

An Economic Analysis of Genuine Alaska Pollock Producers Marketing Programs
on Fishermen Price and Returns

by

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Executive Summary

Genuine Alaska Pollock Producers (GAPP) is an organization of companies that catch and process Wild Alaska Pollock that promotes products made from the species in U.S. and overseas markets. Unlike federally-overseen mandatory checkoff programs used by much of the food and agricultural industries, this marketing program is funded through voluntary contributions by its members. In 2020, the GAPP Board commissioned an evaluation study by Professor Harry M. Kaiser of Cornell University to measure the overall return on investment (ROI) from GAPP marketing efforts. That study found a high ROI on the overall GAPP marketing effort. To ascertain the effectiveness of GAPP on Wild Alaska Pollock fishermen, a new economic study was commissioned in 2022 to determine how the GAPP marketing efforts impacted fishermen prices and returns. Specifically, this study addressed three key research questions:

1. How have GAPP marketing expenditures over time and most recently impacted the fishermen price for Wild Alaska Pollock?
2. What would Wild Alaska Pollock demand have been had there not been any GAPP marketing expenditures?
3. How do the benefits of GAPP to fishermen compare to the fishermen's financial contributions to GAPP through dues paid by the fishing cooperatives?

To answer these questions, this study quantified the relationship between the GAPP marketing effort and the demand for Wild Alaska Pollock (measured as the fishermen price) using the same econometric framework as was used the previous study of wholesale fillet and surimi prices. Econometrics is widely recognized as the best "science" available for evaluating demand impacts of commodity marketing expenditures. The following were the key findings of the study.

- The most important demand drivers for Wild Alaska Pollock are the Consumer Price Index for all items, disposable U.S. income, wholesale price for fillet, surimi, and roe, U.S. dollar-Yen exchange rate, diesel fuel price, volume of catch of Wild Alaska Pollock, and GAPP generic marketing expenditures.
- The results indicated that a 10% increase in GAPP marketing expenditures was associated with a 0.4% increase in the fishermen price, on average, since 2007. This means that the statistical evidence supports the hypothesis that GAPP's marketing activities increase demand for Wild Alaska Pollock.

- In the last 5-years, had there not been any GAPP marketing, the fishermen price would have been 3.9% lower, on average, than it actually was during this period.
- In 2021, GAPP marketing resulted in an average increase in total fishermen revenue of almost \$8 million.
- Each dollar invested in GAPP marketing returned \$14.53 in fishermen net revenue to the Cooperatives for Wild Alaska Pollock.

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Introduction

Genuine Alaska Pollock Producers (GAPP) is an organization of companies that catch and process Wild Alaska Pollock that promotes products made from the species in U.S. and overseas markets. Unlike federally-overseen mandatory checkoff programs used by much of the food and agricultural industries, this marketing program is funded through voluntary contributions by its members. Through this voluntary checkoff program, GAPP has spent an average of \$500,000 per year promoting Wild Alaska Pollock over the period 2003 through 2018. But beginning in 2019, GAPP members dramatically increased their contributions to GAPP to \$3.65 million per year. This represents over a seven-fold increase in marketing spending by GAPP.

In 2020, the GAPP Board commissioned an evaluation study by Professor Harry M. Kaiser of Cornell University to measure the overall return on investment (ROI) from GAPP marketing efforts. That study found a high ROI on the overall GAPP marketing effort. To ascertain the effectiveness of GAPP on Wild Alaska Pollock fishermen, a new economic study was commissioned in 2022 to determine how the GAPP marketing efforts impacted prices paid to fishermen prices and hence, revenue. Specifically, this study examined how the benefits of GAPP compare to the costs of it for fishermen of Wild Alaska Pollock? This report discusses the main findings of this study.

