

9.0 WATER TAXI

The public engagement process identified water taxi service as one of the additional transportation alternatives for consideration. The concept for the water taxi service is to provide a connection across Back Bay between the western shore and the Refuge on the eastern shore for visitors without access to a boat. A water taxi service would provide both an alternative transportation option for those visiting and exploring the Refuge lands and a means for visitors to experience the Refuge waters.

◆ Scoping/Planning

There are several models for operating water transit services to federal land management agency sites. The service can be operated by the agency, by a supportive organization, by a single concessioner, or by multiple private operators via commercial use authorizations. The service could operate on a fixed schedule, on demand, or a combination of both.

For the purposes of this study, it is presumed that a private concessioner would operate the water taxi service. Neither the Refuge, nor BBRF, its supportive organization, has the resources to operate the service. The water taxi concept also assumes that the service would be a fixed-route, scheduled service. This is as identified in the public scoping process. The ability of the boat captain to provide interpretive information to the passengers could be a value-added element to justify the cost of the trip, regardless of the transportation benefits.

Figure 9.1 illustrates the water taxi route. The water taxi would depart from Mill Landing and would have stops at Barbour Hill at FCSP and the existing Visitor Contact Station at the Refuge. The (one-way) trip distance is

approximately 8.5 nautical miles (nm) and could take about 45 minutes. The return trip takes a more northerly route for approximately 5.7 nm and could take about 30 minutes.

◆ Schematic Design
Water Taxi Schedule

The water taxi service is assumed to operate the same days of the year as does the existing Blue Goose tram tour. The tour operates daily during the peak season (Memorial Day through Labor Day), and on Friday, Saturday and Sundays during the shoulder season months of April, May, September and October. In all, the water taxi would operate approximately 150 days each year.

Table 9.1 shows an example daily schedule. The proposed days and hours of operation are somewhat generic for the purposes of this study and comparison to other alternative transportation access options. In reality, the schedule of a commercial water taxi service would, and should, be flexible. For example, the service might operate only six days per week to provide time for maintenance of the boat, the service might not operate on days of bad weather, or the operator may offer earlier or later trips on some days if demand warrants.

The schedule of two-hour roundtrips is based on a single boat and a one-way travel time of about 45 minutes along the 8.5 nautical miles between Mill Landing and the Refuge. Those visiting the Refuge have a choice of four daily departures (the 5:00 pm departure doesn't provide time to visit the Refuge). Those taking the first departure of the day at 9:00 am have the option to visit the Refuge for as long as eight hours and those taking the 3:00 pm departure could visit for two hours. According to the

2012 visitor survey, the average time visitors spend at the Refuge is four hours.

The daily capacity of the water taxi service would be about 30 passengers. The theoretical capacity of the daily departures from Mill Landing to the Refuge is 44 passengers (11 passengers per trip assuming 12-person boats, and ignoring the 5:00 pm dead-head run), but the outbound capacity to the Refuge and FCSP is constrained by the need to accommodate the typical surges of passengers returning from the Refuge and FCSP on the final trips of the day. For example, the 4:00 pm return trip from the Refuge would be used not only by passengers who arrived at the Refuge via the 1:00 pm departure from Mill Landing, but also some of those who arrived via the 9:00 am and 11:00 am departures from Mill Landing.

TABLE 9.1: EXAMPLE WATER TAXI DAILY SCHEDULE

APRIL AND MAY	MEMORIAL DAY TO LABOR DAY	SEPTEMBER AND OCTOBER	NOVEMBER TO MARCH
Fridays, Saturdays, and Sundays	Daily	Fridays, Saturdays, and Sundays	Closed
9:00 am	10:00 am	10:15 am	
11:00 am	12:00 noon	12:15 pm	
1:00 pm	2:00 pm	2:15 pm	
3:00 pm	4:00 pm	4:15 pm	
5:00 pm	6:00 pm	6:15 pm	

Water Taxi Vessels

The water taxi concept assumes the use of a pontoon boat. The shallow draft of such boats is critical given the low and variable water depths in Back Bay, and pontoon boats are commonly used in the bay. Pontoon boats are also well suited for providing visitors with a good experience, and function as tour boats in many wildlife refuges because they are comfortable and provide passengers with good sightseeing views. Additionally, for the operators, they are relatively inexpensive to own, maintain, and operate.

