

Community Impacts of Restructuring the Bristol Bay Salmon Fishery: Executive Summary



 **northern** economics inc.

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Development Corporation**

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and**

NOAA Fisheries

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Foreword

This document has been written in a “journalistic style,” which presents the most important information to the reader at the beginning of the report and relegates more detailed and ancillary information to later portions of the document. The same style is used within each section of the report—the most relevant points are discussed first with remainder of the section providing details that support those findings. Therefore, we encourage the readers to proceed from front to back. Skipping to the end of the study to find the conclusions will be unproductive because the conclusions are in the front.

We also encourage readers to examine the footnotes and appendices contained in the document. In general, the footnotes and appendices provide ancillary information that the authors believe to be important and useful, but which is not provided in the main text so as not to obscure the primary focus of the analysis.

Abbreviations

| Abbreviation | Meaning |
|--------------|---|
| ADF&G | Alaska Department of Fish and Game |
| BBEDC | Bristol Bay Economic Development Corporation |
| BLS | United States Bureau of Labor Statistics |
| CFEC | Commercial Fisheries Entry Commission |
| CIM | Community Impact Model |
| DCED | Alaska Department of Community and Economic Development |
| ESC | Equal Shares Cooperative |
| HSC | Historical Shares Cooperative |
| NEI | Northern Economics, Inc. |
| NOAA | National Oceanographic and Atmospheric Administration |
| PPI | Producer Price Index |

Executive Summary

Overall Conclusions

The Bristol Bay sockeye salmon fishery is in poor economic condition. While the resource is relatively healthy, prices—and therefore incomes earned by both harvesters and processors—have been at historically low levels since 1997 and are expected to stay at these low levels for the foreseeable future. In addition, the current limited-entry management that allocates the fishery resource through a “race-for-fish” encourages inefficiency and practically eliminates incentives to find more efficient means to harvest and process salmon.

This study concludes that:

- By reducing the number of operators and changing the way the fishery is managed, the fishery as a whole can be restructured such that operators in the fishery can once again expect reasonable returns for their effort and investments.
- The cooperative restructuring scenario, analyzed by the study, is the only scenario which provides significant long-term gains to permit holders and communities.
- A buyback will also provide gains to permit holders and communities. However, historically, gains from buybacks in other fisheries have been eroded over time by capital stuffing.
- Under the status quo, permit holders and communities will continue to receive less income from the fishery than they received in the past.
- Under a cooperative restructuring, if participation in the fishery by Bristol Bay watershed residents remains at levels proportionate to their current participation or at higher levels, the Bristol Bay communities stand a reasonable chance of stabilizing their economies and population levels.
- The smaller communities analyzed in this study will receive the largest direct benefits from restructuring. The economies in these communities are more dependent on the fishery than the economies of larger communities such as Dillingham and the Bristol Bay Borough. Restructuring, as analyzed in this study, is more likely to benefit these larger communities through the indirect benefit of being surrounded by healthier smaller communities.
- If a cooperative restructuring resulted in a \$0.20 per pound increase in ex-vessel price (as predicted by *The Bristol Bay Salmon Restructuring Study*) then all of the communities in the study, both large and small, would likely see significant long-term increase in salmon fishery-related income, population, and employment opportunities (See Appendix I).
- There are no conclusive empirical data that indicate that residents of communities in the Bristol Bay Watershed (most of whom are Alaskan Natives) are more likely to leave the industry than residents outside the watershed. However, the general lack of local economic opportunities in the region, the current financial stress of many in the region—precipitated by the long period of reduced earnings in the fishery—and the limited exposure of many local residents to the economic tradeoffs inherent in selling one’s fishing permit, raise the possibility that a disproportionate share of local participants may leave the fishery during a permit buyback. If this happens, then it is possible that some local communities will find themselves without a sustainable economy, which could, in the long term, result in irreversible population declines.

The Purpose and Need for this Study

The purpose of this study is to assess the potential impacts of selected restructuring options on communities in Bristol Bay. The current study is funded in part with a Saltonstall-Kennedy Grant administered by the National Oceanographic and Atmospheric Administration (NOAA) Fisheries (NA03NMF4270110), with additional financial contributions from the Bristol Bay Economic Development Corporation (BBEDC)—a community development organization based in Dillingham, Alaska, and in-kind contributions by Northern Economics, Inc. (NEI)—the primary authors of the report.

This study is the second of two studies examining the issue of restructuring the Bristol Bay sockeye salmon fishery—the world’s largest wild sockeye fishery. Both studies are sponsored and funded at least in part by BBEDC. The purpose of BBEDC is to promote economic growth and opportunities for residents of its member communities in the Bristol Bay Region through sustainable use of the Bering Sea and other local fishery resources.

In 2001, following four years of significantly lower incomes in the Bristol Bay salmon fishery, the BBEDC funded a study (at a cost of nearly \$400,000) to examine means by which the Bristol Bay salmon fishery could generate sufficient incomes for its participants. The study—*An Analysis of Options to Restructure the Bristol Bay Salmon Fishery – The Bristol Bay Salmon Restructuring Study*. (Link, et. al, 2003)—was successful in identifying potential ways to improve the fishery from a fishery-wide perspective, and recommended that stakeholders examine the following:

- Reducing fishing capacity
- Spreading harvesting across time
- Exploring alternative harvesting methods
- Improving product quality
- Marketing the harvest better
- Eliminating the race for fish by assigning shares of the harvest to participants

For various reasons including a lack of funding, the Restructuring Study was unable to fully assess impacts on local communities. While the *Restructuring Study* recommended consideration of restructuring options, it also recognized that community impacts within the Bristol Bay Region could vary widely, and that under some conditions the community impacts could be disastrous—particularly in smaller, more isolated communities that depend almost entirely on the salmon fishery. In many ways, this study is an extension of the *Restructuring Study*, and is designed to fulfill the need for a local community impacts assessment.

Specification of Study Alternatives and Communities

This study goes the next step beyond the original restructuring study and examines and compares the effects on specific communities in Bristol Bay of three specific restructuring scenarios or alternatives to the status quo conditions. The communities and alternatives studied were chosen in consultation with BBEDC board members and were designed to show a wide range of options and community types. The choice of alternatives studied does not reflect any preference on the part of BBEDC or the authors for any one option.