Objectives and Scope of Work

This study quantitatively measures the overall impact of GAPP's marketing on enhancing the demand for Wild Alaska Pollock. Demand, in this context, is measured as the fishermen price for Wild Alaska Pollock. In order to assess the effectiveness of GAPP's marketing activities, an econometric modeling approach is adopted. Econometrics is widely recognized as the best "science" available for evaluating demand impacts of commodity marketing expenditures. The econometric approach quantifies economic relationships using economic theory and statistical procedures with data, which in this case is time series observations on important market variables on a semi-annual basis. This framework enables us to simultaneously account for the impact of a variety of factors that influence Wild Alaska Pollock demand over time, including the volume of Wild Alaska Pollock caught, fishing season, diesel fuel price, price of other white fish (e.g., Cod, Tilapia, Pangasius, imported Pollock), exchange rates for U.S. dollar to Euro, consumer income, other demand drivers, and GAPP marketing expenditures. By casting the evaluation in this type of framework, we can filter out the effect of other demand factors and, hence, quantify directly the net impact of GAPP marketing activities on Wild Alaska Pollock demand. Since Wild Alaska Pollock quantity is often fixed by the harvest and/or by quotas, a price inverse demand equation is used as the demand model. That is, the demand for Wild Alaska Pollock is measured as the price or unit value received by Wild Alaska Pollock fishermen.

This study answers three key research questions:

1. How have GAPP marketing expenditures over time and most recently impacted the fishermen price for Wild Alaska Pollock?
2. What would Wild Alaska Pollock demand have been had there not been any GAPP marketing expenditures?

3. How do the benefits of GAPP compare to the costs of it for fishermen of Wild Alaska Pollock?

To carry out this independent evaluation, GAPP contracted with Professor Harry M. Kaiser of Cornell University to conduct the economic. Dr. Kaiser is the Gellert Family Professor of Applied Economics and Management at Cornell University, and director of the Cornell Commodity Marketing Research Program. Dr. Kaiser has extensive experience in conducting economic evaluation studies of domestic and international checkoff programs. Dr. Kaiser has written 150 refereed journal articles, five books, 17 book chapters, over 150 research bulletins, and received \$8 million in research grants in the area of agricultural marketing with an emphasis on marketing programs. He has conducted over 120 economic evaluation studies of domestic and international checkoff programs in the United States, Canada, and Europe on such commodities as fluid milk, cheese, butter, salmon, red meat, pork, raisins, walnuts, cotton, blueberries, potatoes, beef, peanuts, wheat, watermelons, high-valued-agricultural commodities, and bulk agricultural commodities. In 2005, Kaiser was the lead author of a book on all commodity checkoff programs in California.

This report is organized as follows. First, the types of marketing programs GAPP offers is discussed. Next, the economic methodology used in this study to measure the effects of GAPP's marketing on Wild Alaska Pollock demand is presented. This is followed by a presentation of the econometric (statistical) estimation results. Then, the econometric results are used in conjunction with a simulation model to simulate market conditions with and without the existence of the GAPP marketing so that the impact (return on investment) of its marketing activities can be estimated. The report concludes with a summary and a discussion of the implications of the main findings.

GAPP's Marketing Programs

Between 2003 and 2018, GAPP worked to represent the Wild Alaska Pollock industry by investing in marketing programs to get more Wild Alaska Pollock products into school cafeterias across the U.S. and in promoting Wild Alaska Pollock surimi and roe at various trade shows in Japan, a significant market for both products. During that period GAPP also invested in marketing campaigns in Germany to differentiate Wild Alaska Pollock from Russian-caught pollock products. GAPP also activated on social media and served as a resource for media inquiries on behalf of the entire industry. Furthermore, the organization closely collaborated with the Alaska Seafood Marketing Institute (ASMI) on promotional campaigns for Wild Alaska Pollock both in the U.S. and abroad.

With the increase in investment into GAPP and the formalization of the organization in 2018, the goals and workstreams of GAPP also became more concrete and less ad hoc. Specifically, GAPP put forward a strategic plan in 2019, that was approved by the new Board of Directors, that focused the resources in three key areas: research into consumer perceptions of Wild Alaska Pollock, building a brand for the fish based on consistent communications and partnership programs.

GAPP now invests significantly into understanding which of Wild Alaska Pollock's attributes are most motivational to entice consumers to try and buy the fish. This research became the basis for the communications strategy which has been implemented industry-wide to ensure that Wild Alaska Pollock is talked about the same way, to build a consistent brand for Wild Alaska Pollock. This year, GAPP has further invested in similar research in key European markets and also into research around surimi and roe. This research will be utilized not only by GAPP to guide its future marketing campaigns, but also will be utilized by GAPP's partners.