Pontoon boats are available in many sizes and configurations. For the purposes of this study it is assumed that a 26-foot long vessel would be used. This would allow for up to 12 passengers and crew, could accommodate a wheelchair, and could carry a couple of bicycles and/or camping equipment if necessary.

Coast Guard requirements for vessel inspections, captain licensing, and crewing requirements vary depending on, among other things, the number of passengers in a boat. The lowest requirements apply when there are six or fewer paying passengers. In those cases the operator needs only an Operator of Uninspected Passenger Vessels (OUPV or “six-pack”) license. If there are more than six paying passengers the operator must have a Masters Captain License and the vessel is subject to Coast Guard inspection requirements. Passenger-for-hire vessels of both sizes, “six-pack” and larger, are currently being used for water tours and charters in the Virginia Beach area.

A water taxi service would require other capital items related to the vessel. There would need to be a boat

trailer (and vehicle to pull it) and a storage canopy or shed.

Water Taxi Landside and Waterside Infrastructure

The waterside infrastructure needs for the water taxi service are similar to those for the enhanced canoe/kayak water access discussed previously in Chapter 9.0: an accessible pier, gangway, and floating dock. The landside infrastructure needs for the water taxi service include vehicle parking, access to restrooms, shelter from the sun for those waiting for the boat, and an accessible route from the dock to parking and to nearby contact stations. As with the waterside infrastructure, most of these landside program elements are also applicable to the alternatives to enhance canoe/kayak water access.

The infrastructure needs to accommodate water taxi service are summarized in Table 9.2. Four options are presented. At each of the three locations there are options for the water taxi service to make use of the waterside infrastructure proposed for the enhanced canoe/kayak water access alternatives. There are options to adapt existing piers to accommodate the water taxi service at the existing BBNWR Visitor Contact Station site and at Barbour Hill at FCSP.

Mill Landing has a boat ramp and docks, but they are not suitable for adopting for either a water taxi service or for canoe/kayak launches. Accordingly, the water taxi service would make use of the fixed pier, gangway and floating dock proposed for the handicap-accessible canoe/kayak launches (see Figure 9.1). Landside amenities at the Mill Landing site consists only of a gravel parking lot. The site would need a restroom, and preferably a sun shelter. If the parking lot were to

remain as gravel, there would need to be a pad built for handicap parking and an accessible route to the dock constructed. The parking area at Mill Landing may require expansion to accommodate parking demand on peak days. The water taxi service would require parking for a truck with boat trailer, and for about 10 cars. Additional parking would be needed if overnight parking was allowed for campers at FCSP.



Water Taxi Vessel

TABLE 9.2: WATER TAXI INFRASTRUCTURE PROGRAM ELEMENT NEEDS

	MILL LANDING	BBNWR EXISTING VISITOR CONTACT STATION		BARBOUR HILL - FALSE CAPE STATE
	MILL LANDING USE PROPOSED CANOE/KAYAK LAUNCH	USE PROPOSED CANOE/KAYAK LAUNCH	ADAPT FISHING PIER	ADAPT BOAT SLIP PIER
Pier, Gangway, and Floating Dock	Use pier, gangway, and dock proposed for enhanced kayak water access.	Use pier, gangway, and dock proposed for enhanced kayak water access	Add gangway and dock to fishing pier	Add gangway and dock to boat slip pier
Parking	May need to expand, or provide shuttle bus	Existing	Existing	N/A
Restrooms	Proposed	Existing	Existing	Existing
Sun Shelter	Proposed	Proposed	Proposed	Proposed
Other	Accessible parking and route to dock	Accessible route to parking lot	Accessible route to contact station	Accessible route to contact station

The BBNWR existing Visitor Contact Station site has restrooms and a 105-space parking lot. The site would not need additional waterside infrastructure for the water taxi if the service used the proposed handicap-accessible canoe/kayak launch facilities (see Figure 8.3). If the existing fishing pier/boat ramp could be used instead, a gangway and floating dock would need to be added. Although shelter is available in the existing contact station, a simple shade structure with seating, would be desirable for either option. In addition, the second option would require an accessible path between the contact station and the existing pier.

There is an existing boat slip pier at the Barbour Hill site in FCSP, which would require the addition of a gangway and floating dock if used by the water taxi service. Barbour Hill also has restrooms and a contact station. The only landside improvements needed would be to ensure there is an accessible route from the dock to the contact station.