The three restructuring scenarios studied are specified as follows:

1. **A Permit Buyback**—In this scenario, fishing capacity is reduced with a permit buyback. The buyback reduces the number of drift permits in the fishery to 1,000 and the number of set permits to 550 (a reduction of approximately 45 percent). The buyback scenario is implemented with the assumption that the federal government provides a loan to cover the initial costs of the

buyback and that remaining industry members pay back the loan over a 30-year period. It is assumed that the interest on the loan will be 5 percent per year, but that in no case will the repayment charges exceed 5 percent of ex-vessel value. In this scenario, no other management changes are made to the fishery.

2. **Historical Shares Cooperatives or HSC**—In this scenario, the permit buyback described above is followed by management changes that encourage remaining permit holders to form cooperatives. Fishery managers will open and close fishing opportunities such that the catches of vessels in the cooperative (or cooperatives if more than one is formed) are equal to the proportion of total catch that vessels participating in the cooperative have obtained historically. It is assumed that for the cooperatives, fishery managers waive all gear and vessel limitations so the cooperatives can optimize the efficiency of the fishing effort. In both this and the following scenario, vessels not wishing to participate in the cooperative will be allowed to place their historical catch-share in a pool with other non-members. Managers will work to assure that total catch in this independent pool will be equal to the historical catch of the independent fishers overall, but no individual participant in the pool is guaranteed any specific catch amount. Further, permit holders not participating in the cooperative must continue to follow existing regulations that limit the amount of gear used and the length of vessel used, and that require the permit holder to be on board the vessel with it is fishing and delivering fish. Under this scenario, the analysis assumes that 75 percent of the permit holders remaining in the fishery after the buyback assign their catches to a cooperative, and that 25 percent choose to fish in the independent pool. Finally, it is assumed that the cooperative chooses to harvest its share of the fishery by using only one out of every three vessels owned by member permit holders, thus cutting overall operating costs significantly and assuring a greater overall return to members. It should also be noted that for comparison purposes, the study does not assume that prices paid to harvesters will increase under the cooperatives, although it is generally believed that with the elimination of the race for fish, ex-vessel prices will increase.¹
3. **Equal Shares Cooperatives or ESC**—This scenario is nearly identical to the HSC with the only difference being the catch share assigned to each permit holder. In this scenario, all permit holders are assigned an equal share of the fishery and they can either assign that share to the cooperative or to the independent pool. As in the previous scenario, the ESC scenario assumes that 75 percent of the permit holders remaining in the fishery after the buyback assign their catches to a cooperative, and that the remaining 25 percent choose to fish in the independent pool. Further, it is assumed that the cooperative chooses to harvest its percent share of the fishery by using only one of every three vessels of member permit holders, thus cutting overall operating costs significantly and assuring a greater overall return to members.

These three scenarios look at the impact of reducing the costs associated with the fishery. They do not focus on raising the *price* permit holders receive for their catch. It is very difficult for permit holders to affect the price they receive, but they can, in aggregate, have a direct influence on the costs associated with the fishery. Greater efficiency, as represented by reducing costs, is the easiest way for permit holders to derive higher net revenues from the fishery.

At least one community was chosen from each of the five fishing districts in Bristol Bay. In several cases, two or more communities are treated as a single community due to confidentiality and specificity of available data. For example, Togiak and Twin Hills are treated as a single community

¹ It is generally assumed that with the elimination of the race-for-fish, the quality of fish delivered to processors will improve and processors will be better able to create higher value products that are more finely tuned to market demands. If processors can improve their profitability through quality and market improvements, then it is likely that at least some portion of that improvement will be passed on to harvesters.

representing the Togiak fishing district because many of the secondary data sources combine information for these communities. For similar reasons Pilot Point and Ugashik are combined to represent the Ugashik fishing district. The Naknek/Kvichak fishing district is represented by the three communities forming the Bristol Bay Borough—King Salmon, Naknek, and South Naknek. While each of these communities is somewhat independent, they form a unified Borough for purposes of data reporting. Two separate communities from the Nushagak district are studied: Dillingham and Manokotak. Dillingham, the largest community in the region, was chosen because of its overall importance to the region, and Manokotak was chosen because of the very high level of dependence on the set net fishery. Table ES - 1 lists the communities studied and the fishing district in which they are located. The table also shows 2000 population and the number of permit holders in 2003.

Table ES - 1. Fishing Communities included in the Study

| Studied Communities | Fishing District | Population (2000) | Total Permits (2003) |
|--|-------------------------|--------------------------|-----------------------------|
| Togiak/Twin Hills | Togiak | 840 | 141 |
| Dillingham | Nushagak | 2,466 | 242 |
| Manokotak | Nushagak | 399 | 72 |
| Bristol Bay Borough Communities: King Salmon, Naknek, & South Naknek | Naknek-Kvichak | 1,258 | 182 |
| Egegik | Egegik | 116 | 38 |
| Pilot Point/Ugashik | Ugashik | 111 | 24 |

