

Appendix P: Needs – Ferries



**Kentucky's Long-Range
Transportation Vision**



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FERRY NEEDS

This section summarizes the Kentucky Transportation Cabinet's (KYTC) spending needs between 2022-2045 for ferryboats. Ferries operate at 10 locations in Kentucky. One ferryboat is federally funded (Green River Ferry), two are privately funded (Anderson Ferry and Rising Star Ferry), and seven are state-funded (Augusta, Cave-in-Rock, Dorena-Hickman, Reeds, Rochester, Turkey Neck Bend, and Valley View).¹ Two of the state-funded ferries operate between Kentucky and another state (Dorena Hickman Ferry to Missouri and Cave-in-Rock Ferry to Illinois), and in these cases KYTC shares funding responsibility with the other states' government.²

The needs documented account for only Kentucky's funding share for the seven state-funded ferries' operations, maintenance, and in limited circumstances capital needs. Capital spending needs are not generally included since they are adequately met through a federal capital program funds called the Ferryboat Program Funds for the five state-funded ferries that are eligible for these program funds. Two of the seven state-funded ferries are ineligible for federal capital funds due to being privately owned (Cave-in-Rowaterck ferry) or being owned through a 501(c)(3) entity (Augusta), and capital spending needs for the Augusta ferry are included in this analysis.

The section has three primary sections including this Introduction. The Methodology section describes the data used in the needs assessment, assumptions, and data processing steps. The Results section presents the needs by category and by year of expected expenditure.

METHODOLOGY

Overview

There are four components to ferryboat operation needs, whose calculation is summarized below and is detailed in the following subsections. These four components are summed to generate KYTC's total ferryboat needs between 2022 and 2025.

- **Needs derived from historical spending:** KYTC's spending on ferryboat operations and maintenance that is extrapolated from historical spending captures trends in KYTC's ferryboat spending and is the foundation of the needs assessment.
- **Additional needs derived from known budget requests:** Several ferry operators have made additional budget requests known to KYTC. Since these budget requests are for increases in annual spending for operations and maintenance, they are applied to each year in the planning period and added to the needs derived from historical spending.
- **Additional operations needs for meeting Subchapter M requirements:** Subchapter M rules issued by the U.S. Coast Guard may add additional costs to ferry operators if waivers that have exempted Kentucky's ferry operators from some of its requirements are not extended.³ The needs for additional personnel to meet the federal requirements are added to the needs calculated in the two previous bullets.

¹ Kentucky Transportation Cabinet (n.d.) Ferryboats. Accessed November 15, 2021. Retrieved from <https://transportation.ky.gov/MultimodalFreight/Pages/FERRYBOATS.aspx>.

² Meeting with KYTC freight, rail, and waterways coordinator, November 4, 2021.

³ Meeting with KYTC freight, rail, and waterways coordinator, November 4, 2021.

- Capital needs for ferry replacement:** The cost to replace the Augusta ferry is included since it has been estimated by the ferry operator. There may also be capital needs for the privately owned Cave-in-Rock ferry, although their size is not known and the capital needs of Cave-in-Rock ferry are not included in this analysis.

Data Sources

The primary data sources used in this analysis include programmed state spending on ferries between 2005 and 2026 from the relevant Kentucky State Highway Plans, additional spending requests from ferryboat operators, annual operating hours for each ferry, and expected replacement costs for the Augusta ferry. While most of the data used to derive ferry needs are specific to Kentucky, there are also two data points from the U.S. Bureau of Labor Statistics that are used to derive salaries and benefits for new ferry employees that may be required to meet federal requirements known as Subchapter M requirements. Table 1 shows the primary data sources that were used to generate ferry needs.

Table 1: Primary Data Sources

Description	Source	Purpose in Methodology
Programmed state spending on ferries from 2005 to 2026	Kentucky State Highway Plans for the following years: 2004, ⁴ 2006, ⁵ 2008, ⁶ 2010, ⁷ 2012, ⁸ 2014, ⁹ 2016, ¹⁰ 2018, ¹¹ 2020 ¹²	Estimated needs derived from historical spending
Additional spending requests received by KYTC from ferryboat operators.	Meeting with KYTC freight, rail, and waterways coordinator ¹³	Estimated additional needs derived from known budget requests

⁴ KYTC (2004). Kentucky's FY 2004 - FY 2010 Highway Plan. Retrieved from <https://transportation.ky.gov/Program-Management/Highway%20Plan/2004%20Highway%20Plan%20COMPLETE.pdf>.