Shuttle Service from Visitor Contact Station

The Mill Landing site is owned by the DGIF and is well-used by those fishing, hunting, and boating in the bay. The parking area can become full with vehicles and boat trailers, especially during summer weekends. If the parking could not be expanded to accommodate the additional demand from the water taxi service, then water taxi passengers could park at the future Visitor Contact Station and take a shuttle bus to transport them to Mill Landing. Such a shuttle service could also be used by those arriving at the future Visitor Contact Station from other transit connections, although the number of such users is likely low given that they would have a 3-seat or even a 4-seat transit trip both to and from the Refuge.

The shuttle service would meet the water taxi’s arrival and departure from Mill Landing, starting with the 9:00 am departure to the Refuge and ending with the 7:00 pm arrival from the Refuge. The shuttle route is about 10 miles long (30 minute ride) and a single shuttle bus would be sufficient to accommodate the water taxi schedule.

◆ **Water Taxi Cost Estimate**

A commercial entity would operate the water taxi service alternative. As such, the concessioner rather than the Refuge would bear most of the operating costs. The concessioner would also be responsible for the vessels. The Refuge and its partners would be responsible for construction and maintenance of the waterside and landside infrastructure at the landings.

Water Taxi Capital Costs

The capital costs for the necessary infrastructure at the two landings are shown in Table 9.3. The total cost is \$608,100 if the work is done as a standalone project. The cost would not add any additional costs if the water taxi service is an add-on to the water access alternative of improved canoe/kayak launches.

The capital costs for the concessioner are principally those for the vessel. A pontoon boat, a trailer, and a storage canopy would cost about \$35,000. The concessioner would also need a vehicle, likely at a similar cost. The concessioner would likely also use these for other purposes during the off-season, if not other times, and not all of the capital costs would be attributable to the water taxi concession.

The dock access would most likely be a shared cost with improvements or new construction of the kayak/canoe launch sites at Mill Landing and the existing Visitor Contact Station. The costs shown in Table 9.4 are estimates to build if the launch sites are not built prior to the introduction of the water taxi. Adapting the existing fishing piers involves attaching a floating dock system and other unidentified improvements. Structural and accessibility investigation was not performed in this study. It is assumed that a portable gangway at the dock/pier would be provided at each location.

TABLE 9.3: CAPITAL COSTS BORNE BY REFUGE AND PARTNERS

	MILL LANDING	BBNWR VISITOR CONTACT STATION		BARBOUR HILL - FCSP
	MILL LANDING USE PROPOSED CANOE/KAYAK LAUNCH	USE PROPOSED CANOE/KAYAK LAUNCH	ADAPT FISHING PIER	ADAPT BOAT SLIP PIER
Construction	\$200,000	\$114,000	\$50,000	\$50,000
Contingency	\$40,000	\$22,800	\$10,000	\$10,000
Design	\$36,000	\$20,500	\$8,000	\$8,000
Wetlands Mitigation	\$4,000	\$6,800	N/A	N/A
Permitting	\$7,000	\$7,000	\$7,000	\$7,000
TOTAL	\$287,000	\$171,100	\$75,000	\$75,000

Water Taxi Operation and Maintenance Costs

Most of the operating and maintenance costs would be the responsibility of the concessioner. The Refuge would be responsible for maintenance of the docks and other infrastructure at the landings. The annual cost is estimated at four percent of the capital cost, or \$24,300 if done as a standalone project or as an add-on to accessible canoe/kayak launches. There would also be some undefined indirect costs for administrative oversight of the concessioner contract, emergency response, marketing, etc.

The operations cost for the concessioner includes items such as labor, fuel, maintenance, depreciation, advertising, supplies, and profit. The operations cost is approximately \$109,000 for the season. This equates to about \$715 per day of operation. The round-trip fee required for break-even operations is summarized in Table 9.4. If the service can average 25 passengers each of the 150 days of the season then the breakeven ticket price would be about \$29.00. This is in the high end of the range for ticket prices for other motorized water tours in the Virginia Beach area.

If there proves to be insufficient parking at Mill Landing, there would need to be shuttle service from the proposed BBNWR Visitor Contact Station to Mill Landing. Table 9.5 illustrates the breakeven ticket price for water taxi service, with and without the cost of the shuttle being borne by the water taxi operator. At an (in-service) hourly cost of \$40 the shuttle service would cost \$440 per day and \$66,000 per season. The breakeven ticket price if there were 25 passengers per day would be about \$46.00.