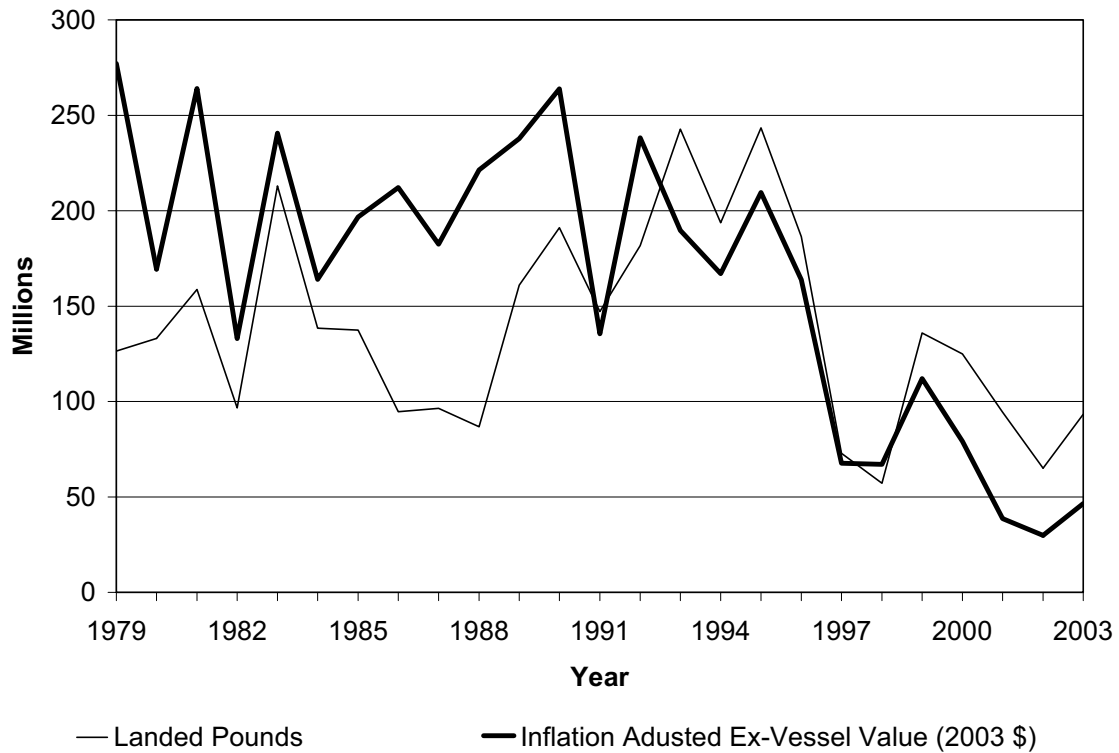
Sources: Population data are from the 2000 US Census. Permit data are from the CFEC.

Summary of Historical and Current Conditions

The Bristol Bay sockeye salmon fishery is the world’s largest wild salmon fishery. It is also one of the world’s most intense fisheries, and historically one of the more lucrative fisheries. Since 1976, annual commercial harvests of sockeye in Bristol Bay have averaged more than 22 million fish or nearly 140 million pounds, the majority of which are harvested during a 4-week period at the end of June and the beginning of July. While catches in Bristol Bay have varied widely, prices paid to harvesters (the ex-vessel price) have increased during periods of low catch, so up through 1996, the total ex-vessel value of the fishery has been significantly less variable compared to catch levels. The relative lack of variability is seen in Figure ES - 1, which shows landed weight and value of sockeye harvests from 1979-2003.

The relatively high catches of the early and mid-90s disguised the fact that the global supply of salmon (both wild catches and farmed fish) had increased dramatically, and supplies of Alaska sockeye salmon were no longer a dominant factor in the world salmon market. The relative weakness of the demand for Bristol Bay sockeye became glaringly obvious only in 1997, when catches fell dramatically due to an unexpectedly low return of fish, but prices did not respond. In 1997, inflation-adjusted earnings in the fishery fell to historically low levels (Figure ES - 1). Economic conditions in Bristol Bay have been in crisis ever since. This crisis is reflected in the estimated net returns to fishers, the increasing number of inactive or latent permits in the fishery (Table ES - 2), and in the capitalized value of both drift and set permits (market price of permits multiplied by number of permits) in Bristol Bay. (See Figure ES - 2.)

Figure ES - 1. Bristol Bay Sockeye Landed Weight and Value (inflation adjusted to 2003 dollars), 1979-2003



Source: Developed by NEI based on data from ADF&G and the US Bureau of Labor Statistics Producer Price Index for Unprocessed Fish.

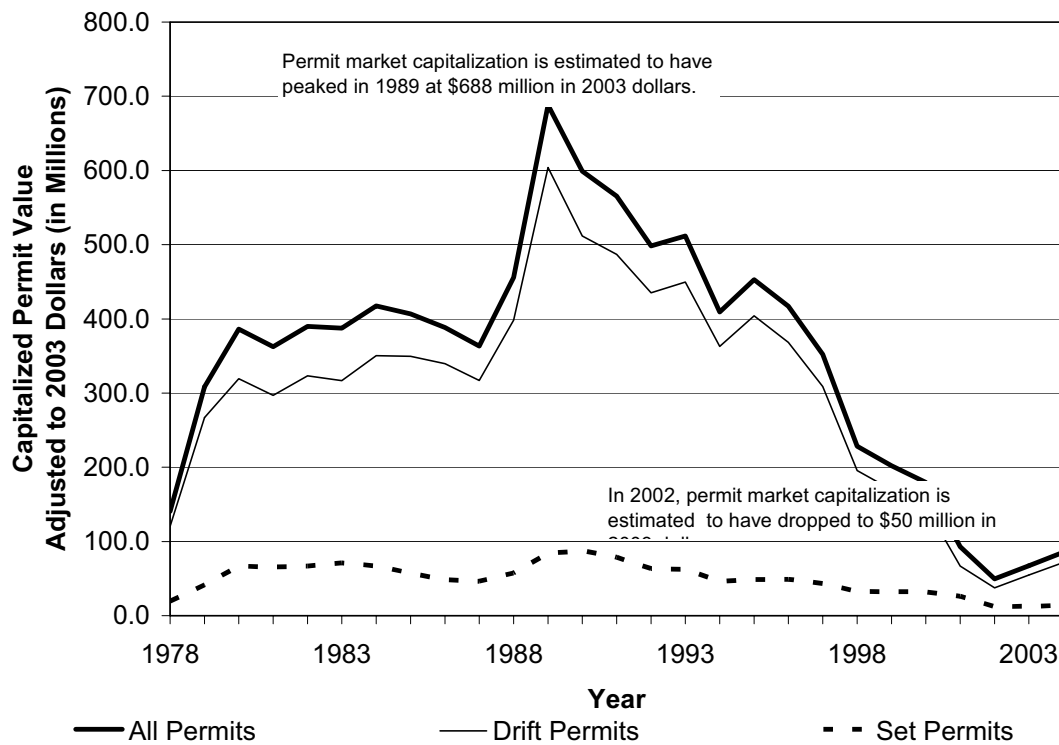
Table ES - 2. Permits, Latency, and Net Income in the Bristol Bay Fisheries, 1999-2003