Another significant component of GAPP's marketing strategy has been to put more Wild Alaska Pollock in front of more consumers every day. To help accomplish this, GAPP has worked to start a Partnership Program which funds projects that either put Wild Alaska Pollock products into new channels, into new categories, or associated with influencers that can help raise the fish's profile with new consumers. Since the start of the program in 2019, GAPP has funded more than 80 projects in the U.S., Europe, and Latin America that have put Wild Alaska Pollock into new product innovations, targeted new categories—like the popular snacking category—and associated products with influencers including Martha Stewart and Antoni Porowski. This program has resulted in new products coming to market utilizing Wild Alaska Pollock and millions of new consumers becoming aware of the fish.

Lastly, GAPP has worked to build a brand for Wild Alaska Pollock using consistent messaging and marketing. Based on the research conducted in 2019 and repeated each year since, GAPP has been able to identify the most motivational attributes for consumers to try and buy Wild Alaska Pollock. Based on that research, GAPP created messaging “toolkits” that tells the Wild Alaska Pollock story in the most compelling way and has trained the industry and GAPP partners on how to use the messaging—on websites, on product packaging, and in sell-sheets and at restaurants and retailers. This new, compelling and consistent messaging has resulted in more than 20 million Americans knowing about Wild Alaska Pollock in 2022 vs. 2019 based on independent research funded by GAPP and conducted by Ketchum, Inc. These marketing messages will continue to be updated as new research results are collected and analyzed to ensure that GAPP's communications strategy can continue to evolve and meet consumers where they are.

Economic Methodology

Econometric Model. To answer the three questions posed previously, this study quantifies the relationship between the GAPP marketing effort and the demand (fishermen price) for Wild Alaska Pollock. The model developed is based on the economic theory of consumer demand. In theory, one expects that GAPP's marketing activities are beneficial to the Wild Alaska Pollock fishermen because such marketing should increase the demand for Wild Alaska Pollock, which results in higher revenue for the industry. However, there are also other factors that affect demand. In order to distinguish the impact of GAPP marketing programs on demand for Wild Alaska Pollock from the impacts of other factors, an econometric framework is adopted. Econometric models are widely recognized as the best "science" available for evaluating demand impacts of commodity marketing expenditures.

The Wild Alaska Pollock demand model developed in this study uses bi-annual time series data for the national market for the period of 2007-2022 (first half). The model can be used to assess how strongly various Wild Alaska Pollock demand drivers are correlated with demand. For example, with the model we are able to determine how important a change in market catch is relative to a change in GAPP marketing expenditures regarding their impacts on the Wild Alaska Pollock fishermen price.

The following demand drivers are included in the initial demand model to determine which have a statistically significant impact on the fishermen price:

- GAPP marketing expenditures
- Volume of catches
- Season of the year, A vs. B
- Diesel fuel price
- Price of other white fish

- Weighted average wholesale price for fillets, surimi, and roe
- Exchange rate of US \$ to Euro
- Exchange rate of US \$ to Yen
- Indicator variable that only U.S.-caught Pollock can be called Alaska Pollock in the U.S.
- Indicator variable for USDA Bonus Buy
- Indicator variable for US MSC certification
- Indicator variable for Russian MSC certification
- Indicator variable that only Pollock caught in the U.S. can be called Alaska Pollock in the U.S.
- Indicator variable for Chinese tariffs

To compare the relative importance of each factor on Wild Alaska Pollock demand, the results from the statistical (econometric) model are converted into “price flexibility coefficients.” A price flexibility coefficient measures the percentage change in the fishermen price given a one-percent change in a specific demand driver, holding all other factors constant. For example, the computed price flexibility for market catch volume measures the percentage change in the fishermen price given a one-percent change in market catch volume. The computed GAPP marketing price flexibility coefficient measures the percentage change in the fishermen price given a one-percent change in GAPP marketing expenditures, and so on. Since price flexibility coefficients are calculated for each demand factor listed above, one can compare them to determine which factors have the largest impact on the fishermen price.

