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Comments on the Hatchery Economic Studies

Comments on
"A Benefit-Cost Analysis of the Alaska Salmon Enhancement Program"
and supporting studies prepared for the Alaska Senate Special Committee
on Domestic and International Commercial Fisheries
Legislative Review of the Alaska Salmon Enhancement Program

Comments prepared by

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Summary

The study addresses important issues. The analysis attempted by the study is extremely difficult, and parts of the analysis are highly sophisticated. But despite many strengths of the study, its policy conclusions are premature and inappropriate. The authors claim that "a reduction in enhanced fish would be warranted from an economic point of view." The analysis is inadequate to justify this conclusion.

A chain of reasoning is only as strong as its weakest link. This study has many strong links, but its chain of reasoning has several critical weak links. The public policy conclusions are not defensible because they are critically dependent on certain assumptions which are not defensible. The problem is not a matter of a few small errors which do not affect the basic conclusion of an otherwise sound analysis. The problem is a few assumptions which are not defensible and on which the rest of the analysis--sound or unsound--rests.

Introduction

Following release of *A Benefit-Cost Analysis of the Alaska Salmon Enhancement Program*, I was invited by the Alaska Department of Fish and Game to offer any comments that I might have about the study. I also received questions about the study from members of the press and officials of hatchery organizations.¹

My comments on this study are brief. They do not relate to the specific statistical modeling techniques which were used, but rather to more general and fundamental problems with the study.

Comments on the Study

1. The study addresses important issues.

It is entirely appropriate to study the costs and benefits of Alaska's hatchery program. It is entirely appropriate to ask how hatchery production may affect prices. It is entirely appropriate to ask what level of public funding may be justified for Alaska's hatchery program.

2. The analysis attempted by the study is extremely difficult.

There are no easy answers to the kinds of questions asked by the study. Developing models to predict salmon prices or harvest costs is very difficult.

¹My credentials for commenting on the study are as follows. I am a Professor of Economics at the University of Alaska Anchorage Institute of Social and Economic Research (ISER), where I have worked since 1981. I am a specialist in resource economics and the Alaska economy. I have written numerous studies of Alaska resource issues, and have taught Resource Economics at the University of Alaska Anchorage for the past twelve years. I have also taught undergraduate courses in Econometrics (the application of statistical methods in economics) several times. I have written several studies relating to Alaska salmon markets, including *Alaska Salmon Markets and Prices*, *The Japanese Salmon Market: An Introduction for Alaskans*, *1992 Alaska Salmon Markets*, *Salmon Markets*, February 1993. From this experience, I am generally familiar with the Alaska salmon industry and salmon markets, as well as more generally with the analysis of public policy issues. I have not, however, had experience with the highly sophisticated econometric techniques used in this paper. My comments here do not relate to these techniques.

3. Parts of the analysis are highly sophisticated.

The analysis represents by far the most sophisticated analysis to date of many important questions related not only to Alaska's hatchery programs but also to Alaska's salmon markets and harvesting costs. There is much of value in the analysis.

4. Despite many strengths of the study, its policy conclusions are premature and inappropriate.

The authors claim that "a reduction in enhanced fish would be warranted from an economic point of view." The analysis presented by the authors is inadequate to justify this conclusion.

5. A chain of reasoning is only as strong as its weakest link. This study has many strong links, but its chain of reasoning has several critical weak links.

The public policy conclusions are not defensible because they are critically dependent on certain assumptions which are not defensible. The problem is not a matter of a few small errors which do not affect the basic conclusion of an otherwise sound analysis. The problem is a few assumptions which are not defensible and on which the rest of the analysis--sound or unsound--rests.

6. The study's predictions of future salmon prices--and the future relationship between prices and hatchery production levels--are based on statistical analysis of past prices and production. But the relationship between prices and production may change dramatically in the future--invalidating the most fundamental assumptions on which the study's conclusions are based.

As the authors put it (emphasis added):

"Let us explain why we believe *our estimates must be treated with caution...* These predictions are based on models using data from only a small number of years. The demand model is based on quarterly data from 1982 to 1991. The fishing cost model is based entirely on data for 1990. *To extrapolate 15 or 30 years based on these short time series is dangerous. Certainly projections made in the 1960s could not have foreseen the changes that occurred in the following 20 years.*" (page 17)

"... *Our estimates of net benefit are based on parameters estimated from relatively short time periods and were extrapolated well beyond the time horizon for which accurate estimates may be obtained.* There are also a number of exogenous factors, such as what is happening in the rest of the salmon suppliers' markets, *that have changed far too rapidly over the last decade to allow precise estimates of where the industry will be in one, two or three decades.*" (page 39)

"The econometric models in this study estimate the historical structure of the international salmon markets. Future revenue projections are based on the assumption that this historical structure continues into the future." (Marketing Model Executive Summary, page 1)

"The results indicate that *given current market conditions and market structure, pink salmon are over produced.*" (Marketing Model Executive Summary, page 15).

By far the most important "finding" of the analysis is that increasing pink salmon production by 15% results in *lower* total revenues rather than higher, and reducing pink salmon production by 15% results in *higher* total revenues (page 3, alternatives 7a and 7b). In other words--although this is nowhere clearly stated in the document--the model predicts that increasing pink production depresses prices so much that total revenues fall rather than increasing. If this is true, then obviously spending money to produce more pinks does not make sense.

