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2086

EXECUTIVE SUMMARY

1.0 Introduction

The primary purposes of the study were to update the study of the Yukon River Ferry System carried out in 1973 and to determine the economic and financial feasibility of operating a ferry service on the Yukon River.

The Yukon River is divided into two sections for the purposes of this study: the upper Yukon, extending from Dawson City, Yukon Territory to Circle, Alaska, and the lower Yukon, extending from Fort Yukon to Holy Cross. Nenana and Manley Hot Springs on the Tanana River are also included in the study of the lower Yukon.

The characteristics of the service on the two sections of the river would differ. The service on the upper Yukon would be primarily directed toward the promotion of tourism as the communities along this section of the river are already provided with road access. The service on the lower Yukon would be directed primarily toward freight transportation, although passenger transportation, primarily for residents of the area, could be an important aspect of this project.

2.0 Alternatives Considered

Ten basic types of vessels were considered, ranging from conventional displacement hulls with either propellers or paddlewheels, through higher-speed semi-planing and planing hulls, to the more sophisticated technologies such

as air-cushion vehicles (hovercraft) and hydrofoils. Consideration of technical and economic factors resulted in the following conclusions.

2.1 Upper Yukon

The most effective configuration would be a high-speed (about 35 miles per hour) propeller-driven planing hull capable of carrying 75 passengers. This would provide a one-day trip between Dawson and Circle, with overnight accommodations at Circle, and a bus connection between Circle and Fairbanks.

A more attractive alternative from the tourism point of view would be a slower paddlewheel-driven vessel similar in appearance to the old-time riverboats, capable of carrying 150 passengers and 25 vehicles, with overnight accommodations on board for a two-day trip. However, the cost per passenger of this alternative would be about three times the cost of the one-day service with the planing hull, and the tariff would then be so high as to significantly discourage the use of the service. In addition, if the service were later found to be less viable than anticipated, there would be little scope for the use of the paddlewheel vessel elsewhere in Alaska, whereas the high-speed planing hull could be used in other services in such a case if desired.

2.2 Lower Yukon

The most effective configuration on this section of the river would be a ferry-and-barge combination with accommoda-

tions for 20 overnight and 50 day passengers on the ferry, and barge capacity of 200 tons plus one 35-foot refrigerated container for the transportation of fish. It would act primarily as a supplement to Yutana Barge Lines in serving the villages along the lower Yukon and would also provide passenger transportation among the villages.

Estimates of capital, operating and maintenance costs, and of revenue, were made for the various alternatives. Benefits in the form of factors such as employment and increased economic development, which are not reflected directly in the revenues of the ferry services, were also considered. The comparisons of costs and benefits, made to determine the viability of the proposed ferry projects, were based primarily on the two basic configurations described above, as they were found to be the most cost-effective alternatives and would then have the greatest chance of becoming financially and economically viable.

3.0 Costs

3.1 Upper Yukon

1. Capital Costs	(\$million)
Ferry, 1982/83	1.86 ✓
Road to dock at Circle	0.96 ✓
Support facilities	<u>1.10</u> private?
Total initial capital costs ¹	<u>3.92</u>

¹A hotel or motel would also be required at Circle, but this would be a self-supporting facility which could be operated either separately or in combination with the ferry service.

Assuming traffic growth is as forecasted in the study, a second ferry could be added in 1989 and a third in 1996.

2. Annual Operating and Maintenance Costs	(\$million)
Ferry	0.49
Support facilities and roads	<u>0.39</u>
Total Annual Operating and Maintenance Costs	<u>0.88</u>

With the addition of a second and third ferry, the ferry operating and maintenance costs would increase in proportion to the number of vessels, but the costs of road and shore facilities would increase only marginally.

3.2 Lower Yukon

1. Capital Costs	(\$million)
Ferry	1.59
Support facilities	<u>0.40</u>
Total initial capital costs	<u>1.99</u>

This ferry is expected to be able to carry the forecasted traffic over the life of the project.

2. Annual Operating and Maintenance Costs	(\$million)
Ferry	0.62
Support facilities	<u>0.02</u>
Total Annual Operating and Maintenance Costs	<u>0.64</u>

A.0 Economic Evaluation

4.1 Upper Yukon

The ferry on the upper Yukon is economically feasible only if the assumptions used to compute the costs and benefits are modified. However, for the base case, which is considered to represent the most realistic assessment, it would not be economically feasible as the following table indicates.