Market Simulation Analysis. Once the econometric model is estimated, the resulting demand models are used to compute a return on investment for GAPP marketing expenditures. An average ROI provides the dollar returns from each dollar invested in GAPP marketing.

In order to compute the ROI, the estimated demand models are used to simulate the outcome of two scenarios for the period, 2017-2022. In the first scenario, which is the baseline or historical scenario, all demand drivers in the models are set to their semi-annual historical levels and the fishermen price is simulated over time. This scenario provides a base to compare the

counterfactual scenario results with. In the second scenario, which is the counterfactual no GAPP marketing scenario, all demand drivers except for GAPP marketing expenditures, are again set to their semi-annual historical values. However, unlike the first scenario, GAPP marketing expenditures are set to zero in the second scenario. Since the only thing different between the two scenarios is GAPP expenditures, the difference in simulated price between the two scenarios provides a quantitative measure of the impact of GAPP marketing on the fishermen price.

Econometric Results

The complete set of econometric results is presented in the Appendix of this report. Here, we focus mainly on the estimated price flexibility coefficients for GAPP marketing. The model was originally estimated with all the demand drivers discussed in the previous section. Then, a “step-down” regression method was used, where each variable that was not statistically significant was omitted one by one, and the regression was re-run. This procedure was followed until all remaining variables in the model were statistically significant. The estimated fishermen model has an excellent statistical fit with a coefficient of determination (R^2) of 0.93 indicating that the demand drivers in the model explained 93% of the variation in the fishermen price over time. The final model included the following statistically significant demand drivers for the fishermen price: volume of catch, disposable U.S. income, U.S. dollar-yen exchange rate, wholesale weighted average price for fillet, surimi, and roe, price of diesel fuel, Consumer Price Index for all items, indicator variable for the name change to Wild Alaska Pollock, season of the year, and, most importantly to this study, GAPP marketing expenditures.

The price flexibility coefficient associated with GAPP marketing is positive and statistically different from zero. Two-period lagged promotion expenditures have a significant

impact on the fishermen price. Specifically, a 10% increase in GAPP marketing expenditures is associated with a 0.39% increase the fishermen price, holding all other demand drivers constant. This means that the statistical evidence supports the hypothesis that GAPP's marketing activities increase demand for Wild Alaska Pollock. So the answer to the first question posed in this research is that GAPP marketing does have a significant and positive impact on the fishermen price.

Because there is error inherent in any statistical model, a 90% confidence interval is computed for the GAPP marketing. This interval can be interpreted as the range of possible values where one can be confident that the true population elasticity could be expected to fall 90% of the time. The 90% confidence interval for the GAPP marketing price flexibility coefficient is (0.06, 0.7). Because the lower bound estimate is positive, this provides statistical confidence that GAPP's marketing activities have a positive and statistically significant impact on the fishermen price.

Return on Investment

The estimated demand model is used to simulate market conditions with and without the GAPP marketing. Specifically, two scenarios are simulated over the time period 2018 - 2022: (1) baseline scenario, where the fishermen price is simulated based on all explanatory variables sets to their historical levels, and (2) no-GAPP marketing scenario, which is the same as the baseline except GAPP marketing expenditures are set to zero. A comparison of the simulated fishermen price between these two scenarios provides a measure of the impact GAPP marketing on Wild Alaska Pollock demand.

