

Sustainable Aviation Fuel

Biomass Assessment: Fisheries

Prepared for

Alaska Department of Transportation



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Introduction

Alaska has a large fisheries industry. Alaska's fisheries industry produces fish oil and other byproducts that may be relevant to certain SAF production pathways, particularly lipid-based pathways such as HEFA. This memo evaluates fish oil as a potential supplemental SAF-related resource. It does not establish fish oil as a feedstock for the ANSyR preferred Fischer–Tropsch pathway or as a material supply source for the modeled ANSyR production scale.¹

Relationship to ANSyR Design Basis

The ANSyR Technical and Economic Analysis evaluates a large-scale Port MacKenzie-centered Fischer–Tropsch Synfuel Refinery. This memo is a preliminary resource screen and does not modify the ANSyR proposed feedstock slate, production volume, lifecycle carbon-intensity result, capital cost estimate, or pathway selection. Any use of the resource described here would require separate technical, commercial, permitting, lifecycle, ASTM/pathway, and integration analysis before inclusion in the ANSyR design basis.

Description of the Resource

Fish oil is primarily extracted from the biomass of small, oily forage fish and byproducts from the commercial seafood processing industry, with Pollock and Salmon serving as the primary biomass sources.

Fish oil produced in Alaska onshore facilities is primarily sold as a value-added product within established markets. Existing markets for fish oil include aquaculture feed, pet food ingredients, and human-grade nutritional/pharmaceutical supplements. Fish oil is also used for industrial fuel (particularly for use within seafood processing facilities).

Quantity of the Resource

An annual average of 5.3 billion pounds of seafood were harvested in Alaska between 2019 and 2023. From this harvest, an average of 2.4 billion pounds of primary seafood products were produced annually. The remaining 2.9 billion pounds were processed into secondary products or disposed of as waste. Secondary products would include fish meal, bone meal and fish oil.

Seafood processing activity is dispersed over a large geographic area in the state, and much of it never touches Alaska shores. Waste generated by at-sea processors is typically disposed of at sea, and other processing occurs on small, dispersed individual vessels. For this study we defined the resource as seafood byproducts and waste generated by onshore processing facilities.

Data from 2024 show an estimated 2.8 million gallons of fish oil produced at onshore seafood processing facilities in Alaska. Facilities in the Western Aleutians produced 96% of this fish oil. Waste from facilities that do not currently produce oil could potentially yield an additional 0.75 million gallons. For a total of potential production of 3.55 million gallons. However, total potential production should not be interpreted as contractable supply. Existing fish oil production is already sold into established markets, and any SAF use would need to compete against those markets on price, quality specification, location, seasonality, and offtake terms.

¹ This resource assessment memo provides only an overview of resource quantity and price information. It is not an assessment of feasibility to use the resource to produce sustainable aviation fuel.

Estimated Cost of Delivery

The price of fish oil from 2015 to 2024 averaged \$5.86 per gallon from production facilities (Figure 1).² Adding costs for delivery to Port MacKenzie would add approximately \$0.28 per gallon.

While \$5.86 was the average price of a gallon of fish oil, prices have varied from a low of \$3.65 in 2017 to a high of \$12.06 in 2024. Assuming delivery costs remain stable, the cost range for delivery to Port MacKenzie is \$3.93 to \$12.34 per gallon. At this price range, fish oil should be evaluated as a high-value lipid feedstock for a separate or supplemental SAF pathway, not as a low-cost bulk carbon source for the ANSyR base-case FT design.

Figure 1. Price per gallon of Alaskan fish oil.



Methods

Quality Estimates

Fish oil production data are from the Alaska Department of Environmental Conservation Environmental Data Management System.³ Estimates of additional production potential are based on conservative estimates made by Mason, Bruce & Girard and Evergreen Economics, based on data from the Environmental Data Management System informed by information provided by staff of fish oil producers regarding considerations and challenges to increasing production. Total raw fisheries input at facilities that do not produce fish oil is higher than at facilities that do, but the types of products processed are expected to be different and to be less oil rich (Table 1).

Table 1. Total pounds (millions) raw, finished, and waste products produced at Alaska shore-based seafood processing facilities, 2024

Type of Facility	Raw product (million pounds)	Finished product (million pounds)	Waste (million pounds)
Not Permitted to Produce Fish Oil	814.3	444.3	117.4
Permitted to Produce Fish Oil	712.3	439.8	20.8
All Facilities	1,565.7	884.1	138.2

Source: Alaska Department of Environmental Conservation. Environmental Data Management System.

Note: Totals exclude processors who did not submit annual reports on production or waste for 2024.

Cost Estimates

Fish oil prices are from the U.S. Department of Commerce, reporting export prices from all Alaska ports. Shipping costs are estimated, based on a 2024 freight costs index for moving a 20-foot container from Dutch Harbor to the Port of Anchorage. The shipping distance from Dutch Harbor to Port Mackenzie is the same as to the Port of Anchorage, so costs are expected to be similar. Cost estimates assume fish oil is transported in 5,800-gallon bladders in 20-foot containers.

² Department of Commerce, USA Trade Online, Anchorage District. The Anchorage District covers the entire state of Alaska - including all ports of entry in the state.

³ <https://dec.alaska.gov/water/edms>