But is it true--or more importantly--will it be true in the future? Suppose, for the sake of argument, that it was true in the past. Presumably the reason would have been that above a certain level of production the market was glutted, so that trying to sell more salmon only drove the price down. Whether this would be true in the future depends entirely on what the salmon industry does to market pink salmon. If the industry develops new products and markets them successfully, then the market might be able to absorb far higher volumes of production without depressing price. *A critical question for economic analysis of the hatchery program is the extent to which new product development and marketing have the potential to expand pink salmon markets.* The authors clearly agree that marketing has the potential to improve salmon markets:

"...It may be prudent to increase efforts aimed at expanding world demand for Pacific wild salmon. This would increase prices at all harvest levels, and increase the ability of the world salmon market to absorb additional salmon production...Expanded demand may also lead to a situation where further increase in pink salmon production lead to increases in fishery revenues. Therefore, it may be advisable to increase efforts aimed at increasing demand for salmon, particularly pink salmon, through increased marketing and promotion, product development, market expansion and the development of new markets." (Marketing Model Executive Summary, pages 20, 22)

There is another, more disturbing scenario for the future of salmon markets, which would be equally damaging to the study's conclusions. It could happen that Alaska's competitors will expand salmon production to the point at which average salmon prices will be driven down to the level of the long-term cost of producing farmed and hatchery salmon. In other words, salmon prices may well fall regardless of Alaska's level of production. In this case, the only result of a cutback in Alaska's hatchery production would be a lower market share. The author's recognize this problem:

"...An increase or decrease in the production of any salmon species may trigger a counter move by competitors in the world salmon industry which may offset any potential gain from the production change. For example, a decrease in pink salmon harvest could provide incentive for the Japanese to invest in the potentially large Russian pink salmon industry. Thus, possible reactions of other participants in the world salmon industry must be considered when evaluating salmon enhancement policy." (Marketing Model Executive Summary, page 22)

"It appears that hatchery exports of pink salmon may be starting in the former Soviet Union. Chile also appears to have room for expansion of its farmed salmon program. If these countries are able to produce fish less expensively than Alaska, then there will be no way to stop them from entering the market in the long run." (page 7)

7. The study methodology is so complex that the authors are unable to state how accurate or reliable their analysis is.

"All of our analysis is based on point estimates... Our predictions of total revenues and producers' surplus are missing confidence levels which would probably make some of the differences between alternatives insignificant.." (page 17).

Anyone who attempts to read the benefit-cost analysis document, much less the supporting analyses, will have to agree that they are complicated. It is far from obvious even to the sophisticated reader how reliable the results actually are. It is up to the authors, therefore, to defend how reliable the results are by demonstrating how sensitive they are to the most critical assumptions. In this case the most critical assumptions are the effects of production on price. But the authors do not test the sensitivity of their results to this critical assumption. How, then, is the reader supposed to know whether the conclusions are valid?

8. The study did not consider at all some significant potential benefits to Alaska from the salmon enhancement program.

"Indirect impacts, such as employment and income from fish processing, were not included. In order to ultimately draw conclusions and make policy concerning the future of the salmon enhancement program, all of these additional factors must be considered." (page 11)

"This analysis only considers benefits and costs to the commercial salmon fisheries. Other user groups such as sport and subsistence fishermen were not included. In addition, indirect impacts such as employment and income in fish processing and support services were not included.." (page 39).

9. The authors make the unwarranted assumption that increasing "net benefits"--a technical economic concept--is or should be the basis of Alaska public policy.

The authors reach the conclusion--which their analysis does not adequately support--that "scaling back the enhancement program, and especially the pink salmon program, would increase net benefits" (page 39). Based on this conclusion, they go on to argue that "... a reduction in enhanced fish would be warranted from an economic point of view " (page 39). This has been interpreted as justification for recommending that the state scale back funding for pink salmon hatcheries.

"An economic point of view" is just that--a very narrow point of view which assumes that the goal of public policy is to maximize net economic benefits. It is highly unlikely that very much, if any, Alaska public policy, is based on the principle of maximization of net economic benefits. If other Alaska fisheries policies were examined with regard to whether they met the criterion of "positive net benefits", the results might be surprising and disturbing.

Consider another example of "the economic point of view." Suppose the criterion for salmon management were maximization of net economic benefits. The most effective step would probably be the reintroduction of fish traps for harvesting salmon. This would undoubtedly drastically reduce total salmon harvest costs, and increase "net economic benefits" in the salmon industry. Yet few Alaskan fishermen would advocate that particular public policy step.

10. The analysis makes inappropriate public policy conclusions based on technical analysis.

Even if the technical analysis were flawless, it would be inappropriate to draw the conclusion that parts of the hatchery program should necessarily be scaled back. The authors

recognize this limitation explicitly (but later go on to ignore it): *"A benefit-cost analysis addresses economic efficiency criteria to be considered when developing public policy. There are factors other than economic efficiency to be considered when developing public policy."* We might come to some startling and disturbing conclusions if we began to subject all Alaska public policies to the efficiency standard implied in this chapter.