| | 1999 | 2000 | 2001 | 2002 | 2003 | 3-Year Avg. | 5-Year Avg. |
|---|--------|--------|-------|-------|-------|-------------|-------------|
| Bristol Bay Drift Permit Holders | | | | | | | |
| No. of Permits Held | 1,898 | 1,890 | 1,877 | 1,858 | 1,867 | 1,867 | 1,878 |
| No. of Latent Permits | 44 | 60 | 310 | 675 | 443 | 476 | 306 |
| Net Income to Operators (\$Million) | 60.2 | 36.0 | 4.7 | 2.9 | 9.8 | 5.8 | 22.7 |
| Avg. Income per Active Permit Holder | 32,455 | 19,686 | 3,024 | 2,481 | 6,853 | 4,176 | 14,460 |
| Bristol Bay Set Permit Holders | | | | | | | |
| No. of Permits Held | 1,014 | 1,012 | 1,010 | 1,002 | 1,001 | 1,004 | 1,008 |
| No. of Latent Permits | 88 | 88 | 175 | 321 | 240 | 245 | 182 |
| Net Income to Operators (\$Million) | 16.8 | 11.1 | 3.9 | 2.6 | 5.5 | 4.0 | 8.0 |
| Avg. Income per Active Permit Holder | 18,107 | 11,984 | 4,675 | 3,792 | 7,238 | 5,268 | 9,652 |

Sources: Pounds and Revenue from CFEC Census Area Reports. Cost and net income developed by Northern Economics based on CFEC survey data and key informant interviews.

Note: Dollar values are not adjusted for inflation.

Figure ES - 2. Market Capitalization of Bristol Bay Permits, 1979-2004



Sources: Developed by Northern Economics based on data from CFEC and the US Bureau of Labor Statistics Raw Fish Producer Price Index Data.

Summary of Overall Effects of Alternatives

This study found that in general, either of the cooperative scenarios is likely to increase net income² to remaining participants more than a buyback, and that all three alternative scenarios increase net income relative to the status quo. In all of the scenarios, the gain in net income is directly attributable to the reduced number of vessels, permit holders, and crewmembers actively participating in the fishery. In other words, there is a direct tradeoff between income and employment. Here it should be reiterated that for purposes of comparison, the authors did not assume any ex-vessel price increases within the cooperative scenarios, even though it is generally expected that ex-vessel prices are likely to increase with cooperatives. Because the analysis assumes no change in prices, any improvements to the fishery result solely from cost reductions that occur with the retirement of permits and vessels.

Differences between the two cooperative scenarios are not evident at the fishery-wide level because, by assumption, the same numbers of vessels participate in cooperatives under both scenarios. The differences between the two cooperative scenarios are evident only at the community level and for individuals. Individuals that have historically caught more than an average share of the fish would fare better with the historical shares cooperative, while individuals that have caught less than an average share will be better off under the equal shares cooperative, at least based on the cooperative scenarios specified in this study.

² In this analysis, net income is defined as the income to crewmembers and permit holders in the fishery after non-labor expenditures (with the exception of principle and interest payments for boats and permits) are deducted from ex-vessel revenue.

The Status Quo

In any comparison of alternative management regimes, it is necessary to first project how participants would fare if there were no changes in the existing management regime. The status quo scenario creates this baseline case against which alternatives are compared. Because the future cannot be expected to exactly replicate past events, it is necessary to make assumptions regarding the value of certain parameters that are likely to drive the analysis. In this study, the assumptions regarding the future under the status quo are relatively straight-forward. In addition to assuming that there are no changes in the basic way ADF&G manages the salmon fishery in Bristol Bay, it is assumed that prices, input costs, and distribution of participation among communities, crew shares, and crew factors are equal to the averages seen during the last three years (2001-2003). Because returns in Bristol Bay vary widely year-to-year, the status quo run size is set equal to the average over the last five years (1999-2003).

While the merits of these key parameter assumptions can be debated, the important point is that together they combine to provide a perspective of what the future might hold if no changes to the management regime are made. More importantly, the assumed values for price (45 ¢/lb.), total catch (107.6 million lbs.) and gross revenue (\$48.0 million) are held constant across all management scenarios in the study. In addition, operating characteristics such as the annual fixed cost to maintain a vessel, the costs to fish (variable costs), and crew factors (1.6 crew on average for drift boats, and 2.2 crew on average per set net operation) in the fishery are assumed to be generally constant across alternatives. Based on these key parameter assumptions, the Bristol Bay salmon fishery is assumed to generate the incomes shown in Table ES - 3.

Table ES - 3. Summary Assumptions and Outcomes under the Status Quo, by Gear Type

| | Drift Net Fishery | Set Net Fishery | Bristol Bay Total |
|--|--------------------------|------------------------|--------------------------|
| Number of Permit Holders | 1,867 | 1,004 | 2,871 |
| Number of Active Permit Holders | 1,391 | 926 | 2,317 |
| Total Catch (lbs.) | 86,281,775 | 21,505,067 | 107,786,842 |
| Gross earnings (\$) | 38,376,774 | 9,634,382 | 48,011,156 |
| Income to Permit Holders (\$) | 9,592,962 | 4,998,391 | 14,591,353 |
| Total Crew Payments (\$) | 7,684,061 | 458,143 | 8,142,204 |
| No. of Crew & Active Permit Holders | 3,355 | 2,626 | 5,981 |
| Income per Crew & Active Permit Holders (\$) | 4,822 | 2,078 | 3,801 |

Permit Buyback

The permit buyback scenario assumes that a federal guaranteed loan program based roughly on existing legislation is used to fund a buyback of 867 drift permits³ and 454 set permits. The cost to buy back each drift permit is assumed to be \$55,000,⁴ while the cost for each set permit is assumed

³ According to Dr. Kurt Schelle, the number of vessels this study assumes to be purchased in the buyback is "reasonable" with respect to the *Optimum Numbers Study for the Bristol Bay Drift Fishery* soon to be released by the CFEC.

