up to Lady Bird Park in Arlington. The region has many historically significant sites, such as Mount Vernon, that have view sheds that cannot be altered. Old Town Alexandria has continued to address development along the waterfront with many of the decisions being controversial.

If a start-up project were to accept federal funding for any part of the project, there would certainly be a requirement for some National Environmental Policy Act (NEPA) evaluation before a decision to fund and to implement. In various areas, depending on the scope of the evaluation, this can be complex as it is not always clear exactly what agency/agencies control the river bottom. Records were researched back when Maryland and Virginia gave up the land to form the District of Columbia and then land was subsequently deeded back to Virginia. Some of the river bottoms are controlled by national parks, some by states, and, in some locations, by the military/Army Corps of Engineers.

Weather. Ice in the winter and flooding in the spring or after a big thunderstorm are frequent issues on the Potomac. Ice builds up between the bridge spans, which can cause disruptions to service during the winter. Some winters have seen the Washington channel frozen over to the degree that boats are surrounded by ice. The region lacks the equipment to break the ice; the equipment is expensive and difficult to maintain without regular use, and the weather pattern is not consistent. For example, in 2022-2023, the river never froze. During the

planning process, it was calculated that the river may be iced from 20 to 60 days to the extent that operation of regular ferry service would be prevented. Technology and/or media communication would be used to let regular riders know when the system is not in service. This would coordinate with a bus company to step in when a vessel cannot operate so that the commuter connection would remain viable.

Tidal waters. Due to the Potomac River being a tidal river with varying depths, ferries would carry passengers only. There is a channel in the river, but as the vessel approaches the banks of the river, water depths vary substantially. To be functional in this environment, the ferry fleet needs to maintain a draft of no more than five feet, with four feet being more desirable. Many of the locations along the river where channels existed at one time will require dredging because they are silted in as a result of river and tidal action. As of 2022, due to limitations on the disposal of dredge spoils, the current dredging costs in the Washington D.C. area are estimated to be \$160 or more per cubic yard. Dredging of any significant magnitude brings regulatory, environmental, and cost challenges. This means that the areas with deeper water tend to be more attractive and more viable, as a startup.

COVID-19. The pandemic deteriorated the roadways as more people are driving and fewer are taking Metrorail and other transit options. At the time of this writing, the transit systems are seeing ridership at approximately 70% of pre-pandemic levels, with less emphasis on peak ridership. The pandemic also proved that small package deliveries can be critical, as we all watched from our dining room tables as UPS, USPS, or Amazon pulled up to deliver the next meal or needed item(s). There is the potential for ferries to provide more

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efficient package delivery to waterfront locations. Further study is needed to identify the potential of this market. It is also recognized that inclusion of light freight would change the configuration of the ferry vessels and the terminals.

Champions. Regional leadership is lacking. Frank Principi, the former supervisor from Woodbridge in Prince William County, was a recognized champion for his work in advancing fast passenger ferries. But he is no longer in elected office. There has not been another elected leader to take on the champion role for developing a water transportation system in the NCR. Political will is a key element as the present land-based transit has many issues, many of which require significant investment just to meet sustainability and safety goals. The concern is that investing up to \$500 million to stand up a ferry operation will endanger efforts to resolve issues with land-based transit. To date, there has been little political willingness to flex funds from highway improvements to start up or support a new mode.

Funding. A governance structure will allow the region to apply to the numerous federal grant funding opportunities that are funding sources designated for ferry providers, such as: Federal Transit Administration Passenger Ferry Funding; Low-emission Ferry Funding; Maritime Administration; Federal Highway Administration Ferry funding; Defense Community Infrastructure Funding; and DoD's Readiness and Environmental Protection Integration for NEPA) funding. The Small Business Administration provides loans for operators to purchase boats and new legislation has funding to assist with retrofitting fleets or building new fleets that are energy efficient. With congressional earmarks back as another option, there could be future earmarks, if there is local support for the concept. Federal grants usually require a 20% to 50% match from state and local funding sources. To date, no sources of these funds have been offered or available. In addition, there is little federal funding available to do the planning, environmental, or engineering necessary to get the projects "shovel ready." For the private sector to build a maintenance facility, a land-lease agreement may be needed. Timing will be critical in getting all of the funding pieces in place as there is no one source for funding needed to move the project ahead. Funding assembly has a distinct time element.

Timing. The permitting process for dredging, NEPA reviews, obtaining speed limit waivers, and dealing with layers of bureaucracy all have their own rules and regulations and will take time. All of these efforts will require coordination at every level of government and necessary funding above what the private sector might bring to the table. There is also

the practical consideration that vessels of the type and design needed for this service are not already built. These vessels will need to be constructed, which—based on today's limitations with materials and availability—could easily take two years, and possibly even longer to ensure regulatory process and dependable, safe integration of lo-no emission technology in those vessels. While the technology exists, it is not yet a maritime industry construction standard compared to conventional power with internal combustion engines.

The path forward

The NVRC business case will be completed in September 2023, and will provide a business plan to increase awareness of opportunity and encourage investment. The business case recognizes the need for the private sector to provide access to financial markets, venture capitalist developers, and ferry operators. The public sector will have the goals of enhancing mobility and resilience. The business case also will propose a feasible, fundable, and workable plan for phasing commuter ferry services. The M-495 stakeholders group

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is working to create interest in leadership for implementation once the business plan is completed with an operating plan, financial model, and governance structure.

Perhaps reading about this project piques your curiosity or sparks your ingenuity with regard to the technological and engineering aspects. Or perhaps it will encourage you to join us in creating a vision of the future by using the Occoquan, Anacostia, and Potomac Rivers as a scenic byway that connect communities to work centers, entertainment, and historical destinations. To learn more, check out www.potomaccommuterfastferry.com. **MT**

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