⁵ KYTC (2006). Kentucky's FY 2006 - FY 2012 Highway Plan. Retrieved from <https://transportation.ky.gov/Program-Management/Highway%20Plan/2006%20Highway%20Plan%20COMPLETE.pdf>.

⁶ KYTC (2008). Kentucky's FY 2008 - FY 2014 Highway Plan. Retrieved from <https://transportation.ky.gov/Program-Management/Highway%20Plan/2008%20Highway%20Plan%20COMPLETE.pdf>.

⁷ KYTC (2010). Kentucky's FY 2010 - FY 2016 Highway Plan. Retrieved from <https://transportation.ky.gov/Program-Management/Highway%20Plan/2010%20Highway%20Plan%20COMPLETE.pdf>.

⁸ KYTC (2012). Kentucky's FY 2012 - FY 2018 Highway Plan. Retrieved from <https://transportation.ky.gov/Program-Management/Highway%20Plan/2012%20Highway%20Plan%20Complete.pdf>.

⁹ KYTC (2014). Kentucky's FY 2014 - FY 2020 Highway Plan. Retrieved from <https://transportation.ky.gov/Program-Management/Highway%20Plan/2014%20Highway%20Plan%20COMPLETE.pdf>.

¹⁰ KYTC (2016). Kentucky's FY 2016 - FY 2022 Highway Plan. Retrieved from <https://transportation.ky.gov/Program-Management/Highway%20Plan/2016HighwayPlanAll.pdf>.

¹¹ KYTC (2018). Kentucky's FY 2018 - FY 2024 Highway Plan. Retrieved from <https://transportation.ky.gov/Program-Management/Highway%20Plan/2018HighwayPlanAll.pdf>.

¹² KYTC (2020). Kentucky's FY 2020 - FY 2026 Highway Plan. Retrieved from <https://transportation.ky.gov/Program-Management/Pages/2020-Highway-Plan.aspx>.

¹³ Meeting with KYTC freight, rail, and waterways coordinator, November 4, 2021.

Description	Source	Purpose in Methodology
Annual operating hours for fiscal years 2019, 2020, and 2021	Ferry Traffic Counts provided by KYTC	Estimated hours for which additional personnel may be required to meet Subchapter M requirements.
Annual salary for “Motorboat Operators”	Bureau of Labor Statistics ¹⁴	Estimated wages for additional personnel that may be required to meet Subchapter M requirements.
Benefits as share of total compensation for state and local employees	Bureau of Labor Statistics ¹⁵	Estimated benefit costs for additional personnel that may be required to meet Subchapter M requirements.
Expected cost to replace the Augusta ferry	Email from KYTC freight, rail, and waterways coordinator ¹⁶	Estimated needs for ferry replacement associated with the Augusta Ferry

Assumptions

The following primary assumptions support the needs analysis.

- Operations and maintenance needs are not decreasing in constant inflation-adjusted terms for any ferry system.
- Inflation will average 2% annually between 2022 and 2045.
- The number of state-sponsored ferries will remain the same during the forecasting period.
- Waivers for enforcing subchapter M requirements will not be granted after 2025.
- Capital costs for state-funded ferries will continue to be met through federal funding programs for eligible ferries.
- Augusta ferry will require one full replacement (tow boat plus barge) during the forecast period.

Processing

Needs Derived from Historical Spending

Historical programmed spending in year of expenditure dollars was collected from each of the Kentucky State Highway Plans between 2004 and 2020. The plan is released every two years and contains programmed spending for the following six years, meaning that several plans report programmed spending for the same years. This analysis retained spending from the plan whose release date is closest to the programmed year

¹⁴ U.S. Bureau of Labor Statistics (2020). May 2020 National Occupational Employment and Wage Estimates. Retrieved from https://www.bls.gov/oes/current/oes_nat.htm#53-0000.

¹⁵ U.S. Bureau of Labor Statistics (2021). Employer Costs for Employee Compensation – June 2021. USDL-21-1647. Retrieved from <https://www.bls.gov/news.release/pdf/ecec.pdf>.

¹⁶ Email from KYTC freight, rail, and waterways coordinator, November 15, 2021

when multiple plans report spending for the same year. All six years of programmed data are retained for the FY 2020-2026 Kentucky State Highway Plans since this plan's release date is closest to the year of expenditure.