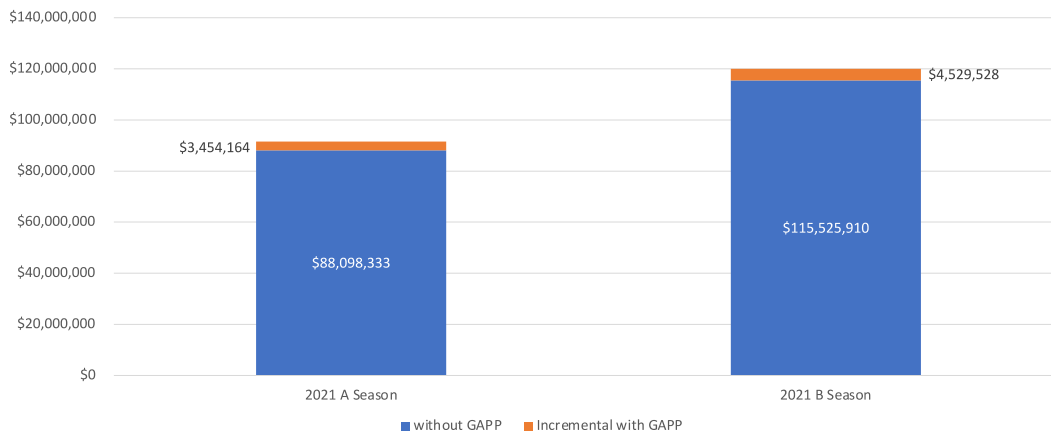
The results indicate that GAPP increased the fishermen price by 3.9% relative to what it

would have been in the absence of GAPP marketing. That is, in the past 5-years, without GAPP, the fishermen price would have averaged 3.9% less than what it actually was.

We can translate that into total revenue created for all cooperatives by multiplying the increase in the fishermen price due to GAPP marketing by total catch in Season A and Season B to derive the gain in total fishermen revenue. This was done for 2021, and the results are presented in the Figure 1 below. For 2021, GAPP returned \$7.983 million in increased revenue to cooperative members. In other words, had there not been GAPP marketing in 2021, net revenue to the participating cooperatives would have been \$7.983 million per year lower than it actually was. This translates into an average return on investment for all cooperatives of 14.53.¹ In other words, each dollar invested in GAPP by cooperatives returned \$14.53 back in net revenue to its members.

¹ The formula for rate of return on investment is: (incremental net revenue due to GAPP-GAPP dues)/GAPP dues.

For 2021, GAPP returned \$7.98 Million in increased revenue to Cooperatives members



Sources: NOAA and Undercurrent News Price Portal

Figure 1. Impact of GAPP on Fishermen Revenue.

Appendix. Econometric Model

Fishermen Demand Model

The fishermen demand model is estimated with semi-annual data from 2007-2022, and has the following econometric results:

Dependent Variable: LOG(PRICE)

Sample: 2007S1 2022S1

Included observations: 31

Huber-White (HC0) heteroskedasticity consistent standard errors and covariance

No d.f. adjustment for standard errors & covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-11.90621	2.760096	-4.313693	0.0003
LOG(CATCH)	-0.128227	0.066841	-1.918382	0.0688
LOG(INC)	-1.671282	0.286242	-5.838700	0.0000
LOG(JAER)	0.298419	0.132334	2.255042	0.0349
LOG(WHOLESALEPRICE)	1.278223	0.161469	7.916205	0.0000
LOG(DIESEL)	0.213352	0.068245	3.126265	0.0051
LOG(CPI)	2.741149	0.480260	5.707639	0.0000
LOG(GAPP(-2))	0.038603	0.018896	2.042905	0.0538
NAMECHG	0.174138	0.052941	3.289318	0.0035
DUMA	-0.123988	0.034614	-3.582038	0.0018
R-squared	0.933038	Mean dependent var		-1.836076
Adjusted R-squared	0.904340	S.D. dependent var		0.195312
S.E. of regression	0.060408	Akaike info criterion		-2.519698
Sum squared resid	0.076631	Schwarz criterion		-2.057121
Log likelihood	49.05532	Hannan-Quinn criter.		-2.368909
F-statistic	32.51248	Durbin-Watson stat		2.068331
Prob(F-statistic)	0.000000	Wald F-statistic		72.30565
Prob(Wald F-statistic)	0.000000			

In the table above, PRICE is the fishermen price for Wild Alaska Pollock, CATCH is U.S. volume of catch of Wild Alaska Pollock, INC is disposable U.S. income, JAER is the U.S. dollar-Yen exchange rate, WHOLESALEPRICE is the weighted average wholesale price for fillets, surimi, and roe, DIESEL is the average diesel fuel price, CPI is the Consumer Price Index for all items, GAPP(-2) is marketing expenditures by GAPP lagged two periods, NAMECHG is an indicator variable for when the name was changed to Wild Alaska Pollock, DUMA is an indicator variable for Season A, and LOG is the natural logarithm operator. The data source for exchange rates are from the USDA/ERS international macroeconomic data set, the CPI is from the Bureau of Labor Statistics, and all other data came from GAPP officials.