⁴ Assumptions regarding the cost to buy back drift permits are based on survey information collected by the CFEC in the course of developing their *Optimum Numbers Study for the Bristol Bay Drift Fishery*.

to be \$20,000.⁵ The study assumes that, following the buyback, there are no latent permits, and that prices, total catch, crew factors and fixed and variable costs are similar to those seen in the status quo. In addition, participants remaining in the fishery after the buyback have to pay back the federal loan, where the payment amount is calculated as the lesser of 5 percent of ex-vessel value, or the principal and interest on the loan at 5 percent per year.⁶

Table ES - 4 shows the projected outcomes in the drift- and set-net fisheries under the Buyback scenario. Because the same total catch and gross earnings as in the status quo are split among fewer permit holders, income to permit holders increases (because of the reduced fixed costs) from \$14.6 million to \$18.0 million. While total crew income is the same in the buyback as in the status quo (due to the assumption that crew shares are constant across all scenarios), the number of crewmembers decreases in proportion to the decrease in active permit holders, and therefore the income per crewmember also increases significantly. Overall, the study projects a 30 percent decline in the total number of permit holders and crew from just short of 6,000 in the status quo to less than 4,200 with the buyback. The increase in income combined with the decrease in participation results in a 65 percent increase in income per participant from \$3,800 to nearly \$11,800.

Table ES - 4. Summary Assumptions and Outcomes under the Buyback, by Gear Type

| | Drift Net Fishery | Set Net Fishery | Bristol Bay Total |
|--|--------------------------|------------------------|--------------------------|
| Number of Permit Holders | 1,000 | 550 | 1,550 |
| Number of Active Permit Holders | 1,000 | 550 | 1,550 |
| Total Catch (lbs.) | 86,281,775 | 21,505,067 | 107,786,842 |
| Gross earnings (\$) | 38,376,774 | 9,634,382 | 48,011,156 |
| Income to Permit Holders (\$) | 12,321,528 | 5,705,697 | 18,027,225 |
| Total Crew Payments (\$) | 7,655,971 | 461,368 | 8,117,339 |
| No. of Crew & Active Permit Holders | 2,416 | 1,750 | 4,166 |
| Income per Crew & Active Permit Holders (\$) | 8,269 | 3,524 | 6,276 |

Note: Estimates include the additional buyback repayment tax of 2.25 ¢/lb.

Historical and Equal Share Cooperatives

The study examines two cooperative scenarios. Both cooperatives are assumed to be formed following the permit buyback. The only difference between the two cooperatives is the method used to assign catch shares. The Historical Share Cooperatives (HSC) scenario assigns catch history based on each permit holder's percent of total catch in that permit holders' gear group. For example, if a permit holder normally caught one percent of the drift net harvest and that permit holder joined a cooperative then that cooperative would be credited with right to one percent of the drift net harvest. The Equal Share Cooperatives (ESC) scenario assigns an equal percentage to the cooperative for each permit holder member by gear type. For example, if there were 500 active drift net permit holders, then each permit holder would bring 1/500th share of the drift net harvest to the cooperative.

⁵ The cost to buy back set net permits is assumed to be proportional to the assumed cost of drift permits relative to current market prices.

⁶ In the scenario developed here, principal and interest on the federal loan at 5 percent is greater than 5 percent of total ex-vessel value; therefore, the annual payment is based on total ex-vessel value. We assume that the federal government subsidizes the fishery for an amount equal to the difference between the principal and interest payment and the actual payment based on total ex-vessel value. The loan payment is assumed to be collected as a per-pound tax equal in this scenario to 2.25 ¢/lb.

Both forms of the cooperative focus on eliminating the harmful aspects of the race-for-fish. In both scenarios, the analysis assumes that two bay-wide cooperatives form—one for each permit type. Each permit holder that joins the cooperative will bring a predetermined percentage to the cooperative, depending on the allocation scenario. Permit holders that do not want to participate in the cooperative could fish independently, and their share (the identical amount that would be assigned to a cooperative) would be applied to an open access pool. Independent operators in the open access pool would not be assured of, or limited to, catching their share, but the open access pool as a whole would be constrained to catch no more than the total percentage assigned to the pool, thus guaranteeing that the cooperative also catches its assigned share.

In order to demonstrate the effect of the cooperatives, the analysis also assumes that:

- 75 percent of permit holders in each gear type join a cooperative and 25 percent of the permit holders remain “independent” and fish in the open access pools
- Two-thirds of the permit holders in the cooperative would not fish during the fishing season and one-third (or 25 percent of the total) would fish for the cooperative
- Which cooperative members are active in any year would be determined by the cooperative, but it is assumed that there would be predetermined rotation among members so that all members have the opportunity to fish once every three years

No price changes are assumed in the study for the cooperatives. This analytical assumption is imposed in order to facilitate comparisons across alternative management scenarios. It is generally anticipated that prices are likely to increase with cooperatives and the elimination of the race-for-fish. The expected increases are considered likely if both harvesters and processors improve product quality relative to the status quo. Similar increases are not expected under the status quo or the buyback alone because under these scenarios the race-for-fish continues.⁷

The assumptions for the HSC and the ESC are such that the only differences are the percentages of the total catch that given individuals bring to the cooperative or to the open access pool. In both cases, 100 percent of the current year’s catch is allocated either to cooperatives or to open access. Because it is also assumed that prices and total catch under both cooperative scenarios are equal to prices and catch under the status quo, there is no difference between the two cooperative scenarios in projected outcome for the fishery as a whole.

Table ES - 5 shows the projected outcomes under the cooperatives for the fisheries overall. Because of the analytical assumption that prices do not change, the projected outcomes under the cooperatives are likely to be understated compared to more optimistic assessments. In other words, if the analysis had assumed price would increase, the results would have shown even higher incomes and incomes per participant. As it is, the analysis indicates that based on the assumptions used to define the buyback and the cooperatives, income per participant under the cooperatives is 152 percent higher than it is under the status quo. Income per participant improves by 52 percent under the cooperative as compared to the buyback.

⁷ As stated in the BBSFRS, a fishery restructured using cooperatives has a significant chance of providing permit holders with higher ex-vessel prices because of increased opportunities for producing a better quality product, more marketing, less waste, etc. That study estimated that the opportunities provided by cooperatives would raise average ex-vessel prices by \$0.20 per pound over current prices. The study team ran the Fishery Impact Models and the Community Impact Models using the BBSFRS’ projected price increases and found that such a price increase, which could only occur under cooperatives, would significantly improve conditions for both permit holders and their communities (see Appendix I).

