



KENAI RIVER SPORTFISHING
ASSOCIATION

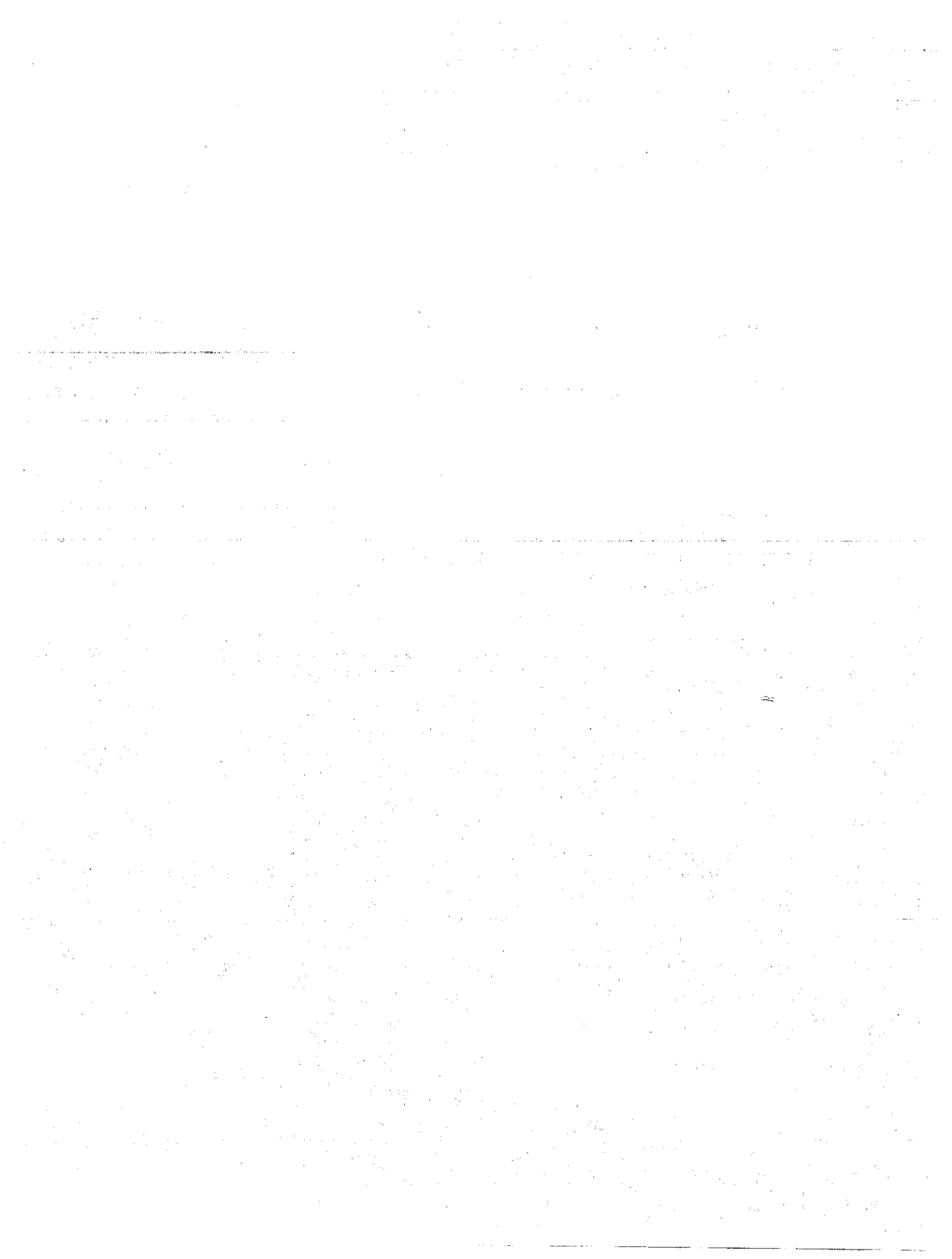
Economic Values of Sport, Personal Use, and Commercial Salmon Fishing in Upper Cook Inlet



KENAI RIVER SPORTFISHING ASSOCIATION • P.O. BOX 1228 • SOLDOTNA, ALASKA 99669

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Kenai River Sportfishing Association

The Kenai River Sportfishing Association (KRSA) is dedicated to ensuring the sustainability of the world's premier sport fishing river. The association's area of responsibility encompasses the Kenai River watershed, greater Cook Inlet basin, and Alaska. Established in 1984 and incorporated in 1992 as a 501(c)(3) nonprofit organization, KRSA accomplishes its mission through four primary program areas: Habitat, Fisheries Management, Research, and Education.

Mission

HABITAT:

KRSA fosters habitat conservation and rehabilitation to maintain and improve the Kenai River watershed for sustainable fisheries;

FISHERIES MANAGEMENT:

KRSA advocates for predictable and meaningful sport and personal use fishing opportunity;

RESEARCH:

KRSA funds and conducts fishery, economic, and conservation research to advance information for management of sustainable fisheries; and

EDUCATION:

KRSA provides public education, scholarships and outreach to promote stewardship of fisheries resources.

COMMENT #

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List of Acronyms

- ADCC&ED** Alaska Department of Commerce, Community and Economic Development
- ADF&G** Alaska Department of Fish & Game
- ADL&WD** Alaska Department of Labor & Workforce Development
- ASA** American Sportfishing Association
- AVSP** Alaska Visitor Statistics Program
- CFEC** Commercial Fisheries Entry Commission
- ISER** Institute of Social and Economic Research
- KPB** Kenai Peninsula Borough
- KRSA** Kenai River Sportfishing Association
- NEV** Net economic value
- NPFMC** North Pacific Fisheries Management Council
- SWHS** Statewide Harvest Survey (conducted by ADF&G)
- UCI** Upper Cook Inlet
- USF&WS** U.S. Fish & Wildlife Service

NAMES OF SALMON

- Chinook.....King**
- Coho.....Silver**
- Sockeye.....Red**
- Pink.....Humpy**
- Chum.....Dog**

Quick Reference

PARTICIPATION

- 160,000 anglers—Alaskans and visitors—sport fish for salmon, and 20,000 Alaskans harvest salmon for personal use in Upper Cook Inlet recreational salmon fisheries each year.
- 1,375 to 2,500 individuals are seasonally employed in commercial salmon harvesting and processing or have jobs indirectly attributable to commercial harvests in Upper Cook Inlet.
- Sport and personal use salmon fishing in Upper Cook Inlet account for well over one-third (37%) of all recreational fishing in Alaska.
- Upper Cook Inlet accounts for 2.2% of the total statewide commercial salmon catch.
- In Cook Inlet there are 25 commercial salmon permits for every 100,000 fish harvested as compared to three permits for every 100,000 fish harvested in the rest of the state.

ECONOMIC SIGNIFICANCE

- Recreational salmon fishing in Upper Cook Inlet generates 3,400 average annual jobs producing \$104 million (2006 dollars) in income.
- Commercial salmon fishing in Upper Cook Inlet generates between 275 and 500 average annual jobs producing between \$10 and \$18 million (2006 dollars) in income.
- The average commercial salmon harvest size in Upper Cook Inlet from 2002 to 2006 is greater than the average harvests over the past ten and past fifty years.
- The current (2000-2006) value of Upper Cook Inlet commercial salmon harvests is 14% of the highest historic value (1986-1992) and 39% of the most recent decade (1991-2000).

NET ECONOMIC VALUE (NEV)

- The average value over and above expenses that individual Alaskans place on their annual recreational fishing is \$776 (2006 dollars).
- The net economic value of recreational salmon fishing in Upper Cook Inlet to Alaskans and visitors is \$115 million (2006 dollars)—almost half (47%) of the statewide net economic value total—with \$62 million of that total going to Alaskans.
- The net economic value of Upper Cook Inlet commercial salmon fishing to all permit holders—Alaskans and non-residents—is less than \$1 million.

FUTURE TRENDS

- Demand for recreational fishing opportunities in the Cook Inlet boroughs is expected to continue to grow by 2.3% per year through 2011—a net increase of almost 29,000 anglers over 2002-2006 levels.
- Salmon farming and globalization of seafood markets will continue to exert downward pressure on prices and values in all of Alaska's commercial salmon fisheries.

ECONOMIC IMPACTS

- Institute of Social and Economic Research (ISER) study models from the mid-1990s suggest that at current commercial prices and values, increasing sockeye salmon allocations for sport fishing in Upper Cook Inlet would generate overall economic gains in the region.

ALLOCATION

- Commercial fisheries are currently allocated 82% of the Upper Cook Inlet salmon harvest, while sport and personal use fisheries are allocated 18% of the harvest.
- In Alaska 2% of the total salmon harvest is allocated for recreational use. For allocations in Alaska to be comparable with other North American Pacific salmon fisheries, allocation rates for recreational fishing would need to be increased two (200%) to five (500%) times.



ECONOMIC VALUES OF SPORT, PERSONAL USE, AND COMMERCIAL SALMON FISHING IN UPPER COOK INLET

EXECUTIVE SUMMARY

Upper Cook Inlet is unique among all of Alaska's maritime regions in its relative proportions of recreational and commercial fishing. Upper Cook Inlet supports Alaska's largest and most economically valuable recreational fisheries. Sport and personal use fishing is heavily concentrated in the region, and the economic values associated with these activities are very substantial. By contrast, commercial fisheries in Upper Cook Inlet yield a small fraction of the state's commercial harvest and the associated economic values are very modest.

Over the past decade the economic values of sport and personal use salmon fisheries in Upper Cook Inlet have greatly surpassed those of the commercial salmon fisheries by every available measure. State fisheries management systems—designed primarily to accommodate commercial fisheries—continue to grapple with the profound and ongoing changes in both recreational and commercial salmon fisheries in the region.

To more clearly define the economic importance and relative values of salmon fisheries in Upper Cook Inlet, this report reviews published studies and agency data on participation, economic significance, net economic value, and potential economic impacts of management practices in the region's sport, personal use, and commercial salmon fisheries.

COOK INLET SALMON FISHERIES

Cook Inlet is divided into two fisheries management areas—Upper and Lower Cook Inlet. Anchor Point (near Homer) is the boundary between the two areas. Upper Cook Inlet is divided into two districts—the Central District (from Anchor Point north to Boulder Point) and the Northern District (from Boulder point north). The Central District is the gateway for salmon returning to the Kenai, Matanuska-Susitna, and Anchorage Borough watersheds.

Almost two-thirds (64%) of the total Cook Inlet commercial salmon catch comes from Upper Cook Inlet. An even greater percentage of the total harvest value—about five-sixths (83%)—comes from Upper Cook Inlet. This means that the great bulk of high-value salmon

species caught in Cook Inlet are taken in Upper Cook Inlet. Sockeye salmon constitute almost all (93%) of the value of the Upper Cook Inlet commercial salmon harvest with Chinook and coho each constituting 3% and chum 1%.

While sockeye salmon is by far the most commercially valuable fish species in Cook Inlet, run-timing and migration routes utilized by all salmon species overlap in Upper Cook Inlet to such a degree that the commercial fishery is largely mixed-stock and mixed-species in nature.

Sockeye salmon are one of the most highly valued salmon species and by far the most abundant species in recreational fisheries in Upper Cook Inlet. Chinook salmon is perhaps the most highly valued salmon species in recreational fisheries, but Chinook harvests are by far the smallest of any salmon species in the region. Though less abundant than sockeye, coho salmon are much more abundant than Chinook and are very highly valued in Upper Cook Inlet recreational fisheries.

Essentially all (98-99%) commercially harvested salmon in Upper Cook Inlet are caught in the Central District. Set gillnets take half of the Upper Cook Inlet commercial salmon harvest and more than two-thirds (70%) of these set gillnets are concentrated on the east side of the Central District where the Kenai River watershed is located. Kenai sockeye generally comprise more than half (52%) of the total Upper Cook Inlet commercial salmon harvest.

The Kenai River watershed supports the largest and most intensively used recreational salmon fisheries in the state. Low numbers of salmon passing through the Central District commercial salmon fisheries to the Northern District of Upper Cook Inlet have limited the development of recreational salmon fishing in Matanuska-Susitna Borough watersheds.

PARTICIPATION

Sport and Personal Use

With one out of every three Alaskans active in sport fishing (some 207,000 resident anglers), Alaska has the

highest rates of participation in recreational fishing in the nation. The great bulk of sport fishing activity in Alaska is attributable to Alaskans who account for well over two-thirds (70%) of some 2.8 million annual sport fishing days in the state. Moreover, recreational fishing by Alaskans is highly concentrated in the Southcentral region with almost three-quarters (72%) of all established resident anglers living and doing nearly all (95%) of their sport fishing in the region.

More than half (51%) of all summer fishing trips in the state—by Alaskans and visitors—are in Upper Cook Inlet. Salmon fishing in Upper Cook Inlet accounts for almost three-quarters (73%) of all fishing trips in the area and well over one-third (37%) of all recreational fishing in the state.

More than a quarter of a million (261,000) anglers—Alaskans and visitors—fish each year in the Cook Inlet boroughs. Of these, some 160,000 anglers fish for salmon in Upper Cook Inlet. In addition, some 20,000 Alaskans obtain personal use permits to net Upper Cook Inlet salmon to feed their households. Alaskans with personal use permits harvest about the same number of sockeye salmon (~300,000) in Upper Cook Inlet each year for household use as all anglers—Alaskans and visitors—take in the Upper Cook Inlet sport fisheries. Alaskans with personal use permits take about one-third and sport anglers—Alaskans and visitors—take about two-thirds of the total Upper Cook Inlet recreational (non-commercial) salmon harvest of all species.

Wildlife Watching

Salmon runs also play a critical role in wildlife watching in Alaska, an activity with even greater rates of participation than recreational fishing and hunting combined. Salmon runs draw marine mammals—such as orcas, belugas, and Steller sea lions—and terrestrial mammals and birds—such as bears, eagles, and land otters—into concentrations and locations where it is both possible and attractive for Alaskans and visitors to view them. Both private and commercial wildlife watching in Cook Inlet rely on access by small plane, motorized and non-motorized boats, conventional and off-road vehicles, and foot to areas where wildlife is concentrated in sufficient numbers to engage participants. Ultimately the spawn and decomposing bodies of salmon provide the critical nutrients in a terrestrial food web extending from insects and plants to a broad host of birds and animals that support more extended wildlife watching opportunities.

Not quite half of all adult Alaskans (42%) and over half of all U.S. summer visitors (56%) actively engage in wildlife watching—in trips away from the home—for a total of more than a half million participants (514,000) and well over 4.2 million days of activity annually.

Commercial

Some 844 commercial permit holders reported a catch in the Upper Cook Inlet management area in 2006. One out of five (22%) commercial permit holders in Cook Inlet are nonresidents. Between 1,375 and 2,500 individuals are estimated to be seasonally employed in commercial harvesting and processing or have jobs arising out of the indirect economic effects of commercial salmon harvests in Upper Cook Inlet.

The Upper Cook Inlet commercial salmon catch accounts for 2.2% of the total statewide commercial salmon harvest.

Commercial salmon fishing permits are seven and a half (7.6) times more concentrated in Cook Inlet than in the rest of the state. In Cook Inlet there are 25 commercial permit holders for every 100,000 salmon harvested compared to three permit holders for every 100,000 salmon harvested in the rest of the state. Commercial salmon fishing effort is disproportionately concentrated in Cook Inlet and even more disproportionately concentrated in Upper Cook Inlet.

ECONOMIC SIGNIFICANCE

Sport and Personal Use

Sport and personal use fishing in Southcentral Alaska generate direct annual spending of some \$453 million (2006 dollars) and total sales of \$581 million that support 6,100 “full-time equivalent” or “average annual” jobs that produce \$186 million in income. Sport and personal use salmon fishing in Upper Cook Inlet generates total annual sales of some \$316 million (2006 dollars) that support 3,400 average annual jobs producing \$104 million in income in the region.

Commercial

Estimates based on high ex-vessel (commercial catch) values of the mid-1990s attribute 500 average annual jobs and \$18 million (2006 dollars) in annual income to harvesting, processing, and indirect and induced employment from commercial salmon harvests in Upper Cook Inlet. At current (2000-2006) average annual



commercial harvest values for salmon in Upper Cook Inlet, employment arising from commercial harvesting and processing as well as indirect and induced employment is estimated to be between 275 and 500 average annual jobs, and average annual income is estimated to be between \$10 and \$18 million (2006 dollars).

Though the size of wild salmon runs fluctuates from year to year, the recent average annual commercial salmon harvest in Upper Cook Inlet is greater than long-term averages. The average commercial salmon harvest in Upper Cook Inlet over the most recent five-year period (2002-2006) of 4.34 million is greater than the average harvests in the region over the past ten years (1996-2005) of 3.70 million and past fifty years (1966-2005) of 4.27 million. By contrast, the inflation adjusted average annual value (in 2006 dollars) of Upper Cook Inlet commercial salmon harvests from 2000-2006 of \$16 million is one-seventh (14%) of the highest historic average annual value for an equivalent time period (1986-1992) of \$108 million and about one-third (39%) of the average annual value of the most recent decade (1991-2000) of \$40 million.

NET ECONOMIC VALUE (NEV)

Both commercial and recreational fishing have economic worth in addition to the value created in local economies from sales, jobs, and income. Measurements of the collective economic gains of all individual participants in an activity—characterized technically as “net economic value” (NEV) assessments—consider the collective benefits that participants in an activity receive over and above their costs or expenses of participation.

Permit holders in commercial fisheries expect to receive profits or returns on their investments that are over and above the amounts they need to meet their expenses. The collective economic gains or net economic value realized by all permit holders is generally assessed by measures most closely associated with collective profits or collective return on investment to permit holders. Expectations about these gains in turn determine the market value of commercial fishing permits as well as the willingness of permit holders to remain active in a fishery.

Recreational fishing participants also realize an economic “profit” from sport and personal use fishing if they value their experience more than the amount they actually have to pay to go fishing. Economists can

measure the amount of this “profit” by determining the extra amount that a recreational fishing participant would be willing to pay in addition to the actual costs of going fishing. The collective total of the “extra” value obtained by each participant is characterized by economists as the net economic value of recreational fishing. Participants’ expectations about this “extra” value determine the willingness of anglers to continue to make certain levels of expenditures on recreational fishing and to remain active in particular recreational fisheries.

Sport and Personal Use

Alaskans place an average value on their annual recreational fishing, over and above their expenses, of \$776 (2006 dollars). The net economic value (NEV) of sport and personal use fishing to participants in Southcentral Alaska is four-fifths (80%) of the statewide NEV total. The net economic value of recreational salmon fishing in Upper Cook Inlet is estimated at \$115 million (2006 dollars)—almost half (47%) of the statewide total—with \$62 million of that total going to Alaskans.

