Wild Fish Conservancy
NORTHWEST

Draft Analysis of Fish Trap Capital and Annual Costs in the Lower Columbia River

The following capital costs, annual costs, labor requirements, and estimated earnings for construction and operation of a commercial salmon trap fishery were identified by researchers and fishers familiar with the gear. This draft analysis may be subject to change as further progress with net design, trap deployment methodology, and harvest techniques are achieved during the 2021 construction and fishing season. Full reporting and a final draft of economic analyses will be completed by Wild Fish Conservancy in December 2021.

Capital Cost

Fish trap capital costs will vary depending on materials chosen, site-specific river bathymetry, lead length, complexity of the trap design, and fluctuations in market prices for materials and labor. Estimated low-end costs of trap construction—including engineering, permitting, pile driving, dock construction, net construction, and all winches, solar, platforms, and hardware expenses—total $102,370 (Table a). The low-end cost estimate was determined by review of realized costs associated with 35 untreated wood piles and quoted costs of materials needed for a passive fishing single pot design (Figure 1) similar in size to the prototype fish trap in Cathlamet Channel WA. Estimated high-end costs of trap construction—including engineering, permitting, pile driving, dock construction, net construction, and all winches, solar, platform, and hardware expenses—total to $150,394 (Table a). The high-end cost estimate was generated after review of realized costs associated with 46 used untreated steel piles and quoted costs of materials needed for a passive double pot trap design (Figure 2) as is being constructed in Clifton Channel, OR. Skiff price was set to the Oregon Department of Fish and Wildlife's estimated value of a Columbia River gillnet vessel, $25,000 (ODFW 2013).

Table a. Estimated capital costs include all elements of trap construction, including skiff purchase, but excluding annual trap deployment.

a. UPFRONT CAPITAL COSTS	*Low-End Estimate (Single Pot - 35 Piles)*	*High-End Estimate (Double Pot - 46 Piles)*
Consulting / Engineering / Permitting	$7,000	$7,000
Pile Driving	$58,278	$81,820
Docks/Live Well	$14,754	$29,508
Navigation Lights	$1,009	$1,009
Net Construction	$16,264	$20,240
Winches	$789	$1,578
Solar	$455	$910
Deployment Poles / Hardware	$2,343	$0
Pipe Clamps	$0	$696
Diver	$0	$1,000
Catwalk / Platforms	$425	$5,093
Line / Hardware	$1,053	$1,540
Total	$102,370	$150,394
Skiff	$25,000	$25,000
TOTAL UPFRONT COSTS	$ 127,370	$ 175,394

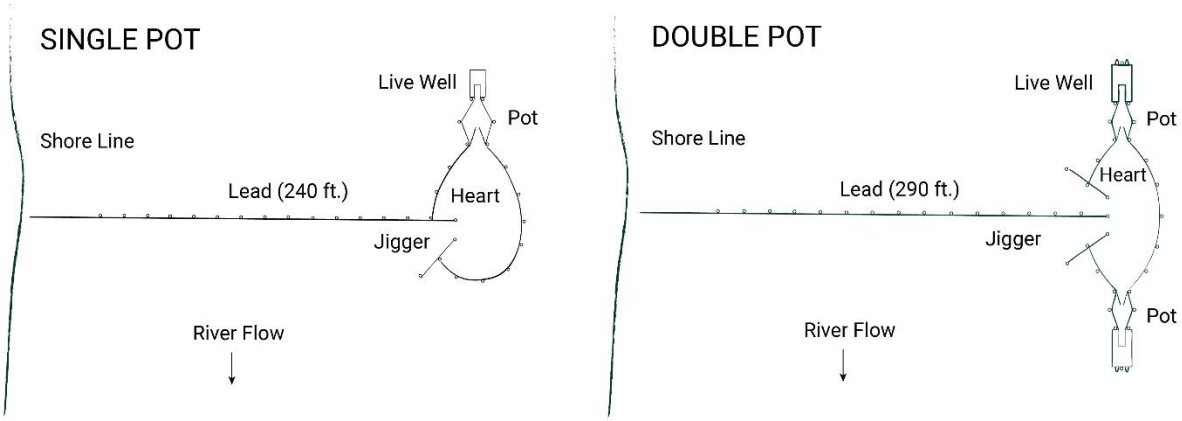

Figure 1 and 2. Sketch of a single pot passive design (left) and double pot passive design (right).

Annual Costs

Total annual costs of a 20-d commercial trapping operation excluding labor inputs were estimated at $6,515 (Table b). Costs were split amongst fixed costs and variable costs. Estimated annual fixed costs totaled $4,836 and included fees for miscellaneous supplies (e.g., replacement hardware, lumber, steel cable, rope), skiff fuel, potential skiff repairs, skiff launch/moorage, permits, licenses, insurance, and annual land-use fees. These fixed costs can only be avoided if a fisher chooses not to participate in the fishery (due to run size forecasts, limited allocation, or other issues). Estimated variable costs for a 20-d fishing period totaled $1,679 and were associated with daily fees for ice and skiff fuel. Once a fish trap is constructed, these variable costs are incurred with each day of harvest and delivery.