Data Used in the Fishermen Model²

YEAR	CATCH	COVID	CPI	DIESEL	DUMA	GAPP
2007S1	505,857	0	219.6	2.86	1	537,982
2007S2	689,557	0	224.6	3.22	0	537,982
2008S1	367,992	0	238.0	4.06	1	169,618
2008S2	525,092	0	251.7	3.68	0	169,618
2009S1	304,824	0	253.5	2.34	1	147,068
2009S2	410,924	0	251.7	2.78	0	147,068
2010S1	308,172	0	250.8	3.04	1	130,350
2010S2	441,482	0	250.1	3.19	0	130,350
2011S1	518,343	0	256.5	4.00	1	134,478
2011S2	707,343	0	264.2	4.02	0	134,478
2012S1	509,085	0	267.6	4.20	1	129,576
2012S2	739,485	0	267.8	4.14	0	129,576
2013S1	520,382	0	270.3	4.07	1	154,028
2013S2	756,282	0	270.5	4.03	0	154,028
2014S1	554,117	0	270.9	4.02	1	210,625
2014S2	812,517	0	271.2	3.86	0	210,625
2015S1	574,176	0	273.6	3.05	1	207,041
2015S2	849,676	0	274.5	2.75	0	207,041
2016S1	599,267	0	273.8	2.42	1	425,181
2016S2	872,567	0	272.4	2.70	0	425,181
2017S1	648,378	0	272.3	2.84	1	354,196
2017S2	843,878	0	271.1	3.09	0	859,781
2018S1	652,048	0	272.2	3.55	1	303,005
2018S2	825,548	0	273.4	3.74	0	712,181
2019S1	628,725	0	276.6	3.59	1	622,493
2019S2	818,125	0	276.5	3.64	0	1,531,991
2020S1	667,556	1	281.1	3.20	1	1,522,062
2020S2	699,644	1	284.2	2.98	0	1,880,934
2021S1	637,842	1	285.1	3.54	1	2,233,663
2021S2	792,669	1	293.1	4.15	0	1,336,564
2022S1	528,890	1	313.5	5.19	1	1,884,367

² The fishermen price is excluded due to confidentiality. All other data are presented here.

YEAR	INC	JAER	NAMECHG	WHOLESALE PRICE
2007S1	10,425	106.0	0	3,805
2007S2	10,633	106.0	0	2,615
2008S1	10,959	95.3	0	3,712
2008S2	10,982	95.3	0	2,848
2009S1	10,905	87.1	0	4,087
2009S2	10,951	87.1	0	2,881
2010S1	11,230	83.7	0	3,607
2010S2	11,483	83.7	0	3,145
2011S1	11,792	78.7	0	3,468
2011S2	11,979	78.7	0	2,762
2012S1	12,388	80.3	0	3,308
2012S2	12,622	80.3	0	2,862
2013S1	12,420	99.4	0	3,061
2013S2	12,615	99.4	0	2,571
2014S1	12,998	106.6	0	3,206
2014S2	13,386	106.6	0	2,600
2015S1	13,645	121.0	0	3,225
2015S2	13,846	121.0	0	2,559
2016S1	14,026	110.3	0	3,052
2016S2	14,251	110.3	0	2,438
2017S1	14,640	115.6	0	2,842
2017S2	14,963	115.6	1	2,405
2018S1	15,439	115.4	1	2,973
2018S2	15,820	115.4	1	2,767
2019S1	16,096	115.5	1	3,229
2019S2	16,342	115.5	1	2,914
2020S1	17,425	114.6	1	3,214
2020S2	17,439	114.6	1	2,907
2021S1	18,796	121.0	1	3,281
2021S2	18,219	121.0	1	2,816
2022S1	18,340	123.0	1	3,448