Table ES - 5. Summary Assumptions and Outcomes under the Cooperatives, by Gear Type

| | Drift Net Fishery | Set Net Fishery | Bristol Bay Total |
|--|--------------------------|------------------------|--------------------------|
| Number of Permit Holders | 1,000 | 550 | 1,550 |
| Number of Active Permit Holders ¹ | 1,000 | 550 | 1,550 |
| Total Catch (lbs.) | 86,281,775 | 21,505,067 | 107,786,842 |
| Gross earnings (\$) | 38,376,774 | 9,634,382 | 48,011,156 |
| Income to Permit Holders (\$) ² | 14,899,308 | 6,258,225 | 21,157,533 |
| Total Crew Payments (\$) | 7,647,730 | 460,391 | 8,108,121 |
| No. of Crew & Active Permit Holders | 1,795 | 1,264 | 3,059 |
| Income per Crew & Active Permit Holders (\$) | 12,561 | 5,315 | 9,567 |

Notes:

- 1) All permit holders are considered active because they all either participate in a cooperative or in open access. However, in the cooperative, only 50 percent of the permit holders are “on the grounds” in any given year.
- 2) Estimates include the additional buyback repayment tax of 2.25 ¢/lb.

In the analysis, the differences between the two types of cooperatives are seen at the community level. In general, the average permit holder in nearly every Bristol bay community catches less than the average permit holder in the fishery overall. Therefore, nearly every Bristol Bay community will be better off under the ESC scenario than under the HSC scenario. It should be noted that in nearly every community there are likely to be some permit holders (highliners in each community, for example) that catch more than the average permit holder, and that these individuals are likely to be personally better off under HSCs.

Direct Effects on Studied Communities

This section discusses the direct effects of the restructuring scenarios on the communities. The direct effects are those effects that occur specifically as a result of restructuring the fishery. These effects include changes in permit holders, crewmembers, average net income, income to permit holders, and income to crew.

Table ES - 6 shows the projected participation levels, total catch and income per crewmember and permit holder in the drift and set net fisheries for residents of the entire Bristol Bay Watershed. Both the buyback and the cooperatives reduce the overall number of participants in the fishery from the watershed. The buyback removes permit holders and crew members, while the cooperative scenarios reduce the number of opportunities for potential crew members. Overall, there is roughly a 50 percent reduction in the number of participants between the status quo and the cooperatives. However, net income per participant more than doubles between those same scenarios. Overall catch stays the same for the status quo, buyback, and HSC, but increases under the ESC scenario.⁸

Under the status quo, the residents of the Bristol Bay watershed operating with drift permits caught 83 percent as much as the average drift permit holder fishery-wide. Resident set permit holders in Togiak/Twin Hills also caught less (97 percent) than the fishery-wide average permit holder. Because of this, the Bristol Bay Watershed communities are projected to fare better under an ESC for both fisheries. It should be noted that some residents of some communities in Bristol Bay caught more fish

⁸ Any difference in catch between the status quo, buyback, and HSC within Table ES-6 is the result of rounding error.

than the average permit (particularly in the set net fisheries), and therefore some may actually fare better under an HSC than an ESC.

Table ES - 6. Projected Participation Catch and Income in Bristol Bay Watershed Communities by Scenario

| | Status Quo | Buyback Alternative | Historical Shares Coop | Equal Shares Coop |
|--|-------------------|----------------------------|-------------------------------|--------------------------|
| Drift Permit Holders | | | | |
| No. of Active of Permit Holders ¹ | 357 | 240 | 240 | 240 |
| Total Catch (lbs.) | 17,550,612 | 17,550,612 | 17,550,612 | 19,918,373 |
| No. of Crew & Active Permit Holders | 862 | 579 | 433 | 433 |
| Income per Crew & Active Permit Holders (\$) | 3,748 | 6,304 | 9,558 | 11,248 |
| Set Permit Holders | | | | |
| No. of Active of Permit Holders ¹ | 335 | 223 | 223 | 223 |
| Total Catch (lbs.) | 8,327,207 | 8,477,569 | 8,431,988 | 8,666,612 |
| No. of Crew & Active Permit Holders | 1,068 | 712 | 513 | 513 |
| Income per Crew & Active Permit Holders (\$) | 2,067 | 3,509 | 5,199 | 5,656 |

1) All permit holders are considered active because they all either participate in a cooperative or in open access. However, in the cooperative, only 50 percent of the permit holders are “on the grounds” in any given year.

Togiak/Twin Hills

Table ES - 7 shows the projected participation levels, total catch, and income per crewmember and permit holder in the drift and set net fisheries for residents of the community of Togiak/Twin Hills. Total participation under the cooperative scenario declines by more than 50 percent relative to the status quo. However, average net income more than triples in the drift net fishery and more than doubles in the set net fishery.

Under the status quo, the average drift permit holder in Togiak/Twin Hills caught 81 percent as much as the average drift permit holder fishery-wide. Resident set permit holders in Togiak/Twin Hills caught more (112 percent) than the fishery-wide average permit holder. Therefore, the community is projected to fare better under an ESC for the drift fishery, but would do better with an HSC for the set net fishery.

Table ES - 7. Projected Participation Catch and Income in Togiak/Twin Hills by Scenario

| | Status Quo | Buyback Alternative | Historical Shares Coop | Equal Shares Coop |
|--|------------|---------------------|------------------------|-------------------|
| Drift Permit Holders | | | | |
| No. Active of Permit Holders ¹ | 63 | 37 | 37 | 37 |
| Total Catch (lbs.) | 2,699,350 | 2,699,350 | 2,699,350 | 3,069,157 |
| No. of Crew & Active Permit Holders | 152 | 89 | 66 | 66 |
| Income per Crew & Active Permit Holders (\$) | \$2,897 | \$6,278 | \$9,740 | \$11,482 |
| Set Permit Holders | | | | |
| No. Active of Permit Holders ¹ | 57 | 35 | 35 | 35 |
| Total Catch (lbs.) | 1,459,264 | 1,459,264 | 1,459,264 | 1,385,489 |
| No. of Crew & Active Permit Holders | 182 | 111 | 78 | 78 |
| Income per Crew & Active Permit Holders (\$) | 2,155 | 3,971 | 6,043 | 5,690 |

1) All permit holders are considered active because they all either participate in a cooperative or in open access. However, in the cooperative, only 50 percent of the permit holders are “on the grounds” in any given year.