Table b. Estimated fixed, variable, and total costs for a salmon trap fisher over a 20-d commercial fishing period excluding the costs of labor.

b1. ANNUAL FIXED COSTS	*Rate*	*Quantity*	*Costs*
Misc. Hardware	--	--	$800
Permits and Licenses	$750	1	$750
Insurance	$2,000	1	$2,000
Annual Land Use Fee	$500	1	$500
Moorage	$110	1	$110
Fuel for Construction / Deconstruction	$17.60	10	$176
Boat Maintenance	--	--	$500
TOTAL ANNUAL FIXED COSTS			$4,836

b2. ANNUAL VARIABLE COSTS	*Daily Rate*	*Quantity*	*Costs*
Fuel	$12.50	20	$250
Ice	$71.43	20	$1,429
TOTAL DAILY MARGINAL COSTS			$84
TOTAL ANNUAL VARIABLE COSTS			$1,679

TOTAL ANNUAL NON LABOR COSTS	$6,515

Annual Labor

The total cumulative labor needed for a 20-d commercial trapping operation was estimated at 80 ten-hour days (Table c). Labor was split between fixed labor needs and variable labor needs. Annual fixed labor totaled to a cumulative 30 ten-hour days including onsite construction and net deployment, on-site deconstruction and net removal, and off-site end-of-season gear maintenance. These fixed labor needs can only be avoided if a fisher chooses not to participate in the fishery (due to run size forecasts, limited allocation, or other issues). Annual variable labor for a 20-d fishing season totaled to a cumulative 50 ten-hour days. It was assumed that during 10 days of peak fishing, a permit holder would operate with two deckhands, accounting for 30 days of cumulative labor. For the remaining 10 days of off-peak fishing, it was assumed that a permit holder would operate with a single deckhand, accounting for 20 days of cumulative labor. Total wage earnings for deckhands would then be dependent on percentages paid out from total profits (revenue – cost).

Table c. Estimated fixed, variable, and total labor needs for a salmon trap fisher over a 20-d commercial fishing period.

c1. ANNUAL FIXED LABOR ESTIMATE	*Rate*	*Days*	*Wages*
Labor: On-Site Construction / Net Deployment			
Lead Fisher - Permit Holder	***	5	***
Deckhand #1	***	5	***
Deckhand #2	***	5	***
Labor: On-Site Deconstruction / Maintenance			
Lead Fisher - Permit Holder	***	5	***
Deckhand #1	***	5	***
Deckhand #2	***	5	***
TOTAL ANNUAL FIXED LABOR	***	30	***

c2. ANNUAL VARIABLE LABOR ESTIMATE	*Rate*	*Days*	*Wages*
Labor: On-Site Construction / Net Deployment			
Lead Fisher - Permit Holder	***	20	***
Deckhand #1	***	20	***
Deckhand #2	***	10	***
TOTAL ANNUAL VARIABLE LABOR	***	50	***
TOTAL ANNUAL LABOR		80	***

Estimated Annual Earnings

Estimated annual earnings were achieved by reviewing revenue generated at the prototype fish trap in Cathlamet, WA during test fishing operations conducted in 2018, 2019, and 2020. Revenue from harvested hatchery coho and Chinook salmon during 20 days of late summer / early fall fishing (Aug-Sep) was averaged across the three seasons resulting in a mean seasonal revenue of $21,946 (Table d1). Subtracting the annual $6,515 costs associated with a 20 day fishing season, a total of $15,431 remain. Dividing this remainder evenly across the labor inputs results in average earnings of $192.89 per 10 hour day, per individual. During the 2018, 2019, and 2020 fishing seasons, sale price of coho and Chinook salmon harvested at the fish trap were set at or near the lower river gill net price, failing to adequately represent the meat quality and value-added practices reflected in the annual variable costs. When conservative value-added prices quoted from the fish buyer are applied to 20 days of late summer / early fall fishing for each season, and then averaged across the three years of test fishing, the result is an increased mean revenue of $32,356 per season (Table d2). Subtracting the annual $6,515 costs associated with a 20 day fishing season, a total of $25,841 remain. Dividing this remainder evenly across the labor inputs results in average earnings of $323.01 per 10 hour day, per individual.

Table d. Average revenue from 20 days of late summer / early fall test fishing in 2018, 2019, and 2020 with achieved prices and conservative value added prices. *Conservative value added prices set at, GMC Chinook - $4.50, PMC Chinook - $0.70, coho - $2.50.*

d1. AVG. TEST FISHING REVENUE (2018 - 2020)

20 Day Season (Realized Prices)	$21,946
Fisherman's Annual Cost	$6,515
Revenue Remaining	$15,431
Fixed Labor (Deployment, Removal, Maintenance)	30 Days
Variable Labor (Fishing)	50 Days
Average Daily Rate (Permit Holder & Deckhands)	$192.89

d2. AVG. TEST FISHING REVENUE (2018 - 2020) VALUE ADDED

20 Day Season (Conservative Value Added Prices)	$32,356
Fisherman's Annual Cost	$6,515
Revenue Remaining	$25,841
Fixed Labor (Deployment, Removal, Maintenance)	30 Days
Variable Labor (Fishing)	50 Days
Average Daily Rate (Permit Holder & Deckhands)	$323.01

Discussion

Due to the high capital costs, inherent uncertainty of an emerging fishery, and other barriers to entry, it is recommended that a transition fund or subsidy be developed for fishers interested in pursuing alternative gear. If a transition fund is secured that covers capital costs, fish traps operating for a 20 day season appear to be an economically viable alternative form of fishing in the lower Columba River. The revenue experienced in the 2018 - 2020 test fisheries exceeds annual costs, paying each individual an average hourly rate of $19.29 for all hours of work (deployment, fishing, and post-season maintenance). With value-added prices secured, the average individual hourly rate increases to $32.30 for all hours of work. This may ultimately be a conservative estimate of revenue and wages, as test fisheries do not represent the full economic potential of a commercial fishery. Test fishing is a research-intensive operation with commercial sampling and research sampling impeding commercial fishing activities. It is recommended that further economic analyses are conducted for fish traps after operating in an emerging commercial fishery setting to better understand the economic viability of the gear.