One adjustment was made to the spending recorded in the Kentucky State Highway Plans, which was to increase spending for the Cave-in-Rock ferry between 2018 and 2026 to \$1.26 million annually to account for those years KYTC contributed funds beyond those from the Road Fund which are reported in the Highway Plan.¹⁷

After this adjustment, the collected spending between 2004 and 2026 is linearly extrapolated for each ferry through 2045.

Then, spending for each ferry from 2022 to 2045 is converted from year of expenditure dollars to constant 2022 U.S. dollars (USDs) using a 2% inflation rate applied to the following equation.

$$2022 \text{ USDs amount} = \frac{\text{year of expenditure amount}}{(1 + \text{inflation rate})^{\text{year}-2022}}$$

Where,

- *2022 USDs amount* is the amount in constant 2022 USDs.
- *year of expenditure amount* is the amount in the dollars of the year of expenditure.
- *inflation rate* is assumed to be 2%.
- *year* is the year of expenditure.

After converting to constant 2022 dollars, the trends for each ferry are examined to determine which are increasing trends and which are decreasing trends. For ferries where the trend is decreasing in constant 2022 USDs, the amounts between 2027 and 2045 that were forecasted by linear extrapolation are replaced with the average annual programmed spending for that ferry between 2020 and 2026. This is done to respect the assumption that operations and maintenance needs are not decreasing in constant inflation-adjusted terms for any ferry system.

Finally, extrapolated spending for each system in 2022 USDs is summed between 2022 and 2045 for each ferry system. The results are shown in Table 2.

¹⁷ Meeting with KYTC freight, rail, and waterways coordinator, November 4, 2021.

Table 2: Needs Derived from Historical Spending by Ferry (2022 USDs)

Ferry	County	Subtotal (24 Years)
Augusta	Bracken	\$5,563,307
Reeds	Butler	\$3,684,733
Rochester	Butler	\$3,684,733
Cave-in-Rock	Crittenden	\$38,337,955
Valley View	Fayette	\$8,696,547
Dorena-Hickman	Fulton	\$3,349,757
Turkey Neck Bend	Monroe	\$21,973,609
SUBTOTAL		\$85,290,641

Additional Needs – Known Budget Requests

Many ferries in Kentucky are experiencing exponential growth in costs, particularly associated with increases in fuel costs and costs associated with employee retirement programs.¹⁸ Therefore, it is expected that several ferries will have spending needs above and beyond spending that is extrapolated from historically programmed spending. Three ferryboat operators (Augusta, Valley View, and Turkey Neck Bend) have submitted additional budget requests to KYTC that reflect these trends. Since these are annual requests, they are multiplied by the 24 years in the planning period before being added to the needs derived from historical spending. The resulting needs from known budget requests are shown in Table 3. An additional budget request is also expected for Cave-in-Rock ferry, though its final amount will not be known until negotiations between the ferry operator and KYTC are complete. Thus, additional needs for Cave-in-Rock Ferry are not included here.

Table 3: Additional Needs Derived from Known Budget Requests by Ferry (2022 USDs)

Ferry	Additional Needs (Annual)	Additional Needs (24 Years)
Augusta	\$25,000	\$600,000
Valley View	\$85,000	\$2,040,000
Turkey Neck Bend	\$173,000	\$4,152,000
SUBTOTAL	\$283,000	\$6,792,000

¹⁸ Meeting with KYTC freight, rail, and waterways coordinator, November 4, 2021.

Additional Operation Needs – Subchapter M Requirements

Subchapter M rules issued by the U.S. Coast Guard may add additional costs to ferry operators if waivers that have exempted Kentucky's ferry operators from some of its requirements are not extended.¹⁹ Some subchapter M requirements that may add cost include the requirement for an additional crewmember onboard. The needs include the costs for this extra crewmember since the waiver may not be extended. To estimate the cost, the approximate salary for experienced deckhands from the Augusta Ferry (\$45,000)²⁰ was multiplied by each ferry's annual operating hours, and then adjusted to account for non-wage benefits. This is divided by the number of working hours per year (2,080) to convert to an hourly wage. According to the BLS, on average, 38.3% of total compensation for state and local government employees is for salary, while 61.7% is for salary.²¹ Based on these amounts, the hourly wage is increased by 62.1% (38.3 / 61.7) to account for benefits.