Commercial

The net economic value of Upper Cook Inlet commercial salmon fishing to Alaskan and nonresident permit holders is less than \$1 million. As a result of low ex-vessel prices and correspondingly low net economic value, current values of commercial salmon permits in Cook Inlet are about one-tenth (10%) of the all-time high values in the late 1980s and early 1990s.

FUTURE TRENDS

Sport and Personal Use

Demand for recreational fishing opportunities in the Cook Inlet boroughs is expected to grow by 2.3% per year through 2011—a net increase of almost 29,000 anglers over 2002-2006 levels. From 2002 to 2006, ADF&G issued an average 20,000 permits for Upper Cook Inlet personal use fishing. A record 21,910 personal use permits were issued in Upper Cook Inlet in 2004. Increases in sport and personal use harvests in Upper Cook Inlet will be determined by administrative allocation rather than underlying demand for fishing opportunities.

Commercial

Comparisons of historical harvest data show that the size of the current commercial salmon catch in Upper Cook Inlet cannot be used as the explanation for current low commercial salmon harvest values. The size of the

average annual commercial salmon harvest in Upper Cook Inlet in recent years is greater than the average harvest sizes in the region over the past ten and past fifty years, yet the current average market value of the harvest is lower than any decade since the 1960s.

This fundamental change in price regimes for Alaska salmon has resulted from dramatic increases in production of farmed salmon and globalization of world seafood markets. Salmon farming and globalization of seafood markets will continue to exert downward pressure on prices and values in Alaska's commercial salmon fisheries and act as a driving force for changes in salmon fisheries management.

In this new economic environment, the exceptional values of commercial salmon harvests in Upper Cook Inlet from the late 1980s to the early 1990s can no longer realistically be used to set benchmarks for fisheries management goals and objectives. To match the historic financial yields of Upper Cook Inlet commercial salmon permit holders under current market conditions, the average annual commercial salmon harvest in Upper Cook Inlet would have to be increased by two (200%) to five (500%) times and exceed the highest average annual harvest of any decade on record.

ECONOMIC IMPACTS

In 1996, the Institute of Social and Economic Research (ISER) published a study assessing the potential economic impacts of increasing management targets for late-run Kenai sockeye by 200,000 fish thus making more fish available in-river for sport and personal use fishing on the Kenai River while potentially reducing commercial harvests and profits. The study modeled scenarios projecting ranges of sockeye run sizes and salmon prices—reflective of values in the early 1990s—ranging from a low of \$1.00 per pound to a high of \$1.75 per pound.

The study found that during high runs there would be no economic impacts, at medium runs and low prices sport gains would exceed commercial losses, and at low runs commercial losses would probably exceed sport gains. The study's authors noted that "given the range of uncertainty in our estimates, we can't definitely conclude that actual commercial losses would be larger than sport gains." The study expressly noted but failed to assess the gains that would accrue to Northern District (Matanuska-Susitna and Anchorage boroughs) recreational fisheries from the

increased number of sockeye salmon that would escape through the Central District under the higher management target.

The real (inflation adjusted) price per pound values of commercially caught sockeye salmon modeled in the ISER study are much higher than the nominal (non-inflation adjusted) values stated in the study. Characterized in constant value 2006 dollars, ISER effectively modeled commercially harvested sockeye salmon at a high value of \$2.37 per pound, a low value of \$1.35 per pound, and a median value of \$1.94 per pound. The nominal values paid for commercially harvested sockeye salmon in Upper Cook Inlet from 2000-2006 were between \$1.10 and \$0.60 per pound. The average annual price per pound from 2000-2006—calculated in constant 2006 dollars—was \$0.83 per pound. This means that the ISER study used price assumptions almost one and two-thirds times (163%) greater at the low end and almost three times (286%) greater at the high end than the current average annual price per pound. Moreover, commercial permit values, harvesting and processing jobs and income, and commercial fisheries net economic values are now fractions of the values used in the ISER study.

This suggests that under current commercial salmon fishery price regimes and values the ISER study model would show economic gains in sport fisheries in Upper Cook Inlet that would exceed regional losses in the commercial fisheries in essentially all of the critical harvest level study scenarios. This would indicate that increasing salmon allocations for recreational fishing in Upper Cook Inlet would generate overall economic gains in the region.

ALLOCATION AND MANAGEMENT

Commercial fisheries are allocated about five-sixths (82%) of the Upper Cook Inlet salmon harvest, while sport, personal use, and subsistence fisheries are allocated about one-sixth (18%) of the catch. The percentage of the total salmon harvest that is allocated for recreational use in British Columbia is 11%, in the Pacific Northwest it is 4%, and in Alaska it is 2%. For Alaska to be comparable with proportionate distributions in other North American Pacific salmon fisheries, allocations for recreational salmon fishing in the state would need to be increased by two (200%) to five and a half (550%) times. Since Alaska's recreational salmon fishing is so heavily concentrated in Cook Inlet, this would mean that allocations in the region



would need to be substantially increased.

The success of recreational fisheries relies not only on receiving an appropriate share of the salmon harvest but also on receiving those fish in a way that is meaningful to recreational users. Recreational fisheries management is based on providing anglers predictable opportunities to harvest a meaningful number of fish incrementally over the entire course of the fishing season. Management practices that optimize commercial fisheries harvests in Upper Cook Inlet often negate management practices that sustain recreational fisheries.

CONCLUSION

The significant economic differences between commercial and recreational salmon fishing in Upper Cook Inlet are not generally understood or widely recognized. Because participation levels in recreational salmon fishing in Upper Cook Inlet are so much greater than those in commercial salmon fishing, recreational fishing produces much greater activity in local economies than does a comparable commercial harvest.

There are about eight (800%) to 15 (1,454%) times as many Alaskans who obtain personal use permits to harvest salmon in Upper Cook Inlet as there are individuals—Alaskans and nonresidents—who are employed in or have jobs arising out of commercial salmon harvests in Upper Cook Inlet. There are about 32 (3,240%) to 59 (5,890%) times as many Alaskans who sport fish for salmon in Upper Cook Inlet as there are individuals—Alaskans and nonresidents—who are employed in commercial salmon harvesting and processing or have jobs arising indirectly out of commercial salmon harvests in Upper Cook Inlet.

Recreational fishing also attracts visitors from outside of Alaska who bring wealth into the state in the form of new dollars spent in local economies. There are about 31 (3,120%) to 57 (5,670%) times as many visitors to Alaska who sport fish for salmon in Upper Cook Inlet as there are individuals—Alaskans and nonresidents—who are employed in commercial salmon harvesting and processing or have jobs arising indirectly out of commercial salmon harvests in Upper Cook Inlet.

In all, there are about 63 (6,300%) to 115 (11,560%) times as many anglers—Alaskans and visitors—who sport fish for salmon in Upper Cook Inlet as there are individuals—Alaskans and nonresidents—who are

employed in commercial salmon harvesting and processing or have jobs arising indirectly out of commercial salmon harvests in Upper Cook Inlet.

Due, in part, to the impact of these vastly greater rates of participation, recreational salmon fishing in Upper Cook Inlet generates about seven (680%) to 12 (1,236%) times as many average annual jobs and six (577%) to ten (1,040%) times as much average annual income in the region as commercial salmon fishing.

The additional worth of commercial and recreational fishing to participants—that is, the value over and above the costs and expenses of participation—is not accounted for by measures of economic activity such as sales, jobs, and income. This additional worth is measured by net economic value (NEV) assessments. The net economic value (NEV) to Alaskans of recreational salmon fishing in Upper Cook Inlet is 62 (6,200%) times greater than the NEV of commercial salmon fishing to permit holders—Alaskans and non-residents—in the region.

Markets for Alaska salmon continue to be impacted by mounting pressures from the globalization of seafood markets and an explosion in aquaculture production. There is no projected abatement of these trends, and they will continue to act as a driving force for changes in salmon fisheries management. Unprecedented commercial fishery values in the late 1980s and early 1990s are no longer realistic benchmarks for fisheries management goals and objectives. It is crucial that the inevitable restructuring of salmon fisheries management in Upper Cook Inlet necessitated by global market forces be fully informed by an awareness of the very significant economic values—both to local economies and to individual participants—of sport and personal use fisheries.

The state agencies that oversee and regulate fisheries were originally designed to address the needs and interests of commercial fisheries. Substantive consideration of the needs of sport and personal use fisheries and informal representation of recreational fishing interests on the Board of Fisheries are relatively recent developments. Fisheries management in Upper Cook Inlet faces the ongoing challenge of adhering to policies and practices that recognize the central economic importance of sport and personal use fisheries in the region.





SPORT FISHERY

Almost two-thirds of Alaska's population (61%) lives in the three Cook Inlet boroughs (Anchorage, Matanuska-Susitna, and Kenai Peninsula), and more than half (56%) of the state's recreational fishing occurs in these boroughs.

Concentrations of Statewide Population & Recreational Fishing in Cook Inlet Boroughs

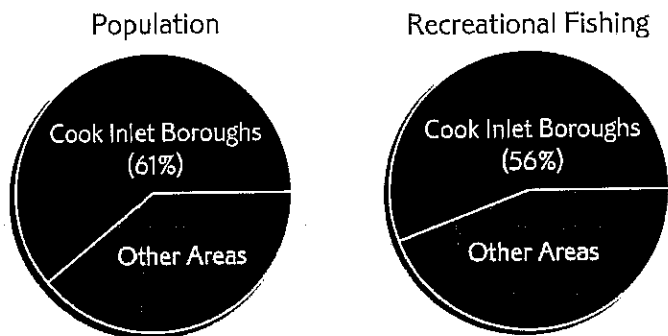


Figure 1. Concentrations of Alaska's population and recreational fishing in the Cook Inlet Boroughs. Source: ADL&WD 2007, ADF&G 2007, USF&WS 2007 and tabulation of data reported in Haley et al. 1999.

Data gathered by the U.S. Fish & Wildlife Service (USF&WS), the Alaska Department of Fish & Game (ADF&G), and the Institute of Social and Economic Research (ISER) suggest that over a quarter million (261,000) anglers—Alaskans and visitors—fish each year in the three Cook Inlet boroughs (Anchorage, Matanuska-Susitna, and Kenai Peninsula). In good fishing years, recreational anglers collectively approach one million days per year fishing on the Kenai Peninsula alone (USF&WS 2003, Pappas and Marsh 2005, and Haley et al. 1999). Tabulation of site-specific trip data in an ISER sportfishing study shows that in 1993 over half (56%) of all fishing trips by Alaskans and visitors were made in the Cook Inlet boroughs. Trip allocation totals based on the study's species target data suggest that more than a third (37%) of all recreational fishing trips in the state in 1993 were taken to catch salmon in Upper Cook Inlet (Haley et al. 1999, 5-6 to 5-9 Tables 5-1 & 5-2)¹.

The Kenai Chinook salmon fishery is world-renowned (e.g., Field & Stream magazine July 2004). Coho returns to the Kenai River support the largest recreational freshwater fisheries for this species in Alaska. The Kenai River is also

the only road-accessible sport fishery where anglers have the opportunity to fish for and harvest sockeye salmon. This fishery has expanded significantly in recent years and is now Alaska's largest sockeye sport fishery. More than one-third of all the summer fishing trips in the state identified by ISER in its study of sport fishing in 1993 were made to the Kenai Peninsula. About 40% of all sport fishing trips in the state by residents and visitors were to the ten most popular sites, the two most popular sites being the Kenai and Russian Rivers (14% of all trips), followed by sites near Homer and then Resurrection Bay at Seward (Haley et al. 1999, ES 6-9). The Kenai Peninsula has the most heavily sport fished waters in the state. Recreational anglers have averaged 600,000 angler days per year on the Kenai Peninsula over the last 20 years with a peak of almost one million angler days in 1994. The Kenai and Russian rivers support almost 300,000 trips per year (Pappas and Marsh 2005).



1. The Haley et al. 1999 publication numbers the pages of its executive summary 1 through 14 and uses hyphenated numbers to denote chapter pages, e.g., 5-6 is page 6 of chapter 5. In this report, pages of the executive summary are distinguished by adding "ES." Thus, ES 6-9 refers to pages 6 through 9 of the executive summary.

PARTICIPATION

With one out of every three Alaskans active in sport fishing, Alaskans have the highest rates of participation in recreational fishing in the nation.

The USF&WS reports in its 2006 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation: State Overview (2006 National Survey) that Alaska and Minnesota were tied in 2006 at 28% for the highest rates of state residents who participated in sport fishing in the nation. The USF&WS placed the number of Alaskans 16 years of age and older that fished in 2006 at 139,000 (USF&WS 2007, 3-4, 21 Table 2).

ADF&G makes estimates of the total number of Alaskans who go sport fishing each year on the basis of its annual Statewide Harvest Survey (SWHS), a statistical sampling of resident and nonresident households. Based on the SWHS, ADF&G estimates that 30% of all Alaskans sport fished in 2006. ADF&G estimates based on the SWHS indicate that from 1996-2006 the average annual percentage of Alaskans who sport fished was 33%, or about one out of every three residents (ADF&G personal communication 2007). ADF&G estimates based on the SWHS do not include Alaskans who harvest fish in the subsistence and personal use fisheries. This suggests that the proportion of Alaskans who fish for sport, subsistence, or personal use may be greater than one out of every three.

The great bulk of sport fishing activity in Alaska is attributable to Alaskans, who account for well over two-thirds (70%) of some 2.8 million annual sport fishing days in the state.

The USF&WS 2006 National Survey indicates that 310,000 U.S. residents over age 16 sport fished in Alaska in 2006. Of these, 44% (137,000)² were Alaskans and 56% (172,000) were nonresidents (USF&WS 2007, 22 Table 3). While the total number of nonresidents who sport fished in Alaska in 2006 was somewhat greater than the number of state residents, Alaskans accounted for the great bulk of

2. The USF&WS reports that of the total number of days in 2006 that Alaskans fished, almost all (98%) were spent fishing at sites in Alaska. Two percent (2%) of the days that Alaskans fished in 2006 were spent fishing in other states (USF&WS 2007, 23 Table 4). The USF&WS reports that the total number of Alaskans that fished (in any state) in 2006 was 139,000 (USF&WS 2007, 21 Table 2) and the number of Alaskans that fished in Alaska was 137,000 (USF&WS 2007, 22 Table 3).

the actual sport fishing activity that occurred in the state. Out of a total of 2.8 million days of sport fishing activity in Alaska in 2006 by U.S. residents, Alaskans accounted for well over two-thirds (70%) of the total, or 1.9 million days. Nonresidents accounted for less than one-third (30%), or 0.8 million days (USF&WS 2007, 23 Table 4).

Annual Sport Fishing Days in Alaska by Angler Residence (2006)

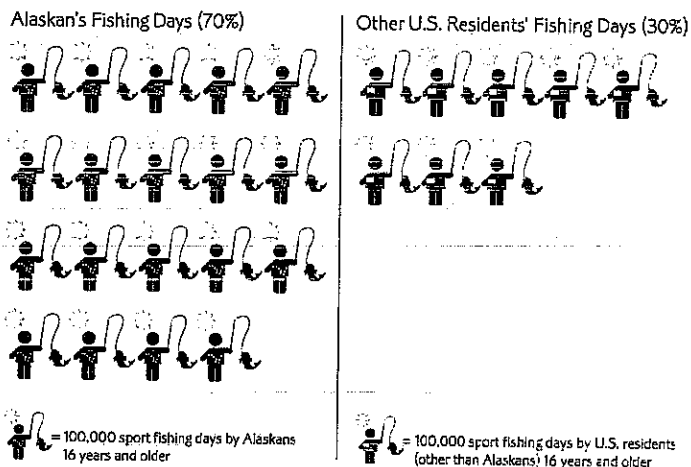


Figure 2. US residents 16 years and older spent 2.8 million days sport fishing in Alaska in 2006. Alaskans accounted for 1.9 million days (70% of the total) of those days. Other U.S. residents accounted for 0.8 million days (30% of the total) of those days. Source: USF&WS 2007.

Recreational fishing is highly concentrated in Southcentral Alaska. Almost three-quarters (72%) of all established Alaskan anglers live in and do nearly all (95%) of their sport fishing in Southcentral. Three-quarters (75%) of all fishing trips by Alaskan anglers residing in Southcentral are in Upper Cook Inlet.

Based on the SWHS conducted annually by ADF&G, an average 71% of all Alaskans who fished each year from 2002 to 2006 were residents of Southcentral Alaska. During this same period, 12% were residents of Southeast, 15% were residents of other parts of Alaska, and 2% were of unknown residence (ADF&G personal communication 2007). This means that 72% of Alaskan anglers with a known region of residence live in the Southcentral region.



Percentages of Alaskans Who Sport Fish by Region of Residence

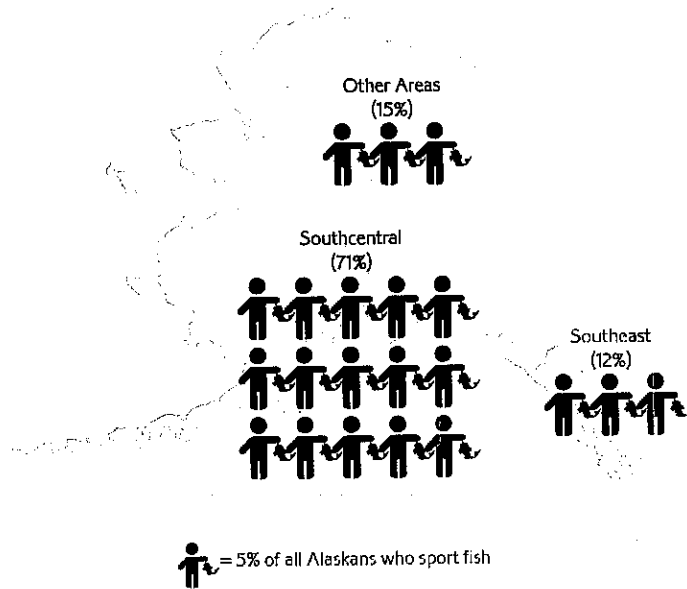


Figure 3. Percentage of all Alaskans who sport fish by region of residence, 2002-2006. (2% of anglers are of unknown residence.) Source: ADF&G 2007.

The study of recreational fishing in Alaska in 1993 conducted by ISER showed that residents of Southcentral Alaska do almost all (95%) of their sport and personal use fishing in the region (ISER 1996, Haley et. al 1999). An ISER tabulation of the 1993 data indicated that residents of Southcentral took 12% of their fishing trips to the Homer area and 8% to Seward. Three-quarters (75%) of fishing trips by residents of Southcentral were made in Upper Cook Inlet (ISER 1996).