Water Taxi Ridership

For most people visiting the Refuge, the water taxi service would not be competitive with regards to travel time when compared with driving to the Refuge or options such as shuttle service from the future Visitor Contact Station. The primary reason visitors would choose the water taxi service from among their other transportation options is the water experience it provides. The trip itself would be the attraction.

For visitors to FCSP, notably campers, the water taxi service would be a very attractive transportation option. The only access to the park for campers is by private boat, to hike/bicycle through the Refuge, or to ride the existing tram. The water taxi service would provide a convenient means to transport equipment and dogs (which are not allowed for those traveling through the Refuge). The water taxi service might also avoid the required \$2.00 per person fee to enter the Refuge on the way to False Cape State Park.

The potential ridership for the water taxi is estimated to be approximately 3,700 (round trips) during the 150-day seasonal operation. This is an average of about 25 passengers per day. The estimate relies on daily visitation patterns in 2014. The water taxi service is assumed to operate at the full 30-person capacity on days when visitation at the Refuge is at or above the average for the season, and at proportionally lower ridership on days the Refuge experiences below-average visitation. In 2014, there were some 84 days during the 150 day schedule with below-average visitation.

Actual ridership will depend in large part on the pricing of the service. The necessary ticket price for breakeven operations of the water taxi is about \$29 per passenger and another \$17 per passenger for the shuttle service between the future Visitor Contact Station and Mill Landing. Although the ticket cost for the boat trip is somewhat comparable to other motorized water tours in the Virginia Beach area, if the shuttle cost had to be covered by ticket sales then the total price would exceed the reasonable price point for attracting riders.

TABLE 9.4: BREAKEVEN TICKET PRICES

AVERAGE DAILY WATER TAXI PASSENGERS	AVERAGE ROUND-TRIP TICKET PRICE (ASSUMING NO SHUTTLE SERVICE FROM FUTURE BBNWR VISITOR CONTACT STATION)	AVERAGE ROUND-TRIP TICKET PRICE (INCLUDING COST OF SHUTTLE SERVICE FROM FUTURE BBNWR VISITOR CONTACT STATION)
15	\$48	\$77
20	\$26	\$57
25	\$29	\$46
30	\$24	\$38

◆ **Benefit Analysis**

As depicted Table 9.5, the water taxi completely meets three of the MOEs.

Visitor Mobility

• **Reduce Traffic Congestion**

Trip time to the Refuge is likely longer for almost all visitors who might use the water taxi, and the water taxi would divert too few cars to have any noticeable impact on congestion along Sandpiper Road. The water taxi is projected to carry 25 to 30 passengers per day. Based on the finding of the 2012 visitor survey that the average travel party size visiting the Refuge is four persons, the water taxi service would reduce the vehicle trips into the Refuge by about 6 to 8 cars per day.

• **Enhanced Visitor Mobility, Accessibility and Safety**

The water taxi service would provide substantial mobility benefits for visitors to the Refuge. The water taxi would provide access to the waters of the Refuge, something that few visitors currently have. The water taxi would be accessible for persons who are mobility impaired.

• **Improve Visitor Education, Recreation and Health Benefits**

The water taxi would have exceedingly high benefits for the visitor experience. The water taxi would offer an opportunity for visitors to experience and learn about the waters of Back Bay. Providing such environmental education and interpretation is an important part of the FWS mission.

◆ **Environmental Benefits**

• **Protection of Sensitive Natural, Cultural and Historical Resources**

The direct environmental benefits of the water taxi service are generally slightly adverse due to the limited number of visitors it could accommodate. The construction of the waterside and landside infrastructure would impact natural resources. The vessel draft, vessel speed, and routes through the Refuge waters would be such that adverse impacts to water habitats would be avoided. The water taxi service would provide indirect environmental benefits by providing an educational experience exploring and learning about Back Bay that can inspire lifelong stewardship of the environment.

• **Reduced Pollution**

Vehicle miles traveled by visitors using the water taxi are likely to be the same or more than if they were to drive to the Refuge and even if they were less the emissions from the boat would offset any savings.