This benefits-adjusted wage is multiplied by the annual scheduled operating hours for each ferry. Table 4 shows the scheduled operating hours for each ferry. All ferries operate on the same schedule seven days per week year-round, except for the Dorena-Hickman ferry, which has different summer and winter schedules. To calculate the annual scheduled operating hours, the number of scheduled operating hours per days is multiplied by 365.25, representing the average number of days in a year accounting for leap years. For the Dorena-Hickman ferry, which has two schedules, the summer schedule is applied for half the year and the winter schedule is applied for the other half. Scheduled operating hours and average annual scheduled operating hours are shown in Table 4.

Table 4: Average Hours of Operation by Ferry

Ferry	County	Scheduled Operating Hours	Daily Operating Hours	Average Annual Scheduled Operating Hours
Augusta	Bracken	8 am to 8 pm	12	4,383
Reeds	Butler	8 am to 8 pm	12	4,383
Rochester	Butler	8 am to 8 pm	12	4,383
Cave-in-Rock	Crittenden	6 am to 9:30 pm	15.5	5,661
Valley View	Fayette	6 am to 6 pm week	12	4,383
Dorena-Hickman	Fulton	7 am to 6:30 pm (summer), 7 am to 5:30 pm (winter)	11.5 (summer), 10.5 (winter)	4,018
Turkey Neck Bend	Monroe	24 hours	24	8,766

¹⁹ Meeting with KYTC freight, rail, and waterways coordinator, November 4, 2021.

²⁰ Email from KYTC freight, rail, and waterways coordinator, December 15, 2021.

²¹ U.S. Bureau of Labor Statistics. Employer Costs for Employee Compensation – September 2021. Retrieved from <https://www.bls.gov/news.release/pdf/ecec.pdf>.

The additional annual ferry needs for operations associated with Subchapter M requirements are summarized in Table 5. These annual ferry needs are applied for years after 2025 only since it is assumed that enforcement waivers will continue to be granted through 2021.

Table 5: Additional needs for meeting Subchapter M requirements by Ferry (2022 USDs)

Ferry	County	Average Additional Annual Cost for Extra Crew	2026-2045 Cost
Augusta	Bracken	\$153,686	\$3,073,728
Reeds	Butler	\$153,686	\$3,073,728
Rochester	Butler	\$153,686	\$3,073,728
Cave-in-Rock	Crittenden	\$198,512	\$3,970,232
Valley View	Fayette	\$153,686	\$3,073,728
Dorena-Hickman	Fulton	\$140,879	\$2,817,584
Turkey Neck Bend	Monroe	\$307,373	\$6,147,457
Subtotal		\$1,268,929	\$25,230,187

Capital Needs – Ferry Replacement

Ferry replacement costs for the Augusta Ferry were estimated by the operator. Costs account for the tow boat and the barge. These estimates have a moderate to high degree of uncertainty due to the volatility in steel prices and supply shortages of components such as engines and generators. The operator estimated replacement costs to be between \$3 and 4 million, and the middle of this range (\$3.5 million) is added to the needs estimate for the Augusta Ferry.

RESULTS

Twenty-five-year spending needs for ferryboat operations in Kentucky at \$121.10 million. In constant 2022 USDs, these needs range from \$3.38 million in 2025 to \$5.64 million in 2045. The needs are greatest for Cave-in-Rock ferry, which contributes 35% of the total spending needs, following by Turkey Neck Bend ferry, with 28%, and Valley View and Augusta ferries, both with 11%. The ferry contributing the least to the spending needs is the Dorena-Hickman ferry, with 5% of the needs. Table 6 summarizes the needs by ferry, and Figure 1 shows the annual needs.



Table 6: Summary of Ferry Needs

Ferry	County	Historically Derived Operations and Maintenance	Additional Needs			TOTAL NEEDS
			Known Budget Requests	Subchapter M	Capital	
Augusta	Bracken	\$5,563,307	\$625,000	\$3,073,728	\$3,500,000	\$12,762,035
Reeds	Butler	\$3,684,733	\$-	\$3,073,728	\$-	\$6,758,461
Rochester	Butler	\$3,684,733	\$-	\$3,073,728	\$-	\$6,758,461
Cave-in-Rock	Crittenden	\$38,337,955	\$-	\$3,970,232	\$-	\$42,308,187
Valley View	Fayette	\$8,696,547	\$2,125,000	\$3,073,728	\$-	\$13,895,275
Dorena-Hickman	Fulton	\$3,349,757	\$-	\$2,817,584	\$-	\$6,167,342
Turkey Neck Bend	Monroe	\$21,973,609	\$4,325,000	\$6,147,457	\$-	\$32,446,066
TOTAL						\$121,095,827

Figure 1: Annual Ferryboat Needs