Southcentral Residents' Trips by Region & Most Popular Fishing Sites

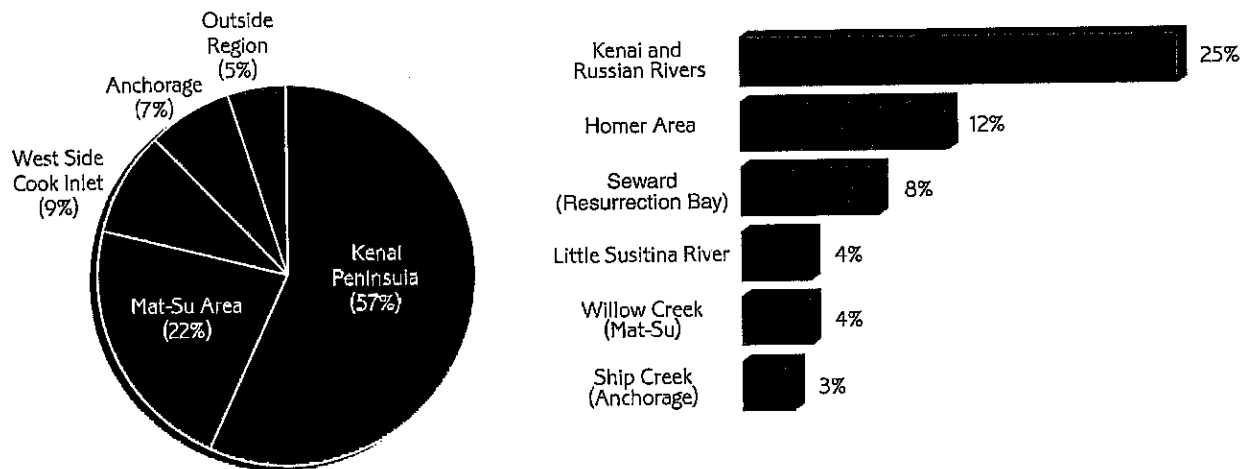


Figure 4. Southcentral resident trips by region and most popular fishing sites, 1993. Source: ISER 1996, Haley et al. 1999.

The USF&WS 2006 National Survey indicates that well over two-thirds (70%) of all sport fishing activity in the state is attributable to Alaskan residents (USF&WS 2007, 23 Table 4). A tabulation of site-specific trip data in the ISER study shows that in 1993 over two-thirds (68%) of all recreational fishing trips in the state—by both Alaskans and nonresidents—were made in Southcentral Alaska (Haley et al. 1999, 5-6 to 5-9 Tables 5-1 & 5-2). The ADF&G, USF&WS, and ISER data confirm that recreational fishing—by Alaskans and visitors—is highly concentrated in the Southcentral region.

Over a quarter of a million (261,000) anglers—Alaskans and visitors—fish in the Cook Inlet boroughs (Kenai Peninsula, Matanuska-Susitna, and Anchorage) each year.

As noted above, the USF&WS's 2006 National Survey reports that 310,000 U.S. residents over age 16 fished in Alaska in 2006. Of these 172,000 were non-residents of the state and 137,000 were Alaskans (USF&WS 2007, 22 Table 3). The USF&WS placed the population of Alaskans 16 years and older in 2006 at 499,000 and the percentage of these Alaskans that fished at 28% (USF&WS 2007, 3-4, 21 Table 2).

However, in Alaska there is significant individual participation in sport fishing by residents younger than 16 years of age and family participation that includes residents younger than 16 years in family sport fishing trips. The Alaska Department of Labor & Workforce Development (ADL&WD) places the population of Alaska in 2005-06 at 670,053 (ADL&WS 2007, <http://almis.labor.state.ak.us/?PAGEID=67&SUBID=171>). If the participation rate established by the 2006 National Survey for Alaskans 16 and older (28%) is assumed to be representative of the participation rate for all Alaskans, the number of Alaskans that participated in sport fishing in 2006 was 187,615. The 2006 National Survey did not count the participation of the substantial number of non-U.S. residents that fish in Alaska each year.

For the most recent five-year period (2002-2006), ADF&G data show that an average of 460,000 sport fishing licenses were issued each year with a high point of 487,000 in 2005. An average of 178,000 (39%) were issued each year to Alaskans between ages 16 and 60 with a high point of 181,000 in 2004. An average of 281,000 (61%) were issued to non-residents with a high point of 306,000 in 2005 (personal communication ADF&G 2007). ADF&G sport fishing license sales data do not capture participation by Alaskans under age 16 who do not need a license or Alaskans over age 60 who have been issued a PID card exempting them from obtaining a sport fishing license.

However, ADF&G does make annual estimates based on the SWHS of the total number of anglers of all ages (including foreign nationals) who sport fish in Alaska each year. For the most recent five-year period (2002-2006) ADF&G estimates indicate that an average 466,000 anglers fished in Alaska each year with a high point of

492,000 anglers in 2005. Of those, an annual average 207,000 (44%) were Alaskans, 243,000 (52%) were other U.S. residents, and 16,000 (3%) were foreign nationals (ADF&G 2007, personal communication).

If the regional fishing patterns identified by ISER in its recreational fishing study have remained relatively constant (Haley et al. 1999), well over a quarter of a million (261,000) recreational anglers fish in the three Cook Inlet boroughs (Kenai, Matanuska-Susitna, and Anchorage) each year³.

More than two-thirds (68%) of all summer fishing trips in Alaska are in Southcentral, and more than half (51%) of all summer fishing trips in the state are in Upper Cook Inlet. Salmon fishing in Upper Cook Inlet accounts for well over one-third (37%) of the state's recreational fishing.

Data in the ISER study of statewide recreational fishing in 1993 shows that more than half of Alaskans' summer fishing trips to identified sites were made in Upper Cook Inlet (Haley et al. 1999, 5-7 Table 5-1)⁴. More than a third (34%) of all resident's summer fishing trips in the ISER study were taken to sites on the Kenai Peninsula (Haley et al. 1999, ES 6-7).

3. A tabulation of 1993 trip data reported by ISER indicates that 56% of all fishing trips were taken to sites in the three Cook Inlet boroughs (Haley et al. 1999, ES 6-10 and 5-5 to 5-9, Tables 5-1, 5-2). If the proportion of statewide fishing trips within the Cook Inlet boroughs is roughly equivalent to the proportion of statewide fishing participants in the area, 174,000 of the subjects of the 2006 USF&WS study fished in the three Cook Inlet boroughs in 2006. The USF&WS study did not include U.S. residents under age 16 or foreign nationals. Allocation of participation using the 1993 ISER trip distribution data and average annual fishing licenses issued by ADF&G from 2002-2006 suggests that an average 258,000 license holders fished in the three Cook Inlet boroughs each year. ADF&G fishing license data does not capture sport fishing participation by family members under age 16 or by Alaskans over age 60. Allocation of participation using the 1993 ISER trip distribution data and ADF&G estimates based on the SWHS of the total number of anglers who fished each year in Alaska from 2002-2006 suggests that an average annual 261,000 anglers fished in the three Cook Inlet boroughs each year.

4. A small percentage (3%) of the trips reported in the study were made to unidentified sites characterized in the study under the category "Other Alaska" (Haley et al. 1999, 5-7 Table 5-1).



Alaskans' Summer Fishing Trips by Region

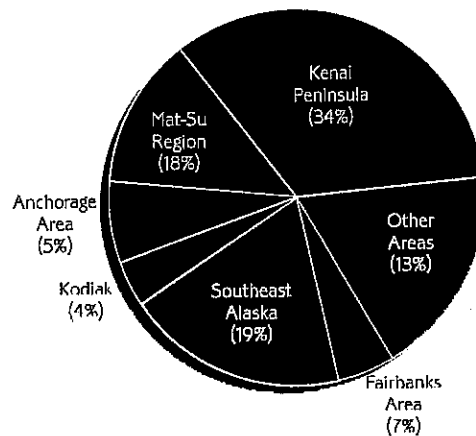


Figure 5. Regional locations of Alaskans' summer fishing trips (percentage of all trips), 1993. Source: Haley et al. 1999.

Collectively, salmon accounted for almost three-quarters (73%) of all summer fishing trips taken by Alaskans who reported a specific species of fish as a trip objective in the ISER study (Haley et al. 1999, ES 6-9, 3-5 to 3-7). Almost one-third (30%) of fishing trips by Alaskans with an identified target species were for Chinook (king) salmon with peak participation in June. Almost one-fifth (18%) of residents' trips were for coho (silver) salmon with peak participation in August. Almost another fifth (17%) were for sockeye (red) salmon with peak participation in July. One-tenth (10%) of residents' trips targeted trout with peak participation in June. A smaller percentage of trips (8%) targeted salmon for which no specific species was given.

Fish Species Targeted by Alaskans on Summer Trips

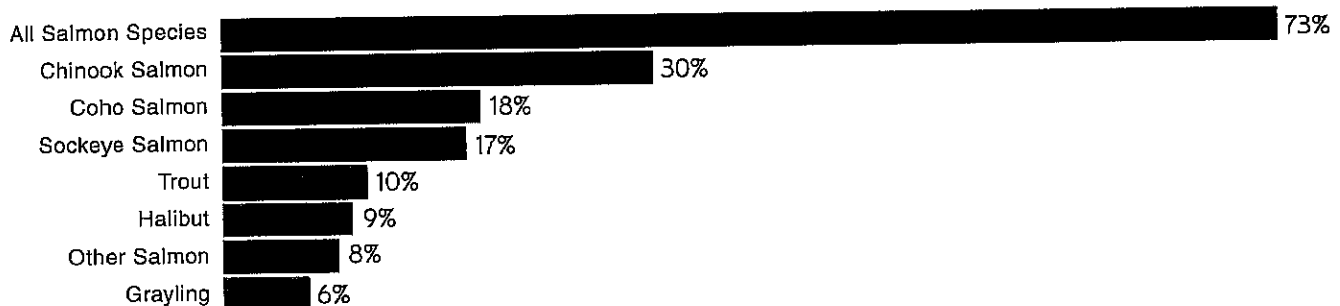


Figure 6. Fish species targeted by Alaskans on summer trips, 1993. (Summer defined as May through October. For 25% of trips surveyed, anglers did not specify a target.) Source: Haley et al. 1999.

More than half (55%) of the fishing trips by visiting anglers in 1993 identified in the ISER recreational fishing study were taken in the Cook Inlet boroughs and 40% were to sites in Upper Cook Inlet (Haley et al. 1999, 5-8 Table 5-2). The most popular site was the Kenai River, followed by Kachemak Bay. Collectively, salmon were the objective for over three-quarters (76%) of all fishing trips by visiting anglers who reported targeting a specific species. About one-third of visitors' trips (32%) targeted coho salmon, one-fifth (20%) targeted Chinook salmon, and 11% targeted sockeye salmon. Another 13% of trips were for salmon of unidentified species. (Haley et al. 1999, ES 6-9, 3-17 to 3-20).

Visitors' Fishing Trips by Region

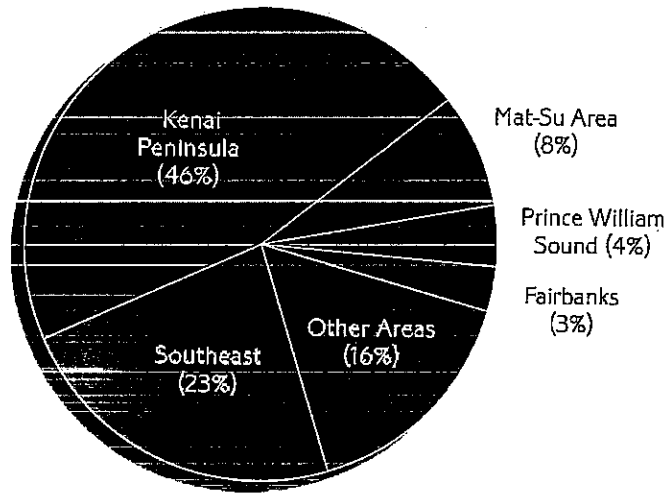
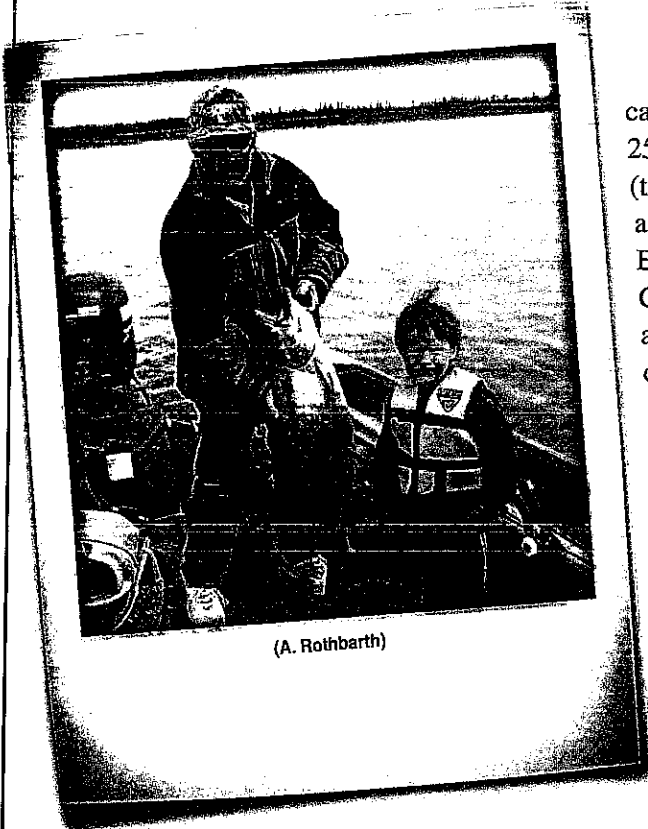


Figure 7. Regional locations of visitors' fishing trips (percentage of all trips), 1993. Source: Haley et al. 1999.



(A. Rothbarth)

Halibut—the next most popular sport fish species after salmon—came in a distant second-place choice for visitors (the objective of 25% of all visitors' trips) and a distant third place choice for residents (trout were the objective of 10% and halibut the objective of 9% of all residents' trips with a reported target species) (Haley et al. 1999, ES 7, 9). A study of the economics of sport fisheries for halibut, Chinook salmon, and coho salmon in Lower and Central Cook Inlet assessed the economic significance and the net economic value of all three species collectively since saltwater Chinook and coho salmon were considered both a substitute and a complement for halibut fishing. Data reported in this study shows that less than 1% of total angler days were spent saltwater fishing for these species north of Ninilchik River in the Central District (the southern-most district) of Upper Cook Inlet (Herrmann et al. 2001).

Fish Species Targeted by Visiting Anglers

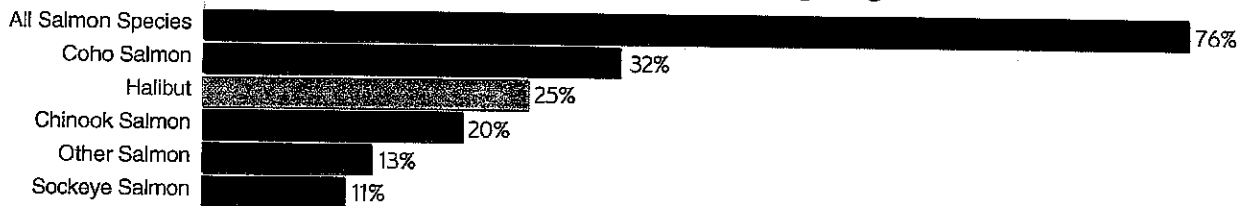


Figure 8. Fish species targeted by visiting anglers, 1993 (for 13% of trips surveyed, visiting anglers listed "salmon" without specifying a species). Source: Haley et al. 1999.



A tabulation of site-specific trip data in the ISER study shows that in 1993 over two-thirds (68%) of all recreational fishing trips in the state were made in Southcentral Alaska. Further tabulation of this trip data shows that more than half (51%) of all fishing trips by Alaskans and visitors were made in Upper Cook Inlet. Trip allocation totals based on the study's species target data⁵ suggest that over a third (37%) of all recreational fishing trips in the state in 1993 were taken to catch salmon in Upper Cook Inlet (Haley et al. 1999, 5-6 to 5-9 Tables 5-1 & 5-2).



Proportion of Alaska Fishing Trips Occurring in Upper Cook Inlet

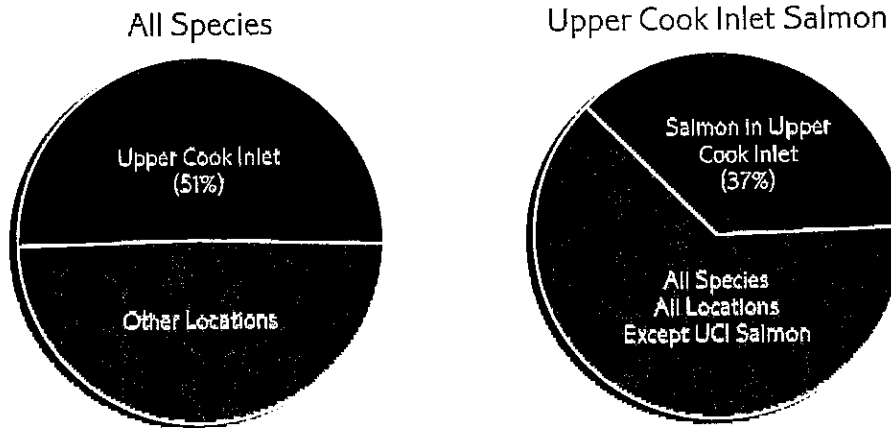


Figure 9. Proportion of all Alaska fishing trips occurring in Upper Cook Inlet and proportion of all state fishing trips targeting salmon in Upper Cook Inlet, 1993. Source: Tabulation of site-specific trip data in Haley et al. 1999.

Some 160,000 anglers—Alaskans and visitors—sport fish for salmon in Upper Cook Inlet each year.

ADF&G data indicate that from 2002 to 2006 an average 207,000 Alaskans sport fished in the state each year. During this same time period an average 72% of established Alaskan anglers lived in Southcentral Alaska (ADF&G 2007, personal communication). The study of recreational fishing in Alaska in 1993 conducted by ISER showed that

5. The respective ratios of salmon to non-salmon trip targets were applied to resident and non-resident site category trip numbers. Personal Use dipnetting trip numbers were counted entirely as salmon fishing. Upper Cook Inlet Central District saltwater fishing trip numbers were divided equally between halibut and salmon fishing.

residents of Southcentral Alaska do almost all (95%) of their sport and personal use fishing in the region (ISER 1996, Haley et al. 1999)⁶. Three-quarters (75%) of fishing trips by residents of Southcentral were made in Upper Cook Inlet (ISER 1996). If the recreational fishing patterns identified by ISER have remained consistent, more than half (54%) of all fishing trips by Alaskans each year are in Upper Cook Inlet. The ISER data shows that almost three-quarters (73%) of all summer fishing trips taken by Alaskans were for salmon (Haley et al. 1999, ES 6-9, 305 to 307).