Indices of Economic Viability for the
Upper Yukon River Ferry System

	<u>Internal Rate of Return (%)</u>	<u>Benefit Cost ¹ Ratio</u>	<u>Net Present Value¹ (\$1 million)</u>
1. Base Case	0.25	0.73	-4.04
2. Reduced Capital and Operating Costs ²	5.40	0.87	-1.59
3. Increased Benefits (+27%) ³	7.45	0.89	-1.35
4. Combination of 2 and 3	13.70	1.06	1.07

¹Discounted at 10.5 percent.

²Excluding the cost of the road and sharing the cost of some of the support facilities with the hotel.

³Based on the maximum fare presently charged on cruiseships.

4.2 Lower Yukon

Even considering the benefits of the ferry to fisheries, agriculture and recreational activities, the existing tug and barge operations and air service are the more cost-effective solutions to transportation on the lower Yukon River.

5.0 Financial Analysis

Realizing that there are many possible financial arrangements that could be developed for the ferry system, two financial programs were analyzed for the upper Yukon River. The common elements in both programs are the assumptions that the state would construct a 3.5 mile extension of the Steese Highway to the ferry landing site six miles up-river from Circle and would provide concessionary terms for the financing of the ferry and its support facilities. In the first case tested, if the state were to finance 90 percent of the project cost with a loan at an eight percent interest rate, a private operator would not find the arrangement particularly attractive, so the conditions of the loan would have to be even more favorable. In a second case, if the state were to subsidize 80 percent of the capital cost of the project (for example, in the form of an interest-free loan to be repaid at some distant future date), the financial rate of return on the operator's 20 percent equity would be about 12 percent, possibly enough to interest the private sector. Alternatively, the state could elect to operate the ferry itself. With one

ferry, the revenue would cover the capital, operating and maintenance costs over the life of the project. However, the ferry would show almost no return on capital, i.e. it would provide a close-to-zero interest rate on the initial investment.

6.0 Conclusions

6.1 Economic and Financial Analysis

1. Upper Yukon

- A. The proposed service would not be economically viable under the basic assumptions, which are considered to represent the most realistic assessment of the project.
- B. From the point of view of a private operator, revenue from the proposed service would not cover the fully-allocated cost (capital, operating and maintenance costs) unless subsidized by the State. The proposed service is therefore not financially viable.
- C. If the State of Alaska were to operate the ferry, the estimated revenues over the life of the project would cover the estimated capital, operating and maintenance costs. However, this does not include any interest charges or return on investment and working capital.

2. Lower Yukon

Under present conditions, the Lower Yukon Ferry is not economically or financially feasible at this time. Much

of the traffic would be diverted from existing services, primarily Yutana Barge Lines, and it is unlikely that the costs of a new service could be made sufficiently low that the tariffs could be less than those now charged by Yutana Barge ferries.

6.2 Social and Economic Impact

1. Upper Yukon (Circle, Eagle and Dawson City)

The main impact of the upper Yukon ferry service will be on the tourist industry. Besides the ferry, hotel facilities would be needed near the ferry site at Circle. 50 to 60 seasonal jobs would be directly involved in the operation of the ferry and hotel and about 100 persons would be indirectly employed in the other service industries supporting the ferry and hotel. Any adverse social impact of the ferry would be minimized, given the location of the support facilities and hotel at some distance from Circle (7 miles by road). Based on a survey of the tour operators and other tourist-related businesses, there is enthusiastic support of the ferry. The public involvement program indicated that individuals in the towns of Circle and Eagle perceive that they would benefit from having the ferry.

2. Lower Yukon (Tanana, Ruby, Galena, Kaltag, Nulato, Koyukuk, Manley Hot Springs and Nenana)

The main impact of the lower Yukon ferry would be the improvement of the freight service in the region. The poten-

tial impact on the processing of fish in the region would be positive, but investments in cold storage facilities as well as the ferry would be needed. The ferry would provide public inter-village transportation. The public involvement program survey indicated that the villagers are in favor of improved transportation on the Yukon and would be willing to pay a higher price for this service than what they are paying for the present tug and barge service. Some villages would not like to see an influx of tourists which might result from the ferry. Direct additional employment is estimated to be less than ten persons.

but also makes them more exposed to damage, especially in narrow and restricted passages likely to be encountered on the Yukon River. Therefore, the sidewheeler will not be investigated further.