Dillingham

Table ES - 8 shows the projected participation levels, total catch, and income per crewmember and permit holder in the drift and set net fisheries for residents of the community of Dillingham. Total participation under the cooperative scenarios (137 persons) is slightly more than 50 percent of the status quo level of 261 persons. The buyback is expected to increase average net income in both the drift net fishery and set net fishery by substantial amounts. However, these increases are well short of the increases the analysis projects under the cooperative scenarios.

Under the status quo, the average resident in drift permit holder in Dillingham caught 97 percent as much as the average drift permit holder fishery-wide. Resident set permit holders in Dillingham caught more (111 percent) than the fishery-wide average permit holder. Therefore, the City of Dillingham would fare better if there were an ESC for the drift fishery and an HSC for the set fishery.

Table ES - 8. Projected Participation Catch and Income in Dillingham by Scenario

| | Status Quo | Buyback Alternative | Historical Shares Coop | Equal Shares Coop |
|--|------------|---------------------|------------------------|-------------------|
| Drift Permit Holders | | | | |
| No. Active of Permit Holders ¹ | 108 | 77 | 77 | 77 |
| Total Catch (lbs.) | 6,308,557 | 6,308,557 | 6,308,577 | 6,495,200 |
| No. of Crew & Active Permit Holders | 261 | 186 | 137 | 137 |
| Income per Crew & Active Permit Holders (\$) | 4,991 | 7,403 | 10,847 | 11,406 |
| Set Permit Holders | | | | |
| No. Active of Permit Holders ¹ | 76 | 54 | 54 | 54 |
| Total Catch (lbs.) | 2,354,484 | 2,400,151 | 2,383,270 | 2,254,328 |
| No. of Crew & Active Permit Holders | 243 | 173 | 132 | 132 |
| Income per Crew & Active Permit Holders (\$) | 2,808 | 4,253 | 5,834 | 5,617 |

1) All permit holders are considered active because they all either participate in a cooperative or in open access. However, in the cooperative, only 50 percent of the permit holders are “on the grounds” in any given year.

Manokotak

Table ES - 9 shows the projected participation levels, total catch, and income per crewmember and permit holder in the drift and set net fisheries for residents of the community of Manokotak. Manokotak would benefit greatly under the ESC scenario. Average net income would more than quadruple in the drift net fishery, while it would more than triple in the set net fishery. The trade off would be a significant reduction in permit holders and crew members. Under the status quo, the average drift permit holder in Manokotak caught 75 percent as much as the average drift permit holder fishery-wide. Resident set permit holders in Manokotak also caught less (72 percent) than the fishery-wide average permit holder. Thus Manokotak is likely to fare better with an ESC than with an HSC.

Table ES - 9. Projected Participation Catch and Income in Manokotak by Scenario

| | Status Quo | Buyback Alternative | Historical Shares Coop | Equal Shares Coop |
|--|-------------------|--------------------------------|-----------------------------------|------------------------------|
| Drift Permit Holders | | | | |
| No. Active of Permit Holders 1 | 26 | 14 | 14 | 14 |
| Total Catch (lbs.) | 944,790 | 944,790 | 1,046,018 | 1,055,874 |
| No. of Crew & Active Permit Holders | 63 | 34 | 26 | 26 |
| Income per Crew & Active Permit Holders (\$) | 2,023 | 5,590 | \$9,275 | \$9,390 |
| Set Permit Holders | | | | |
| No. Active of Permit Holders 1 | 36 | 25 | 25 | 25 |
| Total Catch (lbs.) | 689,896 | 686,021 | 713,245 | 924,793 |
| No. of Crew & Active Permit Holders | 115 | 79 | 58 | 58 |
| Income per Crew & Active Permit Holders (\$) | 1,367 | 2,288 | 3,613 | 4,976 |

1) All permit holders are considered active because they all either participate in a cooperative or in open access. However, in the cooperative, only 50 percent of the permit holders are "on the grounds" in any given year.

Bristol Bay Borough

Table ES - 10 shows the projected participation levels, total catch, and income per crewmember and permit holder in the drift and set net fisheries for residents of the combined communities of the Bristol Bay Borough. As with the other communities, the Bristol Bay Borough is projected to see significant gains from both the buyback and cooperative scenarios. Average net income in the drift net fishery is expected to rise under the ESC cooperatives to \$11,630 from \$3,843, and average net income in the set net fishery is expected to rise from \$1,900 to \$5,200.

Under the status quo, the average resident drift permit holder in Bristol Bay Borough caught 93 percent as much as the average drift permit holder fishery-wide. Resident set permit holders in Bristol Bay Borough caught an amount just equal to the fishery-wide average permit holder. Thus, Bristol Bay Borough is likely to fare better overall with an ESC.

Table ES - 10. Projected Participation Catch and Income in Bristol Bay Borough by Scenario

| | Status Quo | Buyback Alternative | Historical Shares Coop | Equal Shares Coop |
|---|-------------------|--------------------------------|-----------------------------------|------------------------------|
| Drift Permit Holders | | | | |
| No. Active of Permit Holders ¹ | 58 | 36 | 36 | 36 |
| Total Catch (lbs.) | 2,899,787 | 2,899,787 | 2,899,787 | 3,054,555 |
| No. of Crew & Active Permit Holders | 140 | 87 | 65 | 65 |
| Income--All Crew & Active Permit Holders (\$) | 3,843 | 7,266 | 10,890 | 11,630 |
| Set Permit Holders | | | | |
| No. Active of Permit Holders ¹ | 111 | 68 | 68 | 68 |
| Total Catch (lbs.) | 2,638,219 | 2,707,197 | 2,669,610 | 2,667,558 |
| No. of Crew & Active Permit Holders | 354 | 218 | 156 | 156 |
| Income per Crew & Active Permit Holders (\$) | 1,933 | 3,705 | 5,452 | 5,182 |

1) All permit holders are considered active because they all either participate in a cooperative or in open access. However, in the cooperative, only 50 percent of the permit holders are "on the grounds" in any given year.