This suggests that well over one-third (39%) of fishing trips by Alaskan anglers are for salmon in Upper Cook Inlet.⁷ If the proportion of trips made by Alaskans to fish for salmon in Upper Cook Inlet roughly approximates the proportion of Alaskans who fish for salmon in Upper Cook Inlet, some 82,000 Alaskans fish for salmon in Upper Cook Inlet each year.

ADF&G data indicate that from 2002 to 2006 an average 243,000 U.S. residents from other states and 16,000 foreign nationals sport fished in Alaska each year. The study of recreational fishing in Alaska in 1993 conducted by ISER showed that well over one-third (40%) of fishing trips by visitors to Alaska were in Upper Cook Inlet (Haley et al. 1999, 5-8 Table 5-2). Over three-quarters (76%) of fishing trips by visitors were for salmon (Haley et al. 1999, ES 6-9, 3-17 to 3-20). This suggests that almost one-third (30%) of fishing trips by visiting anglers are for salmon in Upper Cook Inlet. If the proportion of trips made by visiting anglers to fish for salmon in Upper Cook Inlet roughly approximates the proportion of visitors who fish for salmon in Upper Cook Inlet, some 79,000 visitors fish for salmon in Upper Cook Inlet each year.

6. An ISER tabulation of the 1993 data indicates that residents of Southcentral Alaska took 12% of their fishing trips to the Homer area and 8% to Seward and 5% of trips outside the region (ISER 1996).

7. The ISER data indicates that 10% of participants reporting a trip target species were for trout, 9% for halibut, 6% for grayling, and 2% of participants did not report a target species (Haley et al. 1999, ES 7, 9). The fishing sites in Upper Cook Inlet surveyed by ISER do not provide grayling fishing. This means that 79% of Alaskans reporting a trip target species in Upper Cook Inlet targeted salmon. In addition, statewide trip target species percentages applied to halibut fishing in Upper Cook Inlet overstate the significance of halibut fishing. Very high participation in halibut fishing in Homer and Seward make statewide participation percentages much higher than those in Upper Cook Inlet. The lower statewide trip target species percentage for salmon (73%) was used for purposes of this estimate.

Combining the estimates for Alaskan and visitor participation in sport fishing would mean that about 160,000 anglers—Alaskans and visitors—fish for salmon in Upper Cook Inlet each year.

Salmon runs play a critical role in wildlife watching in Alaska, an activity with even greater rates of participation than recreational fishing and hunting.

Salmon runs draw marine mammals—such as orcas, belugas, and Steller sea lions—and terrestrial mammals and birds—such as bears, eagles, and land otters—into concentrations and locations where it is both possible and attractive for Alaskans and visitors to view them. Both private and commercial wildlife watching in Cook Inlet rely on access by small plane, motorized and non-motorized boats, conventional and off-road vehicles, and foot to areas where wildlife is concentrated in sufficient numbers to engage participants. Ultimately the spawn and decomposing bodies of salmon provide the critical nutrients in a terrestrial food web extending from insects and plants to a broad host of birds and animals that support more extended wildlife watching opportunities.



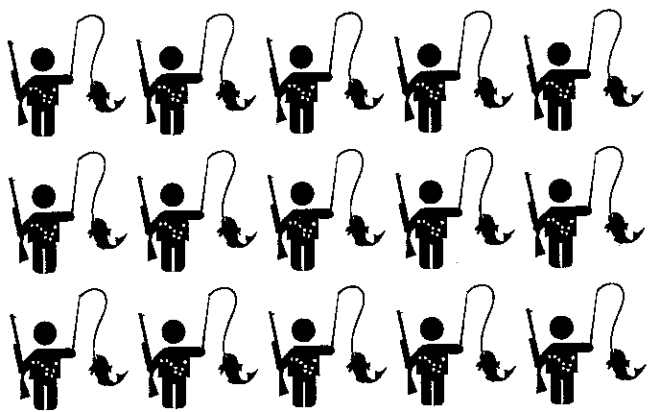



Not quite half of all adult Alaskans (42%) and more than half of all summer visitors (56%) actively engage in wildlife watching for a total of more than a half million participants (514,000) and well over 4.2 million days of activity annually.

The USF&WS 2006 National Survey reports data on wildlife watching, which it defines as “closely observing, photographing, and feeding wildlife.” The USF&WS reports that in 2006 some 208,000 Alaskans age 16 and older—not quite half (42%) of all state residents 16 years and older—actively engaged in wildlife watching. By contrast to participation in wildlife watching, the USF&WS reports that in 2006 some 150,000 Alaska residents age 16 and older—about one third (30%) of all state residents 16 years and older—actively participated in fishing and hunting (USF&WS 2007, 20 Table 1).

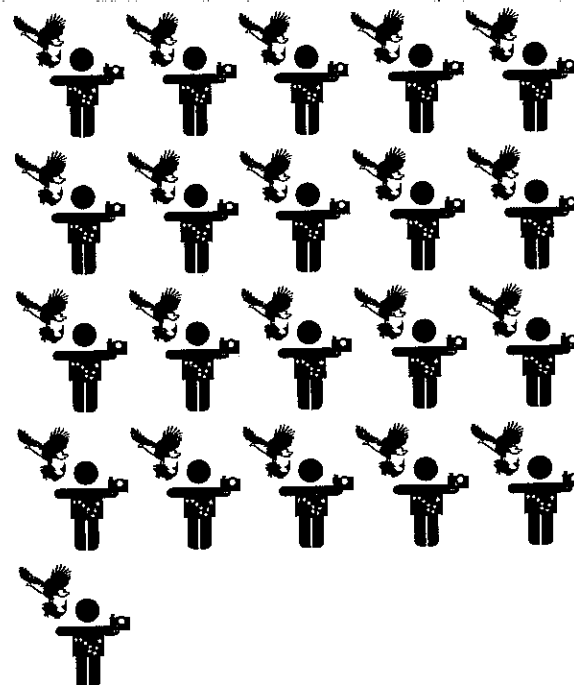
Alaskans Active in Hunting, Sport Fishing & Wildlife Watching (2006)

Hunting and/or Fishing



 = 10,000 Alaskans 16 years and older who went hunting and/or fishing in 2006

Wildlife Watching




 = 10,000 Alaskans 16 years and older who went wildlife watching in-state away from the home in 2006

Figure 10. In 2006 some 208,000 Alaskans age 16 and older—42% of all Alaskans in this age category—went wildlife watching in-state away from the home. About 150,000 Alaskans of the same ages—30% of Alaskans in this age category—went hunting and/or fishing in 2006. Source: USF&WS 2007.

The Alaska Department of Commerce, Community and Economic Development (ADCC&ED) conducts an Alaska Visitor Statistics Program to assess the economic impact of tourism in the state. In the Alaska Visitors Statistics Program: Alaska Visitor Volume and Profile, Summer 2006 (AVSP), ADCC&ED reports that in 2006 more visitors participated in wildlife viewing (56%) than any other activity except shopping (ADCC&ED 2007, 4). The USF&WS reports in the 2006 National Survey that in 2006 there were over a half million (514,000) U.S. residents age 16 and older who actively participated in wildlife watching in Alaska. Of this total, 372,000 or 72% reported wildlife watching away from home, and 204,000 or 40% reported wildlife watching around the home (USF&WS 2007, 27 Table 8).

The USF&WS 2006 National Survey reports that in 2006 those U.S. residents age 16 and older who participated in wildlife watching away from home spent 4.2 million days engaged in this activity. Of this total, 1.4 million days (34%) were spent by Alaskans and 2.8 million days (66%) by visitors (USF&WS 2007, 28 Table 9). These totals do not include the days of wildlife watching by the 204,000 participants who reported around-the-home participation. This means that the total number of days of wildlife watching by Alaskans is under-represented since only the number of days watching wildlife away-from-home was surveyed. By contrast to participation in wildlife watching, the USF&WS reports a total of 2.8 million days of sport fishing activity in Alaska in 2006 by U.S. residents 16 years and older. Of this total, Alaskans accounted for 1.9 million days (70%) and nonresidents accounted for 0.8 million days (30%) (USF&WS 2007, 23 Table 4).

State fisheries management practices that determine levels of participation in sport fishing also directly impact levels of participation in wildlife watching.

The success of sport and personal use fisheries relies not only on these fisheries receiving an appropriate share of the salmon harvest but also on receiving those fish in a way that is meaningful to recreational participants. Optimal recreational fisheries management is based on providing anglers predictable opportunities to routinely harvest a meaningful number of fish in increments that are spread over the entire course of the fishing season. Successful wildlife watching also requires the routine presence of animals, birds, and fish drawn into accessible and meaningful concentrations by incremental runs of salmon spaced over the course of the viewing season.

By contrast, success in commercial fishery management is measured primarily in terms of pounds of fish produced. Commercial salmon harvesting can be concentrated within short periods of intense activity without affecting overall economic outcomes. Commercial management strategies negate recreational fishery and wildlife watching management strategies when commercial harvest allocations are set at levels where the number of fish escaping the commercial fishery and entering river systems is insufficient to provide sport anglers and wildlife watchers with consistent and meaningful fishing and viewing opportunities throughout the season.

ECONOMIC SIGNIFICANCE

Sport and personal use fishing in Southcentral Alaska generate annual sales of some \$581 million (2006 dollars) that support 6,100 average annual jobs producing \$186 million in income in the region.

Estimates of the economic significance of recreational fishing in Southcentral Alaska are available from four sources (Table 1). These numbers may include both direct spending on recreational fishing and the indirect or induced spending generated as the effects of recreational fishing expenditures ripple through local economies causing additional commercial activity.

The USF&WS typically conducts a national survey of fishing, hunting, and wildlife-associated recreation at five year intervals. The 2006 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation: State Overview (2006 National Survey) found that U.S. residents spent an estimated \$564 million on fishing trips and related expenses in Alaska in 2006 (USF&WS 2007, 24 Table 5). The USF&WS analysis of the survey results for Alaska determined that the multiplier effect or economic output of this initial spending generated total expenditures of \$774 million, salaries and wages of \$240 million, and 8,116 full-time equivalent jobs. In addition, this economic activity generated \$58 million in state and local taxes and \$53 million in federal taxes.⁸



8. The USF&WS analysis of the effects of spending in Alaska on fishing and related expenses in 2006 was conveyed in a personal communication by Southwick Associates in advance of formal publication.



The USF&WS 2006 National Survey also assesses the economic effects of participation by U.S. residents in wildlife watching in Alaska. The 2006 National Survey reports the economic effects of wildlife watching in Alaska separately from and in addition to the economic effects of sport fishing. The economic effects of wildlife watching are integral to fisheries management decisions since fishery practices that determine levels of participation in sport fishing in Alaska also directly affect levels of participation in wildlife watching in the state. The USF&WS reported that wildlife watching in Alaska in 2006 accounted for total direct spending of \$705 million. This means that participation in wildlife watching in Alaska in 2006 had additional economic effects that were one and a quarter times (125%) greater than participation in sport fishing. The USF&WS has not yet reported figures describing the economic multiplier effects, wages and salaries, or jobs attributable to wildlife watching in Alaska in 2006.

The ISER study of the economics of recreational fishing in Alaska, initiated in 1993 and completed in 1999, showed that the Southcentral region accounted for over two-thirds (68%) of the total sales generated by sport fishing in the state (Haley et al. 1999, ES 10-12, 4-46). If the recreational fishing patterns identified by ISER have remained relatively constant, Southcentral Alaska experiences total annual sales of \$581 million (2006 dollars) that support 6,100 average annual (full-time equivalent) jobs⁹ producing an annual payroll of \$186 million.

Sport and personal use salmon fishing in Upper Cook Inlet generate annual sales of some \$316 million (2006 dollars) that support 3,400 average annual jobs producing \$104 million in income in the region.

The 1999 ISER study shows that both the regional percentage of total sales generated by recreational fishing and the regional percentage of statewide fishing trips in Southcentral Alaska are the same (68%) (see discussions above). This suggests that the economic significance of recreational salmon fishing in Upper Cook Inlet may bear the same relationship to statewide totals as the proportion of salmon fishing trips in Upper Cook Inlet bears to total statewide fishing trips to identified sites (37%). If so, recreational salmon fishing in Upper Cook Inlet generates total annual sales of \$316 million (2006 dollars) that support 3,400 average annual jobs producing an annual payroll of \$104 million in the region.

Economic Significance of Alaska's Recreational Fisheries

Source	Direct Spending ¹	Total Sales ²	Total Payroll ³	Average Annual Jobs ⁴
Jones & Stokes⁵				
Southcentral Alaska 1986	\$93	\$206	\$65	2,500
Kenai Peninsula 1986	\$82	--	--	--
Kenai River 1986	\$38	--	--	--
ISER				
All Alaska 1993 ⁶	\$540	\$637	\$209	9,200
Southcentral Alaska 1993 ⁷	\$338	\$433	\$139	6,100
Southcentral Alaska 2006 ⁸	\$453	\$581	\$186	6,100
Upper Cook Inlet Salmon 2006 ⁹	\$268	\$316	\$104	3,400
USF&WS				
All Alaska sport fishing (except effects of spending by non-U.S. residents) 2006 ¹⁰	\$564	\$774 ¹¹	\$240	8,116
All Alaska wildlife watching over and above sport fishing (except effects of spending by non-U.S. residents) 2006 ¹²	\$705	****	****	****
Kenai Peninsula Borough				
Kenai Peninsula Borough 2003 ¹³	--	\$664	--	--

Table 1. Estimates of the economic significance of Alaska's recreational fisheries from four sources

(dollar values are in millions). Estimates are based on different models and may not be directly comparable in all cases.

9. Both recreational and commercial fishing are highly seasonal in nature. In order to make appropriate comparisons both between regions and between various user groups, economists convert the values associated with seasonal employment into year round equivalents. The alternative terms "full-time equivalent jobs" and "average annual jobs" generally have the same technical meaning (Colt 2001, 12).

Notes to Table 1.

- ¹ Direct expenditures by anglers for costs related to recreational fishing.
- ² Combined total of direct and indirect spending arising out of recreational fishing activity. These effects are characterized in the USF&WS and Kenai Peninsula Borough studies as "economic output."
- ³ Total wages and salaries generated by direct and indirect spending arising out of recreational fishing activity.
- ⁴ Total average annual (full-time equivalent) jobs created by direct and indirect effects of recreational fishing expenditures.
- ⁵ Jones and Stokes 1986.
- ⁶ Haley et al. 1999, ES 10-12.
- ⁷ Haley et al. 1999, 4-46.
- ⁸ Extrapolated from 1993 data using the Anchorage Consumer Price Index.
- ⁹ Calculated at the same ratio (37%) as the ratio of salmon fishing trips in Upper Cook Inlet to total statewide fishing trips as tabulated from Haley et al. 1999, 5-6 to 5-9, Tables 5-1, 5-2 and converted into 2006 dollars using the Anchorage Consumer Price Index.
- ¹⁰ USF&WS 2007, 24 Table 5. Direct spending is characterized as "total" spending. All other information in this row except direct or total spending was conveyed by personal communication from Southwick Associates in advance of formal USF&WS publication.
- ¹¹ Information conveyed by personal communication from Southwick Associates in advance of formal USF&WS publication characterizes this amount alternatively as "economic output" or "multiplier effect."
- ¹² USF&SW 2007, 29 Table 10. Data for total spending (or economic multiplier), payroll, and jobs not yet reported.
- ¹³ Kenai Peninsula Borough 2005 Comprehensive Plan draft. This amount is characterized in the borough plan as "economic output," but the basis for arriving at this total is not identified.

Jones and Stokes 1986

An early estimate of sport fishing values in Southcentral Alaska was published in 1986 by Jones and Stokes. This study estimated that \$93 million was spent on sport fishing in the Southcentral region. Alaska residents spent \$72 million and nonresidents spent \$21 million, excluding the cost of travel to and from the state. The economic effect of this spending was 2,480 jobs, \$65 million of earnings (payroll), and \$206 million in total output. This study estimated that anglers paid \$82 million dollars in direct expenditures while fishing on the Kenai Peninsula. An estimated \$38 million dollars—almost half of all spending on the peninsula—was spent while fishing the Kenai River alone. A subsequent ISER study of sport fishing in the state in 1993 noted that the Jones and Stokes study used less comprehensive expenditure criteria than its own but concluded that growth in sport fishing expenditures in the region between 1986 and 1993 was significant (Haley et al. 1999, 4-46).

Institute of Social and Economic Research 1993-1999

The most comprehensive and authoritative estimates of the economic significance of sport fishing in Southcentral Alaska were established by ISER in its study of the economics of recreational fishing in Alaska that was begun in 1993 and finished in 1999 (Haley et al. 1999). The ISER study found that anglers spent an estimated \$540 million¹⁰—residents \$341 million and visitors \$199 million—for sport fishing in Alaska during 1993. For residents, expenses included the share of vehicle costs attributed to sport fishing trips (48%), expenses for specific trips (26%), and fishing gear and equipment (15%). Visitor spending included expeditionary costs such as guides and charters (41% of spending), money spent during fishing trips that was not specifically for fishing, such as lodging (38%), and package tour costs which typically included costs of fishing, lodging, transportation, and meals (14%).

The ISER report estimated that these sport fishing expenditures created an estimated 6,635 jobs and \$142 million in payroll in 1993. This income in turn created another 2,601 jobs and an additional \$67 million in payroll as it circulated through local economies. Consequently, the report put the total economic significance of sport fishing in Alaska in 1993 at 9,236 average annual jobs, \$209 million in payroll, and \$637 million in sales (Haley et al. 1999, ES 10-12).

The ISER report also made a regional breakdown of its economic significance findings for Southcentral Alaska. The report estimates sport fishing expenditures in the region in 1993 at \$338 million with \$233 million provided by residents and \$105 million by nonresidents. The economic effect of this spending in Southcentral Alaska in 1993 was \$433 million of total sales that supported 6,100 average annual jobs producing \$139 million in payroll. (Haley et al. 1999, 4-46).

If recreational fishing spending patterns identified by ISER have remained relatively constant, conversion of 1993 values to equivalent values in 2006 dollars using the Anchorage Consumer Price Index puts direct sport fishing expenditures in Southcentral Alaska at \$453 million and

10. The ISER report characterizes the amount of direct spending on sport fishing in the state in 1993 both as \$540 million (ES 10-11) and as "around \$550 million" (ES 13) (Haley et al. 1999). This report uses the lower figure (\$540 million) except where discussing calculations used by ISER that employ the higher approximation.



the direct and indirect effects of this spending in local economies at \$581 million in total sales that supports 6,100 average annual jobs producing \$186 million in payroll. This represents an average annual wage of \$30,492 (2006 dollars) per worker.