Of the ten types of vessels analyzed, three high speed vessels - the captive air bubble (CAB), the air cushion vehicle (ACV), and the planing hull (PH) - and two slow speed vessels, the propeller-driven displacement hull (PDDH) and a sternwheel driven displacement hull (SDDH), are technically feasible alternatives for the upper Yukon River.

5.1.3 Evaluation of Alternative Trip Schedules and Vessel Types

High speed vessels can operate on two-day round trip schedules, but require that a hotel be constructed at or near Circle to accommodate the passengers. The vessel's arrival and departure would not easily facilitate the transportation of passengers between Circle and Fairbanks, a five- to six-hour bus trip. It was determined that a minimum design speed of about 35 miles per hour is required to achieve a two-day round trip, one leg each day, even on a schedule relaxed by the availability of lodging at Circle. Without lodging, a vessel must be designed for about 58 miles per hour. All of the following vessels will be compared under this category:

1. Air Cushion Vehicle (58 miles per hour);
2. Captured Air Bubble Boat (46 miles per hour); and the
3. Conventional Planing Hull (35 miles per hour).

The slower speed vessels can accommodate the arrival and departure of buses to and from Fairbanks so passengers would be able to take the bus trip during daylight hours. Con-

sequently, the four-day round trip does not require that a hotel be located near Circle to provide lodging for the passengers. Because the slower speed vessels are displacement hulls, they can accommodate motor vehicles.

According to the schedule analysis, vessel speeds of approximately 13 miles per hour were necessary. To safeguard against unpredictable river conditions, a value of 14 miles per hour was chosen for this category. This margin was not considered necessary for the two-day boats, because of their much higher relative speeds. The vessels that fall into the slower category are:

1. Standard Displacement Hull, and
2. Sternwheeler.

A detailed discussion of the scheduling of the two types of trips is made in Appendix I.

The schedule analysis was inconclusive as to the required speed for a three-day round trip. It can be assumed that this trip would fall between the two-day and the four-day speeds, but closer to the four-day speed. The only vessel that has a natural speed in this range is the semi-planing hull, whose normal speed is around 21 to 23 miles per hour. This vessel at the capacity required was found to require too deep a draft to be considered for this service, however. Therefore, further consideration of a three-day round trip was dropped.

5.1.3 Selection of the Alternative Vessel Types

Based on the analysis of traffic, a 150-passenger vessel for a four-day round trip and a 75-passenger vessel for a two-

Table 5.1-1

Vessel Characteristics, Upper Yukon, Four-Day Round Trip

<u>VESSEL</u>	<u>150/25 PDDH</u>	<u>150/25-SDDH</u>	<u>200/33-SDDH</u>	<u>150-S</u>	<u>25-B</u>	<u>150-S/25-B</u>
Length Over All (LOA)	210'-0"	255'-0"	280'-0"	233'-0"	131'-0"	369'-0"
Length on Waterline	230'-0"	230'-0"	252'-0"	214'-0"	125'-0"	
Beam, Overall	48'-0"	48'-0"	53'-0"	45'-0"	37'-0"	45'-0"
Beam, Hull	46'-0"	46'-0"	51'-0"	43'-0"	36'-0"	
Depth, Mean, Deck @ Side	7'-5"	7'-5"	3'-2"	6'-4"	7'-0"	7'-0"
Draft, Full Load	5'-8"	5'-8"	6'-0"	5'-1"	4'-6"	5'-1"
Displacement, Full Load (long tons)	1,265	1,265	1,680	1,000	395	1,415
Passengers: Total	150	150	200	150	0	150
Stateroom Capacity	150	150	200	150	0	150
Cars	25	25	33	0	25	25
Crew	38	30 !	50	38	0	38
Speed - Kts/MPH	12/13.8	12/13.8	12/13.8	12/13.8	12/13.8	12/13.8
Rated Horsepower (SHP)	1,665	1,665	2,440	3,490		3,490
Fuel Rate (gallons per hour)	80	80	119	170		170

Source: Consultants' estimates.

TABLE 5.1-2

Capital Costs for Alternative Vessel Types

(\$ million in 1980 Prices)

	<u>Cost</u>	<u>Contingencies</u>	<u>Transportation</u>	<u>Total Cost</u>
150/25 PDDH	4.750	0.475	0.262	5.487
150/25 SDDH	5.220	0.522	0.287	6.029
200/33 SDDH	6.930	0.693	0.381	8.004
150 SDDH	4.210	0.421	0.232	4.863
25 Barge	0.875	0.088	0.048	1.011
75/PH	1.600	0.160	0.088	1.848
75/CAB	3.600	0.360	0.198	4.158
75/ACV	2.500	0.250	0.138	2.887

Source: Consultants' estimates.