Egegik

Table ES - 11 shows the projected participation levels, total catch, and income per crewmember and permit holder in the drift and set net fisheries for residents of the community of Egegik. Like Manokotak, Egegik permit holders would see very real gains from the ESC scenario. The analysis estimates that the change from the status quo to an ESC structure would nearly quadruple average net income for remaining drift net permit holders. Egegik set net holders would see slightly less of an increase, but would still see their average net income rise to more than 200 percent of its current level.

Under the status quo, the average drift permit holder in Egegik caught 74 percent as much as the average drift permit holder fishery-wide. Resident set permit holders in Egegik also caught less (87 percent) than the fishery-wide average permit holder. Thus, an ESC is likely to provide a better outcome than an HSC for Egegik.

Table ES - 11. Projected Participation Catch and Income in Egegik by Scenario

| | Status Quo | Buyback Alternative | Historical Shares Coop | Equal Shares Coop |
|--|-------------------|--------------------------------|-----------------------------------|------------------------------|
| Drift Permit Holders | | | | |
| No. Active of Permit Holders ¹ | 14 | 9 | 9 | 9 |
| Total Catch (lbs.) | 637,567 | 637,567 | 637,567 | 741,794 |
| No. of Crew & Active Permit Holders | 34 | 22 | 15 | 15 |
| Income per Crew & Active Permit Holders (\$) | 3,256 | 6,016 | 9,820 | 11,910 |
| Set Permit Holders | | | | |
| No. Active of Permit Holders ¹ | 9 | 7 | 7 | 7 |
| Total Catch (lbs.) | 227,534 | 198,668 | 235,587 | 252,857 |
| No. of Crew & Active Permit Holders | 29 | 21 | 17 | 17 |
| Income per Crew & Active Permit Holders (\$) | 2,093 | 2,542 | 4,264 | 4,632 |

1) All permit holders are considered active because they all either participate in a cooperative or in open access. However, in the cooperative, only 50 percent of the permit holders are "on the grounds" in any given year.

Pilot Point/Ugashik

Table ES - 12 shows the projected participation levels, total catch, and income per crewmember and permit holder in the drift and set net fisheries for residents of the community of Pilot Point/Ugashik. Like Manokotak and Egegik, the cooperative scenarios hold the potential for real average net income gains for the community. The cooperatives would nearly quadruple the average net incomes in the drift net fishery and nearly triple the average net incomes in the set net fishery.

Under the status quo, the average resident in drift permit holder in Pilot Point/Ugashik caught 80 percent as much as the average drift permit holder fishery-wide. Resident set permit holders in Pilot Point/Ugashik caught more (101 percent) than the fishery-wide average permit holder. Because of these average catch levels, Pilot Point/Ugashik is likely to fare better with an ESC in the drift fishery and an HSC for the set fishery.

Table ES - 12. Projected Participation Catch and Income in Pilot Point/Ugashik by Scenario

| | Status Quo | Buyback Alternative | Historical Shares Coop | Equal Shares Coop |
|--|-------------------|--------------------------------|-----------------------------------|------------------------------|
| Drift Permit Holders | | | | |
| No. Active of Permit Holders ¹ | 8 | 5 | 5 | 5 |
| Total Catch (lbs.) | 370,814 | 370,814 | 370,814 | 394,690 |
| No. of Crew & Active Permit Holders | 19 | 12 | 8 | 8 |
| Income per Crew & Active Permit Holders (\$) | 3,356 | 6,417 | 11,592 | 12,528 |
| Set Permit Holders | | | | |
| No. Active of Permit Holders ¹ | 8 | 5 | 5 | 5 |
| Total Catch (lbs.) | 206,349 | 218,762 | 215,649 | 199,723 |
| No. of Crew & Active Permit Holders | 25 | 16 | 11 | 11 |
| Income per Crew & Active Permit Holders (\$) | 2,232 | 4,177 | 6,446 | 5,905 |

1) All permit holders are considered active because they all either participate in a cooperative or in open access. However, in the cooperative, only 50 percent of the permit holders are "on the grounds" in any given year.

Community Effects on Studied Communities

The Community Impact Models (CIMs) estimate that, while not a panacea, the restructuring scenarios have the potential to stabilize population and employment in smaller communities while increasing per capita income in almost all communities. Larger communities such as those of the Bristol Bay Borough and Dillingham would likely see a smaller magnitude of immediate effect from restructuring because of their more diverse economies. However, the CIMs predict that these communities would benefit in the form of job creation as residents of surrounding communities would spend portions of their higher net incomes in these regional centers.

In addition, the CIMs generally show that a buyback will not be enough to stop the economic decline in many communities. Another form of restructuring that increases net incomes and the potential for job growth is needed to alleviate some of the problems faced by these communities. Also, in general, Bristol Bay communities benefit the most from the Equal Shares Cooperative scenario and slightly less so from the Historical Shares Cooperative scenario.

The following sections outline the CIM highlights for each community.

Togiak/Twin Hills

Togiak/Twin Hills is the most stable of the small communities analyzed in this study. It would see increased job growth under the ESC and stabilizing effects to population, jobs, and working age residents under the HSC and buybacks.

Dillingham

Dillingham will benefit from increased job growth under the ESC and HSC. It is believed that this growth would come from Dillingham's position as a regional center. Increasing net incomes in outlying communities will increase the amount spent in Dillingham. The ESC and HSC have the largest benefits for outlying communities and thus would bring the largest amount of new money into the Dillingham economy.

Manokotak

The CIMs predict that Manokotak will experience sharp declines in population, jobs, and working age residents under the status quo. While the CIMs predict that the buyback and HSC scenarios could slow down losses in this area, only the ESC is predicted to stem, and potentially reverse the situation.

Bristol Bay Borough

The Bristol Bay Borough sees the smallest differences between CIM predictions for the different scenarios. The major effect of restructuring in the Borough is expected to be higher per capita incomes.

Egegik

Under the status quo, the CIMs predict that Egegik will experience significant declines in population, jobs, and working age residents. The CIMs predict that cooperative restructuring could slow population and job loss while increasing PCI. The CIMs also predict that the ESC may actually slow job loss to near zero.

Pilot Point/Ugashik

The CIM results for Pilot Point/Ugashik do not show the difference between scenarios that are seen in the models for other small communities. The two communities are expected by all scenario models to see sizeable gains in population, jobs, and working age residents five years after first year of restructuring.