In assessing its own scope of inquiry, the ISER report affirms that "overall, the study provides the only comprehensive and detailed economic data that exist on recreational fishing in Alaska" (Haley et al. 1999, ES 14). In evaluating the limitations of its data, the report notes that the conditions at specific fishing sites cannot be expected to remain the same over time: "Not only do biological stocks vary from year to year, but so do site amenities, accessibility, and available information." However, the report asserts that while "we cannot assume that site conditions remain the same" over time, "we can fairly assume that angler choice behavior is reasonably consistent over a number of years" (Haley et al. 1999, 5-3).

U.S. Fish and Wildlife Service 2006

The U.S. Fish and Wildlife Service (USF&WS) typically conducts a national survey of fishing, hunting, and wildlife-associated recreation at five year intervals. The survey asks a sample of U.S. households how much money they spent to conduct fishing, hunting, or wildlife viewing. The 2006 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation: State Overview (2006 National Survey) found that U.S. residents spent an estimated \$564 million on fishing trips and related expenses in Alaska in 2006 (USF&WS 2007, 24 Table 5).

The USF&WS analysis of the survey results for Alaska determined that the multiplier effect or economic output of this initial spending generated total expenditures of \$774 million, salaries and wages of \$240 million and 8,116 full-time equivalent jobs. In addition, this economic activity generated \$58 million in state and local taxes and \$53 million in federal taxes.¹¹

The USF&WS national survey polls only members of U.S. households 16 years of age and older and its results do not include the economic effects generated by the very substantial number of foreign visitors to Alaska each year. It is also unclear whether the USF&WS national survey results are as comprehensive as the 1993-1999 ISER study in other categories, such as the inclusion of Alaska's

personal use fisheries which are equal in harvest size to the state's sport fishery. As the 1993-1999 ISER report (Haley et al. 1999) does include foreign nationals and personal use fisheries in its results, it remains the most comprehensive and authoritative study on the economic importance of recreational fishing in Alaska. The USF&WS 2006 National Survey does confirm that the 1993-1999 ISER report (Haley et al. 1999) characterizes the economic significance of recreational fishing in Alaska in orders of magnitude that remain valid to the present.

The USF&WS 2006 National Survey does assess the economic effects of participation by U.S. residents in wildlife watching in Alaska, which the ISER study does not attempt to do. The 2006 National Survey defines wildlife watching as closely observing, photographing, or feeding wildlife. The 2006 National Survey reports the economic effects of wildlife watching in Alaska separately from and in addition to the economic effects of sport fishing. However, fishery management practices that determine levels of participation in sport fishing in Alaska also directly affect levels of participation in wildlife watching in the state. The annual migration of salmon from outer ocean into coastal estuaries and river systems causes wildlife to gather into viewable concentrations and locations. The USF&WS reported that wildlife watching in Alaska in 2006 accounted for total direct spending of \$705 million. This means that participation in wildlife watching in Alaska in 2006 had additional economic effects that were one and a quarter times (125%) greater than participation in sport fishing. The USF&WS has not yet reported figures describing the economic multiplier effects, wages and salaries, or jobs attributable to wildlife watching in Alaska in 2006.

Kenai Peninsula Borough 2003

A fourth estimate of the economic significance of recreational fishing was generated by the Kenai Peninsula Borough (KPB) in its 2005 Comprehensive Plan. The KPB estimated the economic effect of sport fishing in the borough in 2003 at \$664 million. The KPB apparently based this estimate on various values identified in the ISER study of recreational fishing in Alaska in 1993 converted to 2003 equivalents with the Anchorage Consumer Price Index (KPB Comprehensive Plan 2005)¹².

The KPB plan emphasizes the potential for continued growth in sport fishing. According to the plan, tourism

11. The USF&WS analysis of the effects of spending in Alaska on fishing and related expenses in 2006 was conveyed in a personal communication by Southwick Associates in advance of formal publication.

12. The Kenai Peninsula Borough Comprehensive Plan draft does not identify how borough-based totals were tabulated or calculated.

is the borough's fastest growing industry and the single biggest tourist attraction is sport fishing. Growth in the visitor sector was "nothing short of phenomenal during the 1990's." Lodging services sales more than doubled and recreation sales grew from \$9.2 million to \$27.2 million between 1990 and 1998. The borough notes that there is no reliable indicator of visitor industry employment in the borough since visitor-related employment spans several industries. For example, visitors are the principal consumers of lodging, food, and beverage service and even use universal services such as health care, but separating out visitor and resident spending effects is difficult under the current data gathering regimes.

NET ECONOMIC VALUE (NEV)

Individual Alaskans place an average value on their annual recreational fishing, over and above their expenses, of \$776 (2006 dollars).

Sport and personal use fisheries have a very significant economic worth over and above their value to local economies in generating sales, jobs, and income. The allocation of fish for recreational harvests is an allotment of resource wealth to any Alaskan who chooses to participate that is analogous in many respects to Permanent Fund distributions from Alaska's oil wealth. The food and recreational enjoyment received by Alaskans and visitors who participate in sport fishing are in-kind equivalents for the direct out-of-pocket costs that Alaskans would otherwise be required to pay for comparable foods and equivalent forms of recreational activity.

Economists quantify the collective economic gain or net economic value (NEV) of sport and personal use fisheries based on the monetary value that participants place on the benefits they receive. Measurements include both the actual costs of going fishing and what participants would have been willing to pay over and above these expenses. Economists refer to this "willingness to pay" additional amounts over and above actual expenses as a "consumer surplus" or "compensating variation" (ISER 1996, Haley et al. 1999, Colt 2001, Herrmann et al. 2001).

Recreational fishing participants realize an economic gain from sport and personal use fishing by the amount that they value the food and recreational enjoyment they receive over and above the cost of going fishing. The collective value of these individual gains is referred to

by economists as the net economic value of recreational fishing. Expectations about these individual gains in turn determine the willingness of anglers to continue to make certain levels of expenditures on recreational fishing and to remain active in recreational fisheries.

ISER estimated that Alaskans collectively received \$107 million of net economic value from recreational fishing in 1993 (Haley et al. 1999, ES 13). Using the Anchorage Consumer Price Index to express this amount in equivalent 2006 dollars yields \$144 million. If it is assumed that 185,000 of all recreational fishing participants in 1993 were Alaskans¹³, the average value (over and above expenses) that individual Alaskans placed on their annual recreational fishing was \$776 (2006 dollars).

The net economic value of sport and personal use fishing to participants in Southcentral Alaska is four-fifths (80%) of the statewide NEV total.

ISER estimated the total economic value of recreational fishing in Alaska to all participants during 1993 at \$736-738 million (Haley et al. 1999, ES 13, 5-5 to 5-9). This total includes the combination of what Alaskans and visiting anglers actually spent to go fishing (around \$550 million) and how much more they would have been willing to pay over and above actual costs or net economic value (\$186 million).¹⁴ Alaskans accounted for about \$107 million and non-residents for \$78 million of the NEV total. Both sport and personal use fisheries were included in these assessments.

13. It is not clear how many Alaskans the ISER report identified as being anglers in 1993. The U.S. Fish and Wildlife Service (USF&WS) reported in its 2006 National Survey that there were 310,000 U.S. citizen anglers age 16 and older fishing in Alaska in that year. Of these anglers 44% (137,000) were Alaskans and 56% (172,000) were visitors. ADF&G estimates that during the most recent five-year period, 2002-2006, an average 466,000 anglers of all ages and nationalities fished in Alaska each year. Of those, an annual average 44% (207,000) were Alaskans and an annual average 6% (16,000) were foreign nationals not included in the 2006 National Survey results (ADF&G Sport Fishing Division, personal communication 2007). If the current number of resident anglers identified by the USF&WS and ADF&G is greater than the number of resident anglers identified in the 1993 ISER study, the per angler value in this calculation understates the actual average per angler value in 1993.

14. This measure does not assess the net economic value of recreational fisheries to sport fishing guides and outfitters and sport fish processors (freezing, smoking, canning, packaging, and mailing). In addition, the NEV to consumers of sport-caught fish—the family, friends, and business associates who eat the fish caught by sport anglers—is not included in this assessment.



Regional Proportions of Total Net Economic Value of Alaska's Recreational Fishing

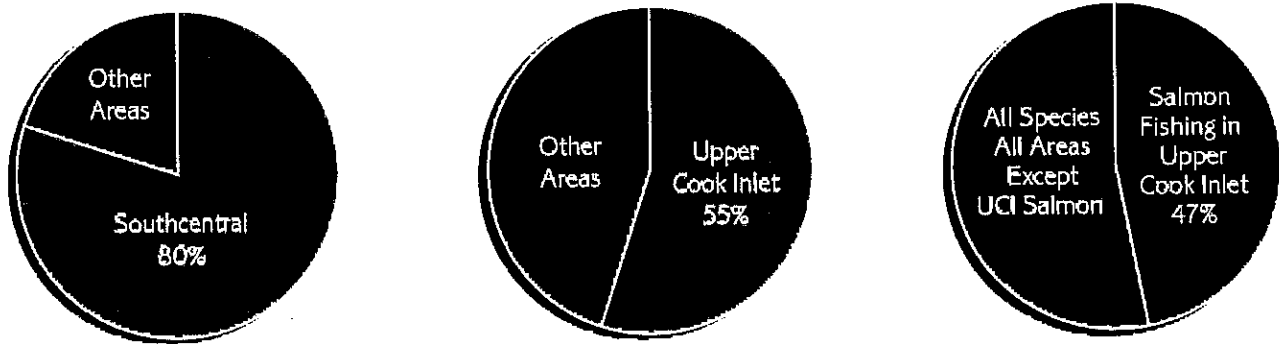


Figure 11. Regional proportions of the total net economic value of Alaska's recreational fishing and proportion of statewide net economic value of salmon fishing in Upper Cook Inlet, 1993. Source: Tabulation of data reported in Haley et al. 1999.

The ISER study provides a detailed breakdown of the estimated economic gains or net economic values of Alaska's recreational fisheries in 1993 for resident and non-resident anglers by fishing site in Tables 5-1 and 5-2 of its publication (Haley et al. 1999, 5-8 to 5-9). A tabulation of the data in these tables places the net economic value of sport fishing in Southcentral Alaska at \$144 million, over three-quarters (78%) of the statewide NEV total and four-fifths (80%) of the statewide NEV total for specifically identified sites.¹⁵

The net economic value of recreational salmon fishing in Upper Cook Inlet is estimated at \$115 million (in 2006 dollars)—almost half (47%) of the statewide total—with \$62 million of that total going to Alaskans.

A further breakdown of the ISER data places the net economic value of recreational fishing in Upper Cook Inlet at \$102 million, over half (55%) of the statewide NEV total. If halibut fishing is factored out as a contributor to Upper Cook Inlet net economic value totals¹⁶, the NEV for sport salmon fishing in Upper Cook Inlet is \$86 million, almost half (47%) of the statewide NEV recreational

fishing total. Converted to 2006 dollar values based on the Anchorage Consumer Price Index, the net economic value of recreational salmon fishing in Upper Cook Inlet is \$115 million with \$62 million of that total going to Alaskans and \$53 million going to visiting anglers.

If the proportion of direct spending by all Alaskans and visitors in 1993 on salmon fishing in Upper Cook Inlet is equivalent to the percentage of fishing trips they took to sites in the region (37%), direct spending on salmon fishing in the region comes to \$268 million (in 2006 dollars). Combining the total for direct spending on salmon fishing in Upper Cook Inlet (\$268 million) with the total net economic value accruing directly to Alaskans and visitors from recreational fishing (\$115 million) yields a total economic value of recreational salmon fishing in Upper Cook Inlet to Alaskans and visitors of \$383 million (2006 dollars).

FUTURE TRENDS

Participation in Southcentral Alaska sport fisheries is expected to grow by 2.3% per year through 2011—a net increase of some 29,000 anglers over 2002-2006 levels.

ADF&G data for sport fishing licenses issued for the most recent five-year period (2002-2006) show that, on average, some 460,000 licenses were issued each year with a high point of 487,000 in 2005. Of the average annual number of sport fishing licenses issued in the 2002-2006 period, an average of 39% (178,000) were issued to Alaskans and 61% (281,000) to non-residents. In the prior five-year period (1997-2001), an average 409,000 sport

15. Less than 5% of the statewide net economic value in Tables 5-1 and 5-2 of the ISER study (Haley et al. 1999) is attributed to sites that are not specifically identified (characterized in the tables as "Other Alaska").

16. Since saltwater salmon (chinook and coho) are both substitutes and complements for halibut fishing in Upper Cook Inlet (Herrmann et al. 2001), net economic value totals for those site categories where halibut fishing is a likelihood were split evenly between salmon and halibut. For all other sites, the ratio of salmon to non-salmon trip targets for trips identifying a specific species objective for each angler category (with the exception of halibut) was used to determine the percentages of site-specific NEV attributable to salmon fishing (Haley et al. 1999, ES 6-9, 3-5 to 3-7, 3-17 to 3-20).



(A. Rothbarth)

fishing licenses were issued each year with a high point of 425,000 in 2000. Of the average annual number of sport fishing licenses issued in the 1997-2001 period, an average of 41% (170,000) were issued to Alaskans and 59% (243,000) to non-residents (personal communication ADF&G 2007 and tabulation of ADF&G data). From the 1997-2001 period to the 2002-2006 period, the average annual number of sport fishing licenses issued increased 11.3% making the average annual increase 2.3%. From 1997-2001 to 2002-2006, the average annual number of sport fishing licenses issued to Alaskans increased 4.7% making the average annual increase for resident licenses 0.9%. From 1997-2001 to 2002-2006, the average annual number of sport fishing licenses issued to non-residents increased 15.8% making the average annual increase for non-resident licenses 3.2%.

If the average annual number of sport fishing licenses issued over the next five years (2007-2011) continues to increase at the same rate as the increase from 1997-2001 to 2002-2006, the issuance of sport fishing licenses would go up by 2.3% per year. This would equate to an additional 52,000 anglers statewide. If the regional sport fishing patterns identified by ISER in its 1993 study have remained relatively constant, on average an additional 29,000 anglers would be licensed to participate in sport fishing in the Cook Inlet boroughs over the next five years.

Comparing growth rates in sport fishing participation tracked in the ADF&G data with data for population and tourism growth suggests that past increases in resident participation have been roughly equivalent to growth rates in population, and growth rates in sport fishing participation by visitors have been approximately the same as growth rates in tourism generally. Increases in participation in sport fishing have been projected to keep pace with both population and tourism growth trends (Brooks & Haynes 2001, 8-9).

The ADL&WD forecasts population growth in the Matanuska-Susitna Borough of 2.2% from 2006-2010 and 3.0% from 2010-2015. The ADL&WD forecasts population growth in the Kenai Peninsula Borough of 1.1% from 2006-2010 and 0.9% from 2010-2015. The ADL&WD forecasts population growth in the Municipality of Anchorage of 0.9% from 2006-2010 and 0.9% from 2010-2015. The ADL&WD forecasts population growth in the Anchorage/Matanuska-Susitna region (which excludes the Kenai Peninsula Borough) of 1.2% from 2006-2010 and 1.4% from 2010-2015.

Both the greater proportion of visiting anglers (61%) to resident anglers (39%) and the greater growth rates for visiting anglers (3.2%) versus resident anglers (0.9%) in the ADF&G data suggests that growth in tourism may play a somewhat greater role in the growth of the total number of participants in recreational fishing than the population growth rate in Southcentral Alaska.

In 1999, ISER projected annual growth in tourism statewide and in Southcentral Alaska of just over 3% to 2010 (Goldsmith 1999). However, the Alaska Visitor Statistics Program (AVSP) has more recently tracked the increase in summer visitor volume from 2001-2006 from 1.2 million to 1.6 million, an average annual increase of over 7% per year (ADCC&EC 2007, 2), a rate more than double the ISER forecast. The AVSP reports that over half (56%) of all summer visitors tour Southcentral Alaska and that the percentage of visitors that stay overnight in Southcentral (49%) is much greater than any other region. The next closest region is the Interior where 32% of visitors reported overnight stays followed by Southeast with 11% of visitors reporting overnight stays (ADCC&ED 2007, 3). The much higher percentage of visitors who overnight in Southcentral Alaska indicates a length of stay in the region that allows for relatively greater participation in on-site activities such as sport fishing.



Several factors taken together—the weighted average of the current percentage of resident participation in sport fishing, the projected growth in population with the current percentage of visitor participation in sport fishing, and the most conservative projected growth in tourism in Southcentral Alaska (3%)—suggest an average annual growth in demand for sport fishing opportunities in Southcentral Alaska through 2011 of 2.3%. This would mean a net increase of almost 29,000 anglers over 2002-2006 levels.



Increases in sport and personal use harvests in Upper Cook Inlet will be determined by administrative allocation rather than underlying demand for fishing opportunities.

Alaskans harvest about the same number of sockeye salmon for personal use in Upper Cook Inlet as sport fishery participants—Alaskans and visitors—take for recreation. In Upper Cook Inlet, sockeye salmon make up the great bulk of the sport and personal use harvests. From 2002 to 2006, Upper Cook Inlet sport fishery participants harvested an average annual 300,000 sockeye salmon (ADF&G 2007, 109 Table 19). During this same period, some 20,000 Alaskans harvested an average annual 291,000 sockeye salmon for household use (personal communication ADF&G 2007, ADF&G 2007, 109 Table 19). Current harvest levels in personal use and sport fisheries in Upper Cook Inlet are determined by regulatory restriction rather than demand for recreational fishing opportunities. An increase in harvest levels in the Upper Cook Inlet recreational salmon fisheries will depend upon administrative allocation. (See discussion below.)

PERSONAL USE FISHERY

Personal use fisheries, in which participation is limited to residents, allow Alaskans to harvest salmon for their households.

Under the Upper Cook Inlet Personal Use Salmon Fishery Management Plan (5 AAC 77.540) personal use fishing is allowed under different harvest gear type and take limit regulations than sport fishing in limited areas in Cook Inlet. Currently, personal use gillnet fishing is open near the Kasilof River in the waters of Upper Cook Inlet normally closed to commercial set gillnet fishing. Personal use dipnet fishing is allowed at the terminus of the Kenai and Kasilof rivers. A personal use dipnet fishery opens at Fish Creek if the upper end of the escapement goal of 70,000 is projected to be exceeded (ADF&G 2007, 32).