Table 5.1-3

Ferry Operating Cost, Upper Yukon River Ferry Overnight Trip

	150/25 PDDH	150/25 SDDH	Combined	
			150 SDDH	25 Barge
1. Capital Costs (million \$)	5.49	6.03	4.86	1.01
2. Wages and Bene- fits/year	615,276	615,276	615,276	--
3. Annual Victualling for crew	102,600	102,600	102,600	--
4. Maintenance and Repairs	138,348	151,956	122,472	6,060
5. Supplies and Equip- ment	32,940	35,180	29,160	--
6. Hull Insurance	192,150	211,050	170,100	35,350
7. Protection and Indemnity Ins.	137,250	150,750	121,500	25,250
8. Fuel	96,422	131,375	204,897	--
9. Subtotal Without Capital Costs	1,314,986	1,399,187	1,366,005	66,660
				1,432,665
10. Capital Costs @ 10.5% 25 years	623,040	684,701	551,544	114,621
11. Total Annual Cost	1,938,026	2,083,888		2,098,830

150K

Source: Consultants' estimates.

Table 5.1-5

Cost Per Passenger on the Upper Yukon River Overnight Trip

	<u>150/25</u> <u>PDDH</u>	<u>150/25</u> <u>SDDH</u>	<u>150/ 25</u> <u>SDDH/B</u>
1. Cost per passenger unit 100% utilization of capacity	205	221	222
1 car equivalent to 1 passenger	205	206	207
1 car equivalent to 1.5 passengers	191	206	207
1 car equivalent to 2 passengers	179	193	194
1 car equivalent to 3 passengers	159	<u>172</u>	173
2. 80% Utilization			
Ratio of 1:1	256	276	277
Ratio of 1:1.5	239	257	258
Ratio of 1:2	224	241	242
Ratio of 1:3	199	<u>215</u>	216
3. 50% Utilization			
Ratio of 1:1	410	442	444
Ratio of 1:1.5	382	412	414
Ratio of 1:2	358	386	388
Ratio of 1:3	318	344	346
4. Cost per passenger without Capital Costs (assuming a ratio of 1:2)			
100% Utilization of Capacity	122	130	133
30% Utilization of Capacity	152	162	166
50% Utilization of Capacity	244	259	265
5. Percent reduction between 1, 2 and 3 and 4.			
	32	33	31

Source: Consultants' estimates.

Alaska State Legislature



House of Representatives

Committee on Transportation

Rep. Bette Cato, Chairman

Pouch V
State Capitol
Juneau, Alaska 99811
(907) 465-4858

March 27, 1982

HOUSE TRANSPORTATION COMMITTEE LETTER OF INTENT

TO ACCOMPANY HB 286

"An Act making a special appropriation for payment as a grant to the City of Nenana for ferry construction; and providing for an effective date."

The House Transportation Committee has had HB 286 under consideration.

Section 1 of HB 286 appropriates from the general fund \$8,600,000 as a grant to the City of Nenana for construction of an Upper Yukon River stern-wheeler ferry.

It is the intent of the House Transportation Committee that a condition be included in the terms of agreement for Nenana to receive the grant. The condition is that if the Alaska Marine Highway Authority is created, (presently HB 651) then the City of Nenana must transfer this project to the Marine Highway Authority once that Authority is established.

Bette Cato
Ch. Transportation Committee

COMMITTEE REPORT

HOUSE

FURTHER: FINANCE

(7)

3/3/82

Date: March 25, 1992

Mr. Speaker: (Taken from Finance 3/8/82)

The Committee on TRANSPORTATION has had SSHB 286

"An Act making a special appropriation for payment as a grant to the City of Nenana for ferry construction; and providing for an effective date."

under consideration and ~~(a majority of the committee)~~ ~~(the committee)~~----- reports it back with the following recommendations:

- do pass do not pass
- do pass with attached amendments(s)
- replace with CS for _____ same title
 new title
- and recommends _____

AND attaches a "Letter of Intent" New Fiscal Note

reports it back ^{without} without recommendation

referred to the Finance Committee

MEMBERS SIGNING
DO PASS

Raymond Mopp
Paul H. Z...

MEMBERS HAVING
OTHER RECOMMENDATIONS:

William Ward Jr. Yalson
Geo. Sutcliffe w/c REC
Letter to the...

Robert...
CHAIRMAN