TABLE 9.5: MEASURES OF EFFECTIVENESS - WATER TAXI

MEASURES OF EFFECTIVENESS - WATER TAXI	SCORE
VISITOR MOBILITY	
Reduce Traffic Congestion	1
Enhanced Visitor Mobility, Accessibility and Safety	3
Improve Visitor Education, Recreation and Health Benefits	3
ENVIRONMENTAL BENEFITS	
Protection of Sensitive Natural, Cultural and Historical Resources	0
Reduced Pollution	0
OPERATIONAL EFFICIENCY AND FINANCIAL SUSTAINABILITY OF ALTERNATIVES	
Effectiveness in meeting BBNWR Goals	3
Financial Plan - Development and Operational Costs	1
Potential Funding Sources	1
CONSTRUCTION/OPERABILITY	
Project Phasing and Sequence Limitations	1
Limitations on Transportation Operation	2
SCORING SYSTEM: 0=DOES NOT MEET CRITERIA, 1=SLIGHTLY MEETS CRITERIA, 2=MOSTLY MEETS CRITERIA, 3=COMPLETELY MEETS CRITERIA	

◆ **Operational Efficiency and Financial Sustainability of Alternatives**

• **Effectiveness in meeting BBNWR Goals**

BBNWR goals are identified in the September 2010 Comprehensive Conservation Plan. By providing a sustainable alternative means of access to the Refuge, the water taxi would support BBNWR goals for habitat preservation, and would support the FWS priority public uses of wildlife viewing, wildlife photography, environmental education and environmental interpretation.

• **Financial Plan - Development and Operational Costs**

Construction of the water taxi dock could be combined with the investments made for the canoe/kayak launches at Mill Landing and the existing contact station in BBNWR, resulting in few additional costs and little additional permitting. If the dock becomes a standalone project, then the Mill Landing site would require a new pier and dock, but water taxi docks at BBNWR and FCSP could be added to existing piers and thus reduce costs and schedule.

The water taxi service is among the most financially sustainable of the transportation access alternatives because there are no commitments to most future operating costs. If the concessioner does not find the service to be financially viable it will simply discontinue and there will be no further re-occurring costs except the maintenance of infrastructure at the landings built specifically to support the water taxi.

• **Potential Funding Sources**

Section 11.1 of this report identifies a range of potential sources that could help fund the water taxi

service. Related improvements at the Refuge are eligible for Federal Lands Transportation Program funding and improvements at Mill Landing, and perhaps FCSP, are eligible for the Federal Lands Access Program (FLAP). The DGIF Public Boating Access Grants and the Transportation Investment Generating Economic Recovery (TIGER) program may offer other potentials for funding this type of improvement.

◆ **Constructability/Operability**

• **Project Phasing and Sequence Limitations**

The phasing of costs associated with the upgrades for the canoe/kayak launches would need to account for the water taxi dock improvements. The operability of the sites would require maintenance in the form of clearing vegetation and obstructions, regrading, and pier and dock maintenance, as well as police patrol and enforcement activities.

• **Limitations on Transportation Operation**

Stakeholders raised concerns about water depths during the initial planning of the water taxi concept. Water depth is primarily an issue during the out-of-

season months when the wind patterns shift from southerly to northerly, pushing water out of the bay. If there are periods of time during the months when the water taxi is in operation that the water depths in the bay drop below acceptable levels for operation of the water taxi, then service would be disrupted.

◆ **Conclusion**

The scheduled, fixed-route water taxi service to the Refuge outlined in this study is unlikely to be viable. Projected ridership is too low, and the operating cost too high, to attract concessioners. The financial viability could be improved if the operations could be more flexible, with fewer days of operation and the ability to cancel trips when passenger demand is low, but this would not be consistent with BBNWR's objectives for alternative transportation.

Providing visitors access to the waters of BBNWR is highly desired. It provides opportunities for environmental education and interpretation, wildlife observation, and wildlife photography — all of which are among the priority uses at national wildlife

refuges. If a fixed-route water taxi concession is not practicable, a more effective water taxi operation would be to grant commercial use authorizations (CUAs) to whomever wished to operate water taxi service from their own properties along the bay. They could offer more targeted, personal service to visitors to the Refuge and to FCSP. As an on-demand service they would have lower operating costs because trips would occur only when passenger demand warranted. Essentially, the market would control how many water taxi operators there would be and how they would operate. Additionally, the operators would have more flexibility in making trips and could expand services to other Back Bay locations, perhaps even Little Island Park.

TABLE 9.6: WATER TAXI PROJECT SCHEDULE

PROJECT MILESTONES	PROJECT SCHEDULE WATER TAXI															
	YEAR 1				YEAR 2				YEAR 3				YEAR 4			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Concessionaire Procurement																

Project Schedule Notes:

1. Schedule assumes the Water Access project elements have been constructed.