A permit issued by ADF&G along with a valid resident sport fishing license (or an exemption) is required to participate in the personal use fisheries. The annual bag and possession limits are 25 salmon per head of household, with an additional salmon for each household member. Special limits apply to the taking of Chinook salmon in the personal use fisheries (ADF&G 2007, 32).

PARTICIPATION

Some 20,000 personal use permits are issued to Alaskans each year for the Upper Cook Inlet personal use fisheries.

For the most recent five-year period (2002-2006), ADF&G issued an average 20,000 personal use permits each year to Alaskans for use in the Upper Cook Inlet personal use fisheries with a high point and historical record of 21,910 in 2004.

Alaskans harvest over 300,000 salmon annually in the Upper Cook Inlet personal use fisheries to feed their families. Almost all of these salmon (94%) are sockeye.

During the most recent five-year period (2002-2006), Alaskans fishing with personal use permits in Upper Cook Inlet harvested an average annual 310,000 salmon of all species (ADF&G 2007, 109 Table 19; Reimer & Sigurdsson 2004; ADF&G 2007, personal communication). Sockeye salmon are by far the largest component of the Upper

Cook Inlet personal use fishery harvest. During the most recent five-year period (2002-2006), an average annual 291,000 sockeye salmon were harvested in the personal use fisheries in Upper Cook Inlet (ADF&G 2007, 109 Table 19) accounting for an average annual 94% of the total Upper Cook Inlet personal use salmon harvest.

Upper Cook Inlet Personal Use Salmon Harvest by Species

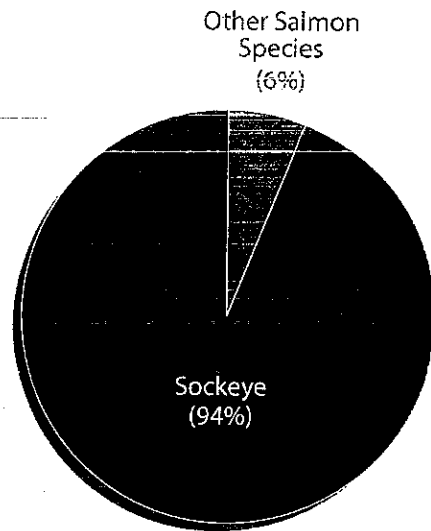


Figure 12. From 2002-2006 an average annual 291,000 sockeye salmon were harvest in personal use fisheries in Upper Cook Inlet accounting for an average 94% of the harvest. Source: ADF&G 2007.

The Kenai River dipnet fishery is by far the largest personal use fishery in terms of participation and harvest in Upper Cook Inlet. The personal use harvest of sockeye salmon at the mouth of the Kenai River is generally equivalent to the sport harvest of sockeye in the entire Kenai River drainage, the state's largest sockeye recreational fishery.

For the most recent five-year period (2002-2006), an average annual 218,000 sockeye were harvested in the Kenai River personal use dipnet fishery. This means that the Kenai River personal use dipnet fishery accounts for three quarters (75%) of the personal use harvest in Upper Cook Inlet.



Upper Cook Inlet Personal Use Sockeye Salmon Harvest by Area

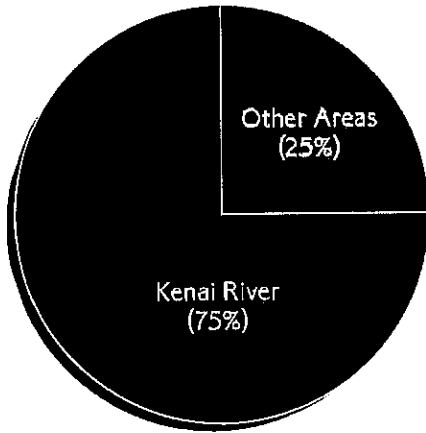


Figure 13. From 2002-2006, an average annual 218,000 sockeye salmon were harvested in the Kenai River personal use dipnet fishery accounting for 75% of the personal use harvest in Upper Cook Inlet. Source: ADF&G 2007.

However, in 2006 only about half the average number of sockeye salmon (128,000) were harvested in the fishery (personal communication ADF&G 2007). ADF&G attributes this anomaly to the fact that the fishery was closed because of low sockeye salmon passage rates for nine of the 22 days that it was scheduled to be open in July (ADF&G 2007, 33). Yet in 2006, 143,000 salmon of all species were still harvested in the Kenai River personal use dipnet fishery, making up almost two-thirds (61%) of the Upper Cook Inlet personal use harvest. In 2006, 58,000 salmon were harvested in the Kasilof River dipnet personal use fishery, 30,000 salmon were harvested in the Kasilof River gillnet fishery, and the Fish Creek dipnet fishery was not open to harvest (ADF&G 2007, 102 Table 15). In 2006, a total of 234,000 salmon of all species were harvested in the Upper Cook Inlet personal use fisheries (ADF&G 2007, 102 Table 15). In 2006, the personal use harvest of sockeye salmon in Upper Cook Inlet was 216,000, which accounted for almost all (92%) of the total personal use harvest.

Alaskans with personal use permits take about the same number of sockeye salmon in Upper Cook Inlet as all anglers—Alaskans and visitors—take for sport.

The bulk of the harvest in all Upper Cook Inlet salmon fisheries is sockeye salmon. From 2002 to 2006, the annual sockeye salmon harvests in Upper Cook Inlet by the sport and personal use fisheries have been roughly equivalent.

From 2002 to 2006, Upper Cook Inlet sport fisheries took an average annual 300,000 sockeye and personal use fisheries 291,000 sockeye (ADF&G 2007, 109 Table 19). This means that Alaskans with personal use permits harvest about the same number of sockeye salmon as all anglers—Alaskans and visitors—take for sport.

Upper Cook Inlet Recreational Sockeye Salmon Harvest by Catch Method

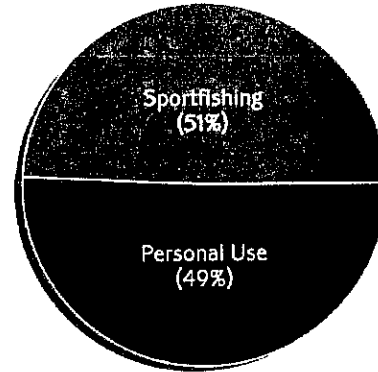


Figure 14. From 2002-2006, Upper Cook Inlet sport fisheries took an average annual 300,000 sockeye salmon and personal use fisheries took 291,000. Source: ADF&G 2007.



Alaskans with personal use permits take about one-third and sport anglers—Alaskans and visitors—take about two-thirds of the total Upper Cook Inlet recreational (non-commercial) salmon harvest of all species.

From 2002-2006, Upper Cook Inlet sport anglers took an average annual 617,000 salmon of all species and personal use participants 310,000 (ADF&G 2007, 109 Table 19; Reimer & Sigurdsson 2004; ADF&G 2007, personal communication). This means that Alaskans with personal use permits take about one-third, and sport anglers—Alaskans and visitors—take about two-thirds of the total Upper Cook Inlet recreational (non-commercial) salmon harvest.

Upper Cook Inlet Recreational Salmon Harvest by Catch Method (All Species)

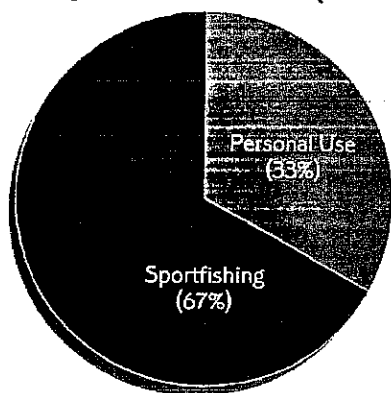


Figure 15. From 2002-2006, Upper Cook Inlet sport anglers took an average annual 617,000 salmon of all species and personal use participants took 310,000. Source: ADF&G 2007.

ECONOMIC EFFECTS

While the commercial value of the 2006 Upper Cook Inlet personal use catch would be \$1.3 million, the economic effects of the personal use harvest are many times greater than this.

At average weights and ex-vessel prices per pound, the Upper Cook Inlet personal use harvest in 2006 would have an ex-vessel value of \$1.3 million. Measured in wholesale prices or retail prices to the end consumer, the value of this harvest would be significantly greater. The 1993-1999 ISER study of recreational fishing in Alaska (Haley et al. 1999) determined that sport and personal use fishing participants place a much greater value on their catch than retail consumers would place on the same number

and kind of fish. The values placed on the harvest by personal use fishery participants and the economic effects of personal use fisheries are included in estimates by ISER of total sport fishing effects as described in the earlier discussions in this report of the economic significance and net economic values of recreational fishing.

FUTURE TRENDS

Personal use harvest levels in Upper Cook Inlet are determined by regulatory restriction. Increases in participation and harvest numbers will depend upon administrative allocation.

Current harvest levels in personal use fisheries in Upper Cook Inlet are determined by regulatory restriction rather than demand for personal use fishing opportunities. An increase in harvest levels in the Upper Cook Inlet personal use salmon fisheries will depend upon administrative allocation.

Personal use fishing opportunities in Upper Cook Inlet are not currently sufficient to meet demand. With the loss of personal use fishing opportunities in the Anchorage area, demand for alternative personal use fishing opportunities in the region has increased. Large numbers of Anchorage and Matanuska-Susitna area residents travel to the Kenai Peninsula to participate in the Kenai and Kasilof personal use fisheries. Projected population growth in Southcentral Alaska is expected to lead to increasing demand for personal use fishing opportunities in the region.

Participation in and growth of personal use fisheries in Upper Cook Inlet is limited primarily by commercial fisheries interception and take of the bulk of the sockeye run in most years. Potential participants closely monitor commercial fishery openers, with calls to the commercial fishery hotline peaking at over 10,000 per day (ADF&G, personal communication 2004). Many potential personal use fishery participants don't make the trip to the Kenai Peninsula when commercial openers are set because of the expectation of low fishing success.



COMMERCIAL FISHERY

The Central District of Upper Cook Inlet is the gateway for salmon returning to the Kenai, Matanuska-Susitna, and Anchorage Borough watersheds as well as the rivers of the western shore of central Cook Inlet.

Cook Inlet is divided into two fisheries management areas—Upper and Lower Cook Inlet. Anchor Point (near Homer) is the boundary between the two areas. Lower Cook Inlet consists of the waters adjoining Homer and Kachemak Bay and the western shore of lower Cook Inlet. Upper Cook Inlet is divided into two districts—the Central District (from Anchor Point north to Boulder Point) and the Northern District (from Boulder point north). The Central District is the gateway for salmon returning to the Kenai, Matanuska-Susitna, and Anchorage Borough watersheds as well as the rivers of the western shore of central Cook Inlet.

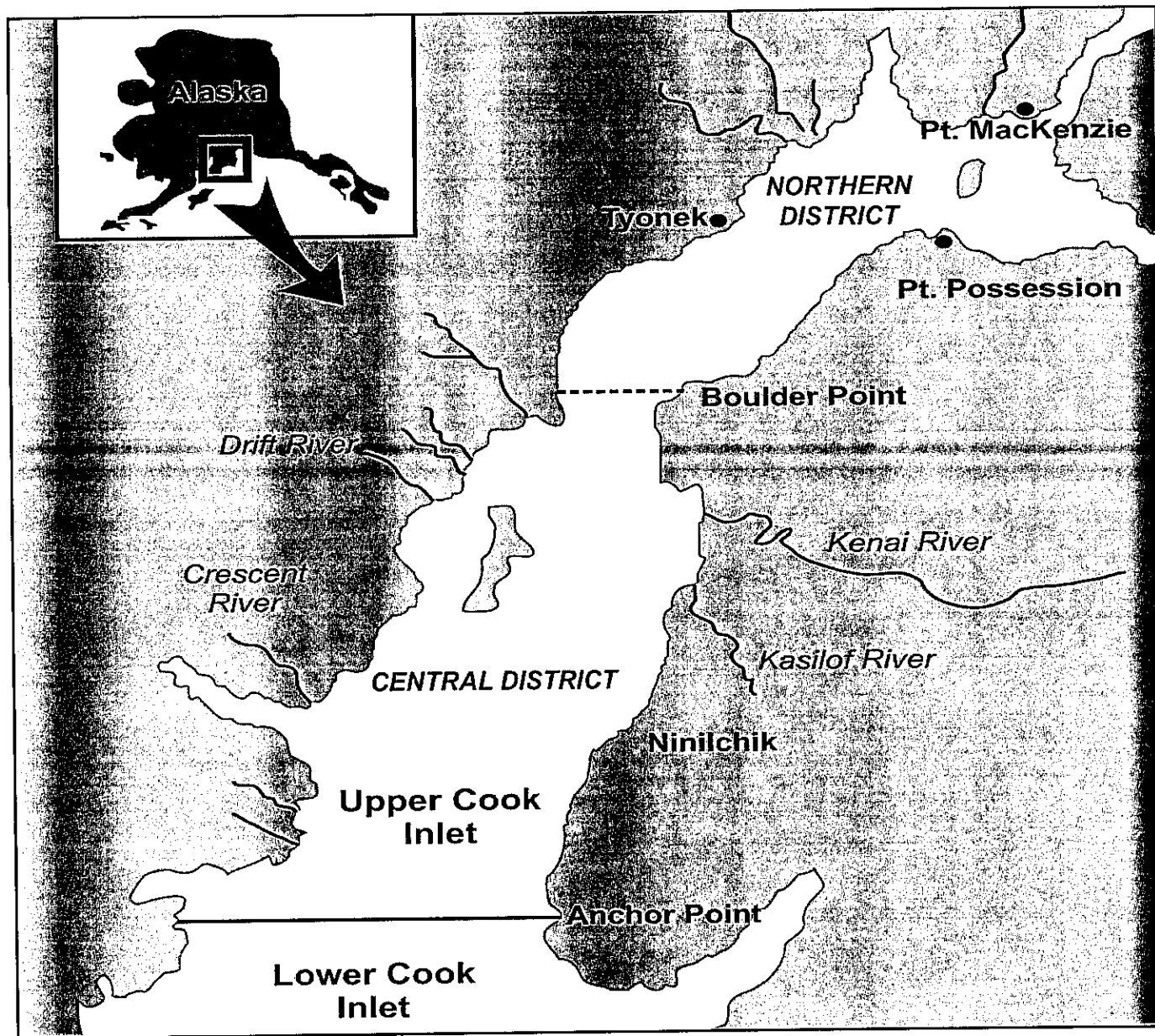


Figure 16. Upper Cook Inlet Commercial Management Districts. Source: ADF&G 2004.

Sockeye salmon are by far the most commercially valuable fish species in Upper Cook Inlet. However, run-timing and migration routes utilized by all salmon species overlap in Upper Cook Inlet to such a degree that the commercial fishery is largely mixed-stock and mixed-species in nature.

From 2000 to 2006, the average annual nominal (not adjusted for inflation) price per pound of Chinook (king) salmon was \$1.14, making Chinook the most valuable commercial species in Upper Cook Inlet on a per pound basis. During this same time period, the average annual nominal price per pound for sockeye (red) salmon was \$0.77, making sockeye the second most valuable commercial species on a per pound basis. However, since the size of the sockeye salmon run is many orders of magnitude greater than the chinook run, sockeye are by far the most commercially valuable fish species in Upper Cook Inlet.

From 2000 to 2006, the average annual nominal price per pound of coho (silver) salmon was \$0.36 per pound, making coho the third most valuable commercial species in Upper Cook Inlet on a per pound basis. During this same time period, the average annual nominal price per pound of chum (dog) salmon was \$0.17 per pound and for pink (humpy) salmon \$0.07, making chum the second to the least most valuable species on a per pound basis and pink the least valuable species on a per pound basis.

Run-timing and migrations routes utilized by all salmon species overlap in Upper Cook Inlet to such a degree that the commercial fishery is largely mixed-stock and mixed-species in nature.

Almost two-thirds (64%) of the total Cook Inlet commercial salmon catch comes from Upper Cook Inlet. An even greater percentage of the total harvest value—about five-sixths (83%)—comes from Upper Cook Inlet. This means that the great bulk of high-value salmon species caught in Cook Inlet are taken in Upper Cook Inlet.

From 2000 to 2006, the Upper Cook Inlet commercial salmon catch (all species) averaged almost two-thirds (64%) of the Cook Inlet harvest and about five-sixths (83%) of the total Cook Inlet harvest value (ADF&G 2007, 128 App. A6, 130 App. A7, <http://www.cf.adfg.state.ak.us/geninfo/finfish/salmon/catchval/blusheet>). This indicates that a significantly higher percentage of the high-value species—sockeye, coho, and Chinook—are being taken in Upper Cook Inlet than is represented by the proportion of the Cook Inlet catch of all species. This means that the great bulk of high-value salmon species caught in Cook Inlet are taken in Upper Cook Inlet.

Cook Inlet Commercial Salmon Catch & Ex-Vessel Value by Area

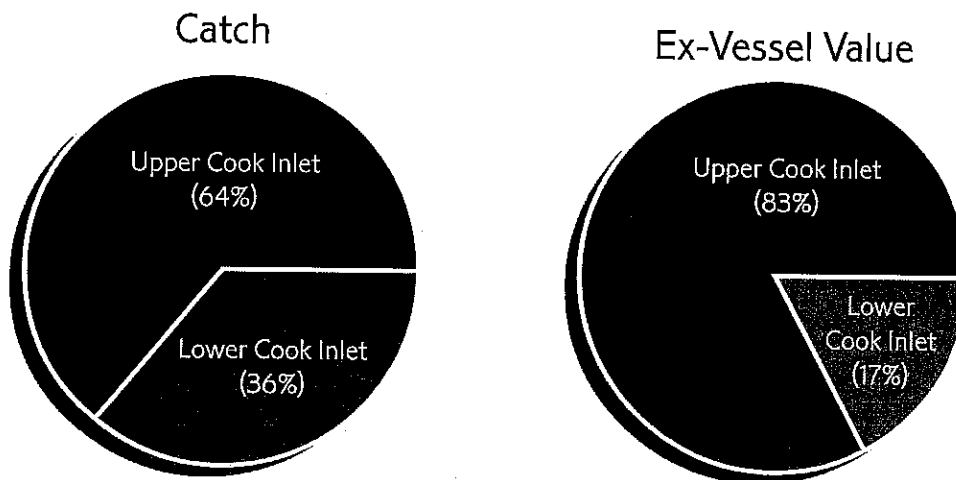


Figure 17. From 2002-2006, the Upper Cook Inlet commercial salmon catch (all species) averaged almost two-thirds (64%) of the Cook Inlet harvest and about five-sixths (83%) of the total Cook Inlet harvest value. Source: ADF&G 2007.



Sockeye salmon make up over five-sixths (85%) of the Upper Cook Inlet commercial salmon harvest, and Kenai sockeye are generally more than half (52%) of the total harvest.

From 1996 to 2006, sockeye salmon averaged over five-sixths (85%) of the total Upper Cook Inlet salmon harvest (ADF&G 2007, 128 App. A6). In most years, Kenai sockeye alone make up about half (52%) of the Upper Cook Inlet commercial salmon harvest (ISER 1996, 6-7). Other sockeye in the Upper Cook Inlet harvest include stocks of the Kasilof, the Susitna, and other rivers of the upper inlet.

Sockeye salmon constitute almost all (93%) of the value of the Upper Cook Inlet commercial salmon harvest with chinook and coho each constituting 3% and chum 1%.

In terms of their recent economic value, sockeye salmon are by far the most important component of the catch in Upper Cook Inlet. From 2002 to 2006, sockeye salmon averaged 93% of the annual harvest value with Chinook and coho each constituting 3%, chum 1%, and pink less than a half of a percent (ADF&G 2007, 1; App. A7).

Upper Cook Inlet Commercial Salmon Harvest Value by Species

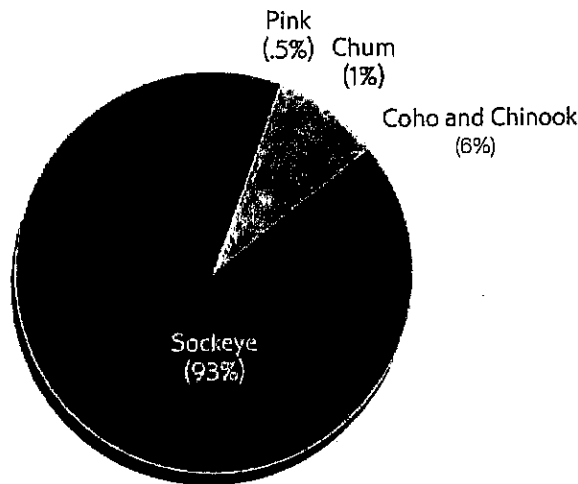


Figure 18. From 2002-2006, sockeye salmon averaged 93% of the annual harvest value with Chinook and coho each constituting 3%, chum 1%, and pink less than a half of a percent. Source: ADF&G 2007.

Essentially all (98-99%) commercially harvested salmon in Upper Cook Inlet are caught in the Central District, which is the gateway for salmon returning to the Kenai, Matanuska-Susitna, and Anchorage Borough watersheds.

An ISER report in 1996 noted that over a five-year study period, driftnetters and eastside setnetters in the Central District averaged 96% of the Upper Cook Inlet sockeye harvest leaving 2% to Northern District Setnetters and 2% to Central westside setnetters (ISER 1996, 6). In 2004, over 99% of the sockeye harvest and over 98% of the total salmon harvest of all species were taken in the Central District (ADF&G 2005b, 47 Table 8). In 2005, 99% of the sockeye harvest and over 99% of the total salmon harvest of all species were taken in the Central District (ADF&G 2006, 73 Table 8). And in 2006, 99% of the sockeye harvest and 99% of the total salmon harvest occurred in the Central District (ADF&G 2007, 80 Table 8).

This harvest data suggests that, on average, 98-99% of the Upper Cook Inlet commercial salmon harvest activity occurs in the Central District.¹⁷This indicates that not only is commercial salmon fishing effort in Cook Inlet largely consolidated within Upper Cook Inlet but that commercial salmon fishing effort in the Central District of Upper Cook Inlet is particularly concentrated.

Upper Cook Inlet Commercial Sockeye Salmon Harvest by Gear Type & Location

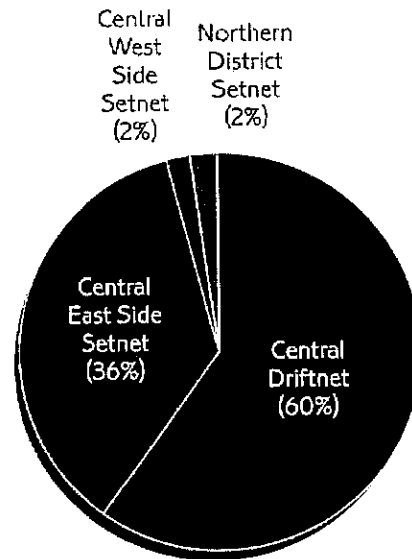


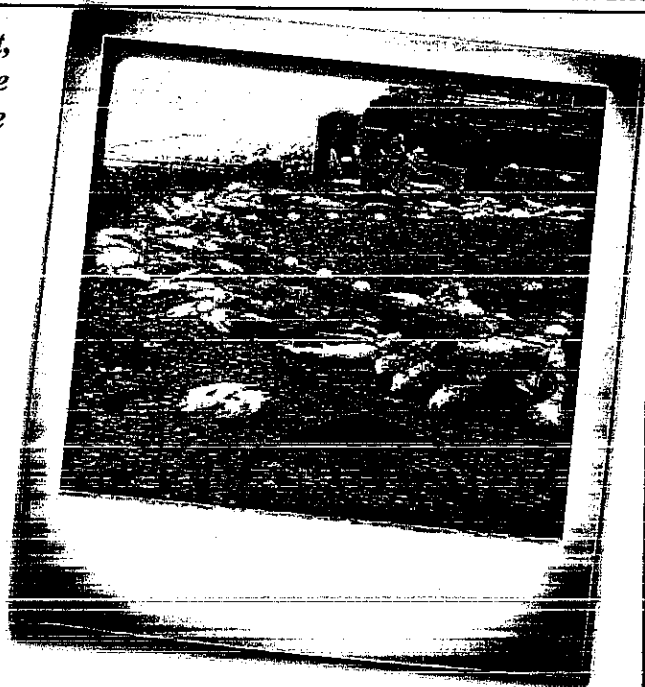
Figure 19. Division of Upper Cook Inlet commercial sockeye salmon harvest by gear type and location, 1990-1994. Source: ISER 1996.

17. The ratio of ISER's estimate of the ex-vessel value of commercial salmon fishing in the Central district of Upper Cook Inlet in 1994 (\$33 million) to ADF&G's estimate of the ex-vessel value of commercial salmon fishing in both districts of Upper Cook Inlet in 1994 (\$34.4 million) is 96% (ISER 1996, 7, ADF&G 2004, 67 App. A.7). This suggests that harvest activity and ex-vessel values in Upper Cook Inlet are closely linked.

Set gillnets take half of the Upper Cook Inlet harvest, and more than two-thirds (70%) of these set gillnets are concentrated on the east side of the Central District where the Kenai and Kasilof River drainages are located.

Currently, set (fixed) gillnets are the only gear permitted in the Northern District. Both set and drift gillnets are used in the Central District where the average annual harvest since 1966 has been split about equally between drift and set gillnets. The use of seine gear is restricted to the Chinitna Bay Subdistrict, where it is employed only sporadically (ADF&G 2007, 1, App. A1-A5).

While setnetters fish in both the Central and the Northern Districts, about 70% of setnetters in Upper Cook Inlet are concentrated on the east side of the Central District where the Kenai and Kasilof River drainages are located (ISER 1996, 6).



PARTICIPATION

Some 844 commercial permit holders reported a catch in Upper Cook Inlet in 2006. One out of five (22%) commercial permit holders in Cook Inlet are nonresidents.

The Commercial Fisheries Entry Commission (CFEC) reported that in 2006 there were 570 active drift gillnet permits for the Cook Inlet area, with 71% issued to Alaskan residents. Of the total, 396 reported catches in Upper Cook Inlet for 2006 (ADF&G 2007, 81 Table 9). CFEC also reported 738 active set gillnet permits in Cook Inlet with 83% issued to residents. From the total, 448 reported fishing in Upper Cook Inlet in 2006 (ADF&G 2007, 21, 81 Table 9, 137 App A13, CFEC <http://www.cfec.state.ak.us/SPCS/MENU.SHTM>)¹⁸. Calculations based on CFEC data indicate that about 78% of all commercial permit holders in Cook Inlet in 2006 were Alaskans and 22% nonresidents. CFEC and ADF&G data indicate that some 844 permit holders reported catches in Upper Cook Inlet in 2006.

Commercial Salmon Permits Reporting a Catch in Upper Cook Inlet in 2006 & Percentage Permits issued to Nonresidents

	Drift Gillnet	Set Gillnet	Total
Permits in Cook Inlet	570	738	1,308
% Permits Reporting UCI Catch in 2006	69% (396)	61% (448)	64% (844)
% Cook Inlet Permits Held by nonresidents	29%	17%	22%

Table 2. Active commercial salmon permits in Cook Inlet, percentage of permits reporting 2006 catch in Upper Cook Inlet, and percentage of permits held by nonresidents. Source: ADF&G 2007, CFEC 2006.

18. The Commercial Fisheries Entry Commission (CFEC) is now charged with the oversight and management of Alaska's limited-entry program. Under the terms of AS.16.43.290, the CFEC is directed to determine optimum numbers of permits for the state's limited entry fisheries based on a reasonable balance of economic, conservation, and fishery management concerns. The commission also maintains vital statistics concerning the number of registered and active permits within various fisheries and records of harvests, gross earnings, and permit values (CFEC 2004).



Estimates based on the higher price regimes of the early 1990s put the seasonal participation of permit holders and crew in commercial salmon fishing in Upper Cook Inlet at 3,000. At current low ex-vessel values, participation would be less.

An ISER study evaluating the commercial fishery in the Upper Cook Inlet Central District in 1994 estimated about 3.5 operators and crew per actively fished permit (ISER 1996, 7). If the same ratio of operators and crew to the total number of fishable permits in (Upper and Lower) Cook Inlet is assumed, an estimated 4,361 total seasonal workers participated in the (Upper and Lower) Cook Inlet salmon fishery in 1994.

The ISER study suggests that in Upper Cook Inlet 98% of commercial salmon harvest activity occurs in the Central District and puts the total number of actual seasonal commercial fishers in the Central District in 1994 at 2,900 (ISER 1996, 6-7). If participation in each district of Upper Cook Inlet was proportional to its percentage of the total harvest, the number of seasonal commercial fishers in both districts of Upper Cook Inlet in 1994 was about 3,000.

Crew members are normally paid a percentage of the ex-vessel value of the harvest (the amount paid directly to commercial permit holders for their catch) as their earnings (ISER 1996, 7). ISER estimated the ex-vessel value of the commercial salmon harvest in the Central District of Upper Cook Inlet in 1994 at \$33 million (ISER 1996, 7). The ex-vessel value of commercial salmon harvests in both districts of Cook Inlet in 1994 was estimated by ADF&G at \$34.4 million. Expressed in inflation-adjusted 2006 dollars (using the Anchorage Consumer Price Index), the 1994 Cook Inlet harvest would have a value of \$45.2 million.¹⁹ The average annual value of salmon harvests in Upper Cook Inlet from 2000 to 2006 (calculated in constant inflation-adjusted 2006 dollars) was \$15.5 million,²⁰ about one third (34%) of the 1994 harvest value.

At 2000-2006 harvest value levels, not only would total crew earnings necessarily have been greatly reduced, but total participation in commercial salmon fishing in Cook Inlet would have been reduced as well.

Participation, Employment, Earnings, & Revenue in Commercial Salmon Fishery, Upper Cook Inlet, Central District, 1994

	Driftnet	Eastside Setnet	Total
ESTIMATED NUMBER OF PERMITS FISHED IN 1994	580	514	1,094
ESTIMATED TOTAL OPERATIONS	567	258	825
AVERAGE NUMBER OF FISHERMEN PER OPERATION			
Heads of Operations	1.0	1.0	1.0
Crew*	1.6	4.6	2.6
Total	2.6	5.6	3.5
ESTIMATED TOTAL FISHERMEN			
Heads of Operations	567	258	825
Crew	884	1,183	2,068
Total	1,451	1,442	2,893
METHOD OF PAYMENT (FOR PERSONS OTHER THAN HEADS OF OPERATIONS)			
Owner	6.1%	13.1%	10.1%
Share	73.3%	62.5%	67.1%
Fixed Rate	5.4%	12.7%	9.6%
Family Member	6.6%	3.5%	4.8%
Other	5.3%	4.0%	4.5%
Not Available	3.3%	4.2%	3.8%
TOTAL	100%	100%	100%
ESTIMATED TOTAL CREW EARNINGS	\$2,709,000	\$3,941,000	\$6,649,000
ESTIMATED TOTAL REVENUES	\$19,548,000	\$12,508,000	\$33,057,000
TOTAL CREW EARNINGS AS % OF TOTAL REVENUES	13.9%	29.2%	20.1%

Table 3. Commercial salmon fishery participation, employment, earnings, and revenue in Upper Cook Inlet, Central District, 1994. Source: ISER 1996. (Includes some permit holders other than heads of operations paid as owners.)

19. Later revisions by the ADF&G put the harvest total for Upper Cook Inlet in 1994 at \$34.45 million (ADF&G 2006, App. A7. Expressing this amount in 2006 dollars places the 1994 UCI harvest total at \$45.25 million.

20. ADF&G estimates of the ex-vessel value of the 2005 Upper Cook Inlet harvest were changed from \$31.7 million as reported in 2006 to \$26.8 million as reported in 2007. See: ADF&G 2006, 124 App. A7 versus ADF&G 2007, 130 App. A7.

Between 1,375 and 2,500 individuals are seasonally employed in commercial harvesting and processing or have jobs arising indirectly out of commercial salmon harvest activity in Upper Cook Inlet.

Employment arising from commercial harvesting and processing of salmon in Upper Cook Inlet as well as indirect and induced employment is estimated between 275 and 500 average annual jobs. (See discussion below.) If each of these average annual jobs represents five individuals working an average of 2.4 months during the commercial harvest season, there would be between 1,375 and 2,500 individuals who are seasonally employed in commercial harvesting and processing or have jobs otherwise arising out of commercial salmon harvests in Upper Cook Inlet.

The Upper Cook Inlet commercial salmon catch accounts for about 2% of the statewide commercial salmon catch.

From 2000 to 2006, the Cook Inlet commercial salmon catch averaged 3.4% of the statewide harvest total (ADF&G 2007, 128 App. A6, 130 App. A7; ADF&G 2007(c) <http://www.cf.adfg.state.ak.us/geninfo/finfish/salmon/catchval/blusheet>). During this same period, the Upper Cook Inlet commercial salmon catch averaged 2.2% of the statewide harvest total (ADF&G 2007, 128 App. A6, 130 App. A7; ADF&G 2007(c), <http://www.cf.adfg.state.ak.us/geninfo/finfish/salmon/catchval/blusheet>).



In Cook Inlet there are about 25 commercial permit holders for every 100,000 salmon harvested compared to about three permit holders for every 100,000 salmon harvested in the rest of the state.

From 1998 to 2002—the most recent five-year period for which ADF&G has reported statewide and regional averages—the average annual commercial salmon catch in Cook Inlet was 4,240,511 fish and the average statewide was 166,838,906 (ADF&G 2005(b), 4 Table 1) making the average annual catch in the state outside of Cook Inlet 162,598,395. The average annual number of commercial salmon fishing permits in Cook Inlet in the 1998-2002 period was 1,052 and the average statewide was 6,334 (ADF&G 2005(b), 4 Table 1) making the average annual number of permits in the state outside of Cook Inlet 5,282. This means that in Cook Inlet there are 24.8 permits for every 100,000 fish harvested as compared to 3.2 permits for every 100,000 fish harvested in the rest of the state.

Upper Cook Inlet Proportion of Statewide Commercial Salmon Harvest

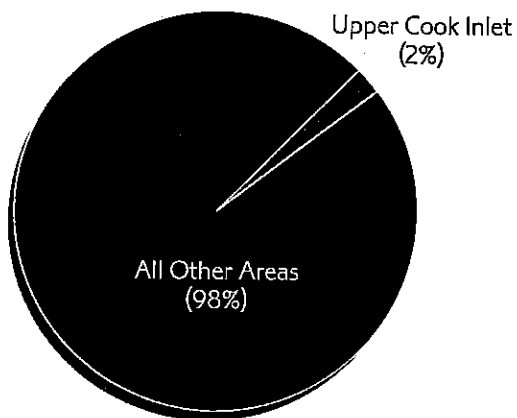


Figure 20. Average annual proportions of statewide commercial salmon catch by area 2000-2006. Source: ADF&G 2007.



Commercial Salmon Permit Holders for Every 100,000 Fish Harvested

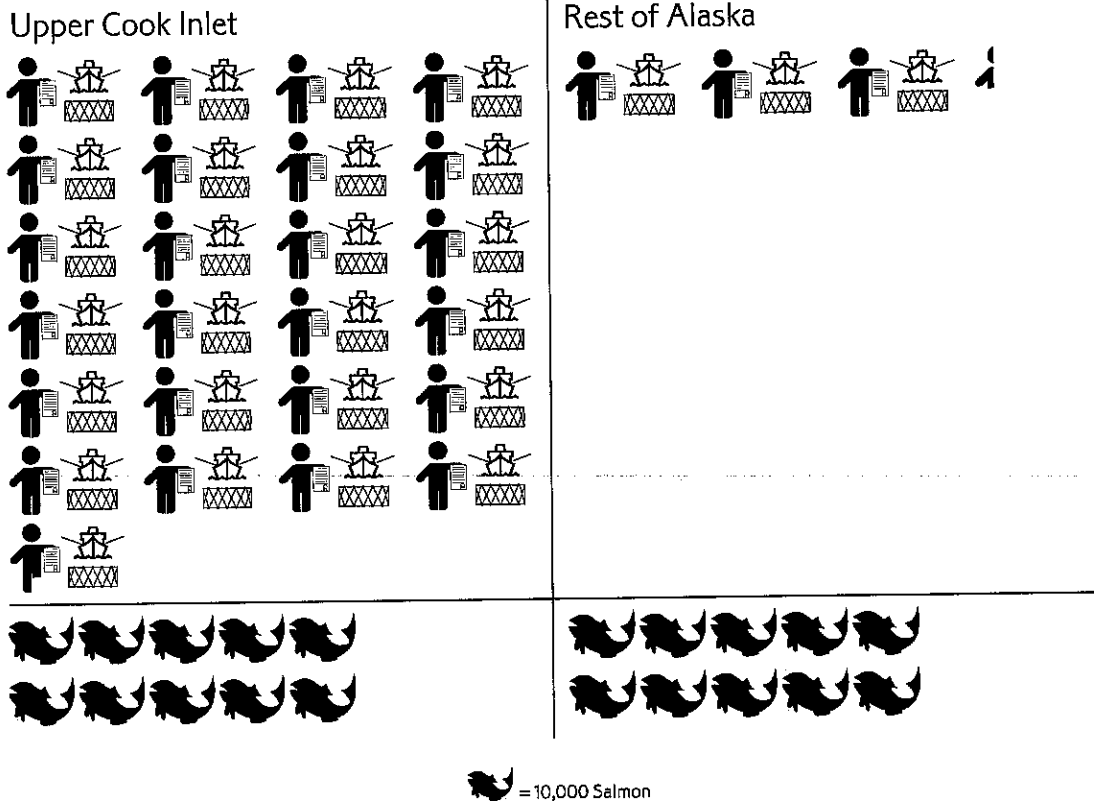


Figure 21. In Cook Inlet there are 24.8 permits for every 100,000 fish harvested as compared to 3.2 permits for every 100,000 fish harvested in the rest of the state. Source: ADF&G 2005.

Commercial salmon fishing permits are about seven and a half (7,600%) times more concentrated in Cook Inlet than in the rest of the state.

From 1998 to 2002, the Cook Inlet commercial salmon harvest was about 1/36 of both the statewide commercial salmon catch (2.54%) and the statewide catch poundage (2.84%). During this same period, the average annual number of commercial salmon fishing permits in Cook Inlet was 1,052 or one-sixth (16.61%) of the statewide total of 6,334 (ADF&G 2005(b), 4 Table 1). This means that the proportion of commercial salmon permits per unit of harvest in Cook Inlet is six to seven (6.5) times greater in Cook Inlet than statewide. If the Cook Inlet numbers are extracted from the statewide totals and placed in comparison to the rest of the state, the proportion of commercial salmon permits per unit of harvest in Cook Inlet is seven to eight (7.6) times greater in Cook Inlet than in the rest of the state.

The CFEC reports 902 permits were fished in Cook Inlet in 2006 (CFEC 2007(a), <http://www.cfec.state.ak.us>). ADF&G data show that 844 commercial salmon permit holders reported harvesting fish in Upper Cook Inlet in 2006 (ADF&G 2007, 80 Table 8). This means that almost all (92%) commercial salmon permits being fished in Cook Inlet were active in Upper Cook Inlet in 2006. In 2006 the Cook Inlet commercial salmon catch was 3.3% of the statewide catch and the Upper Cook Inlet catch was 2.0% of the statewide catch (ADF&G 2007, 128 App. A6, 130 App. A7; ADF&G 2007(c), ADF&G 2007(c), <http://www.cf.adfg.state.ak.us/geninfo/finfish/salmon/catchval/blusheet>). In 2006 the number of commercial salmon fishing permits issued in Cook Inlet represented 12.4% of all commercial salmon permits issued statewide and the number of permits fished in Upper Cook Inlet represented 11.5% of all permits fished statewide (CFEC 2007(b), http://www.cfec.state.ak.us/gpbycen/2006/00_ALL.htm). This means that in 2006 Upper Cook Inlet accounted for 11.5% of all actively fished commercial salmon permits but just 2.0% of the statewide salmon catch.

Upper Cook Inlet Percentages of Commercial Salmon Caught & Permits Fished Statewide (2006)

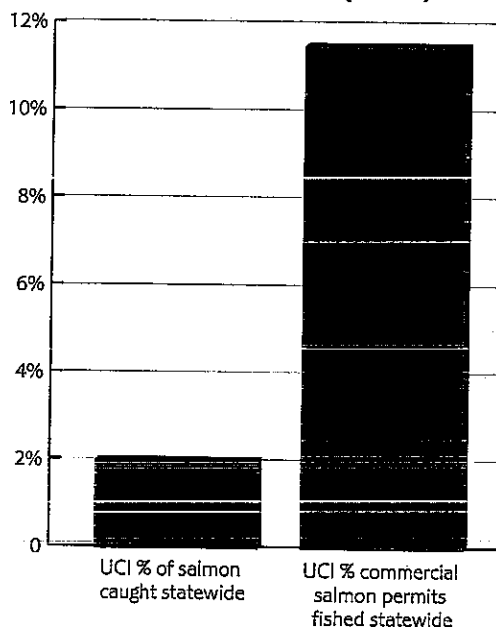


Figure 22. In 2006 Upper Cook Inlet accounted for 11.5% of all actively fished commercial salmon permits but only 2.0% of the statewide salmon catch. Source: ADF&G 2007, CFEC 2007.

Commercial salmon fishing effort is disproportionately concentrated in Cook Inlet and even more disproportionately concentrated in Upper Cook Inlet.

The proportion of permits per unit of harvest is one indicator of the concentration of commercial fishing effort. Another indicator of fishing effort concentration is the relative proportion of the salmon harvest taken within specified management units. From 2000 to 2006, the Upper Cook Inlet commercial salmon catch averaged almost two-thirds (64%) of the total Cook Inlet catch (ADF&G 2007, 128 App. A6, 130 App. A7, ADF&G 2007(c), <http://www.cf.adfg.state.ak.us/geninfo/fish/salmon/catchval/blusheet>). Essentially all (98-99%) commercially caught salmon in Upper Cook Inlet are harvested in the Central District, which is the gateway for salmon returning to the Kenai, Matanuska-Susitna, and Anchorage Borough watersheds. (See discussion above.) This means that not only is commercial salmon fishing effort disproportionately concentrated in Cook Inlet but that this disproportion is even greater in Upper Cook Inlet and particularly in the Central District.

ECONOMIC SIGNIFICANCE

Though the size of wild salmon runs fluctuate from year to year, recent salmon catch averages statewide and in Upper Cook Inlet are similar to or greater than long-term averages.

Though the size of wild salmon runs fluctuate from year to year, recent salmon catch averages statewide and in Upper Cook Inlet are similar to or greater than long-term averages. The 2006 Upper Cook Inlet commercial harvest of 2.9 million exceeded annual harvests in 1998, 2000, and 2001, but was somewhat below the average long-term and short-term harvests in the region. The 2005 Upper Cook Inlet harvest of 5.6 million salmon was the second highest annual harvest in the region in the past 13 years and was approximately 32% greater than the average annual harvest from 1966 to 2004 (ADF&G 2006, 4). The 2004 salmon harvest in Upper Cook Inlet of 5.7 million was the largest harvest in the region in ten years and about 47% greater than the average annual harvests from 1956 to 2003 (ADF&G 2005b, 2). The Upper Cook Inlet commercial salmon harvests of 3.8 million fish in 2003 and 3.7 million fish in 2002 were greater than the average annual harvests of the prior ten years of 3.5 million and approximately equal to the average harvest for the prior 50 years (ADF&G 2004, 3, 66 App. A.6).



The average annual commercial harvest for the past five years (2002-2006) in Upper Cook Inlet of 4.34 million salmon exceeds the ten-year average (1996-2005) of 3.70 million and the fifty-year average (1966-2005) of 4.27 million (ADF&G 2007).

Upper Cook Inlet Commercial Salmon Harvest Size Over the Past 5, 10 & 50 Years

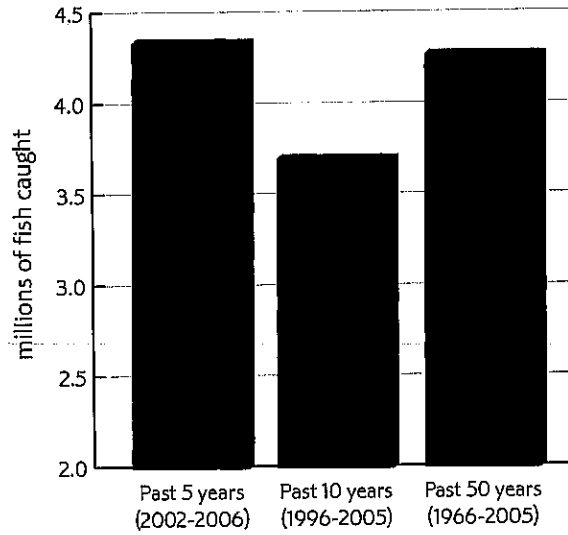


Figure 23. In Upper Cook Inlet the average annual commercial salmon harvest over the past five years (2002-2006) was 4.34 million salmon. Over the past ten years (1996-2005) the average was 3.70 million, and over the past fifty years (1966-2005) the average was 4.27 million. Source: ADF&G 2007, CFEC 2007.

In Upper Cook Inlet, sockeye salmon averaged 85% of the total harvest from 1996 to 2005. Pink and coho salmon averaged 5%, and chum salmon averaged 4%. Chinook salmon averaged less than 0.5% (ADF&G 2007, 128 App. A6). Sockeye salmon harvest trends in Upper Cook Inlet roughly approximate long-term statewide harvest trends. Statewide sockeye and pink salmon account for the greatest percentage of the harvest followed by chum salmon. Coho and Chinook salmon harvests account for a much smaller percentage of salmon totals. Statewide harvests of pink and chum salmon have been strong in recent years. Sockeye harvests have fallen from record levels of the mid-1990s but are still very strong by long-term standards (ADF&G 2005(b) 5 Figure 1).

From an historical frame of reference, Alaska's salmon harvest numbers have set all-time records in recent years (Knapp et al. 2007).

Alaska Commercial Salmon Catches, 1880-2005

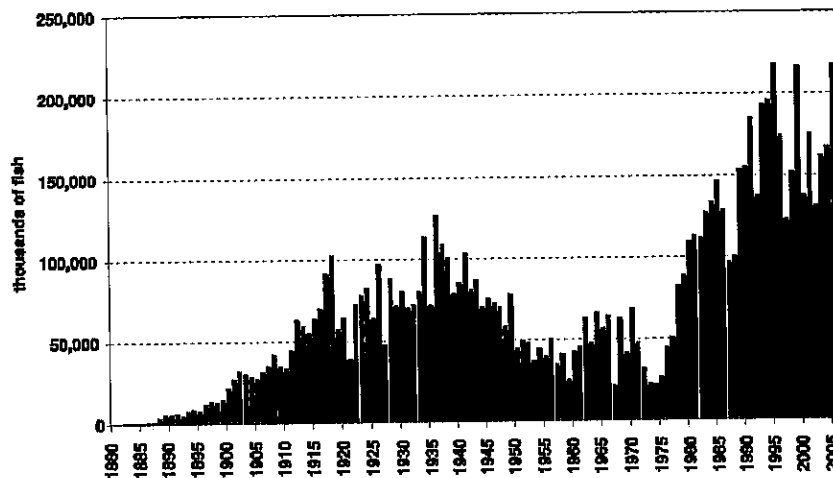


Figure 24. Historical trends in Alaska's commercial salmon harvest. Source: Knapp et al. 2007.

The real (inflation adjusted) average annual value of recent (2000-2006) Upper Cook Inlet salmon harvests is one-seventh (14%) of the highest comparable historic period (1986-1992) and about one-third (39%) of the next most recent decade (1991-2000).

The average annual value of commercial salmon harvests in Upper Cook Inlet from 1961 to 1970 calculated in constant 2006 dollars was \$14.7 million; from 1971 to 1980 the average was \$33.1 million; from 1981 to 1990 the average was \$82.9 million; and from 1991 to 2000 the average was \$39.6 million. Thus, after more than doubling each decade following the 1960s, average salmon harvest values in Upper Cook Inlet fell back in the 1990s to the levels of the 1970s.²¹

Real Upper Cook Inlet Commercial Salmon Ex-Vessel Values, 1960-2006 (Inflation Adjusted)

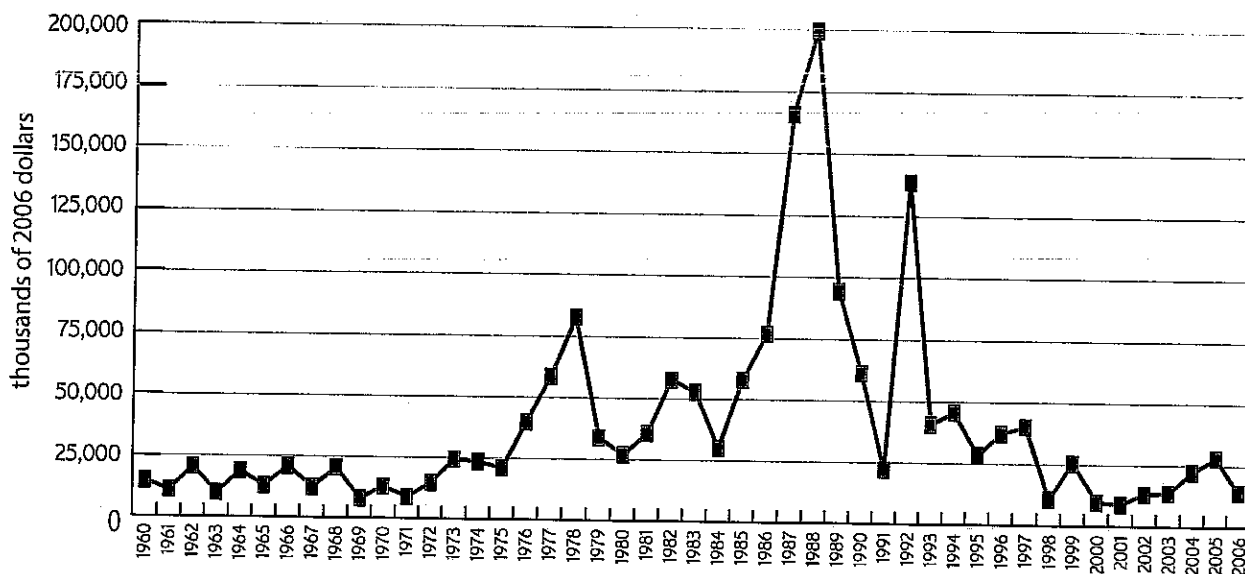


Figure 25. Upper Cook Inlet ex-vessel value of commercial salmon harvests in constant 2006 dollars. Source: ADF&G 2007, ADL&WD 2007.

The average annual value of commercial salmon harvests in Upper Cook Inlet for the most recent period of 2000 to 2006 (again calculated in constant 2006 dollars) was \$15.5 million²², a level of value equivalent to those last seen in the 1960s. By contrast, the average annual value of salmon harvests in Upper Cook Inlet at the all-time height of ex-vessel values from 1986 to 1992, \$108.1 million (2006 dollars), is almost seven times the average value of current harvests (2000-2006). The average annual value of the salmon harvest from 2000 to 2006 is one-seventh (14.3%) of the highest values (1986-1992) and about one-third (39.1%) of the next most recent historical period, 1991-2000.

Recent declines in Upper Cook Inlet ex-vessel prices and values are not merely regional phenomena. Since the late 1980s, with increasing globalization of salmon markets and increasing farmed salmon production, Alaska wild salmon prices have fallen dramatically. Ex-vessel prices paid to all commercial permit holders for Alaska salmon in 2006 in constant value dollars were less than half (42%) the average for the 1980s (Knapp 2006).

21. Annual ex-vessel salmon harvest values for Upper Cook Inlet reported by the Alaska Department of Fish and Game can be converted into inflation adjusted constant dollars using the Anchorage Consumer Price Index reported by the Alaska Department of Labor and Workforce Development (ADF&G 2006, App. A7, ADL&WD 2007).

22. ADF&G estimates of the ex-vessel value of the 2005 Upper Cook Inlet harvest were changed from \$31.7 million as first reported in 2006 to \$26.8 million as reported in 2007. Compare: ADF&G 2006, 124 App. A7 and ADF&G 2007, 130 App. A7



Real Ex-Vessel Value of Alaska Salmon Harvests, 1980-2005

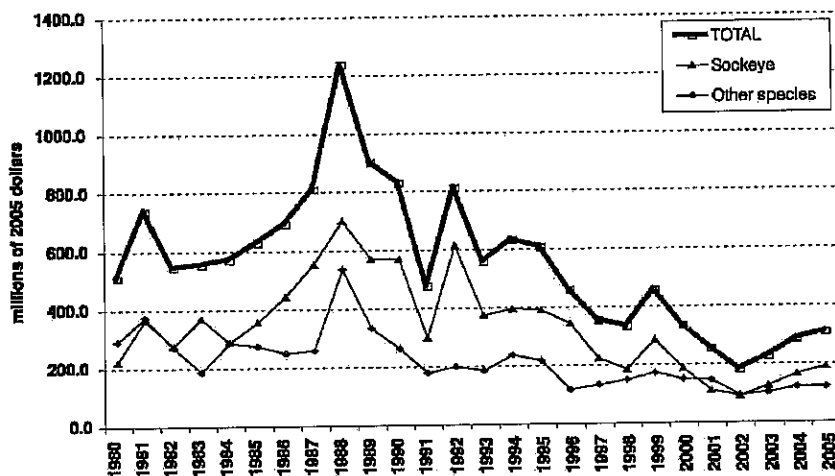


Figure 26. Real ex-vessel value (adjusted for inflation) of Alaska salmon (2005 dollars). Source: Knapp et al, 2007, Figure 2.

Moreover, due to the dramatically reduced share of Alaska sockeye salmon in world salmon markets, lower catch numbers no longer tend to be offset—in whole or in part—by increased prices (Knapp et al. 2007, xxiii).

Alaska Sockeye Salmon Catch and Real Ex-Vessel Price, 1982-2005

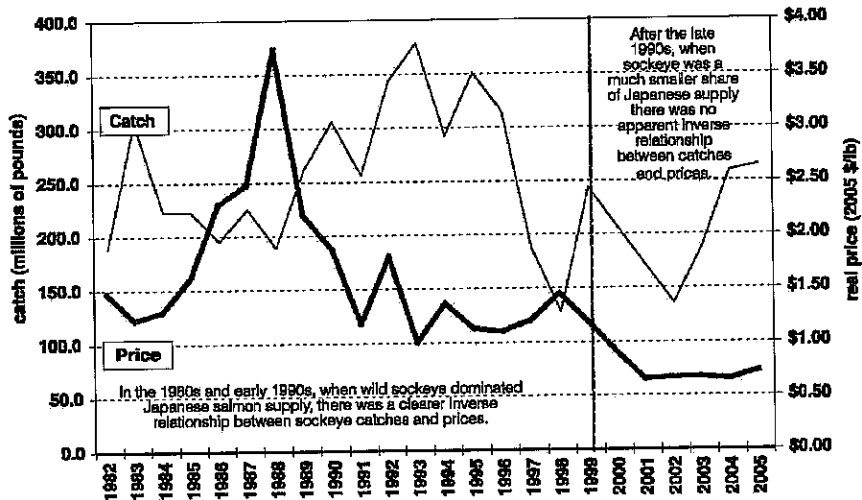


Figure 27. Alaska sockeye salmon harvests (millions of pounds) and real ex-vessel prices (adjusted for inflation as 2005 dollars) 1982-2005. Source: Knapp et al. 2007, Figure XIII-8.

The real, inflation-adjusted value of Alaska salmon harvests have declined from the 1980s average to 2006 by 58% (Knapp 2006).

Real Alaska Salmon Harvest Value (Adjusted for Inflation)

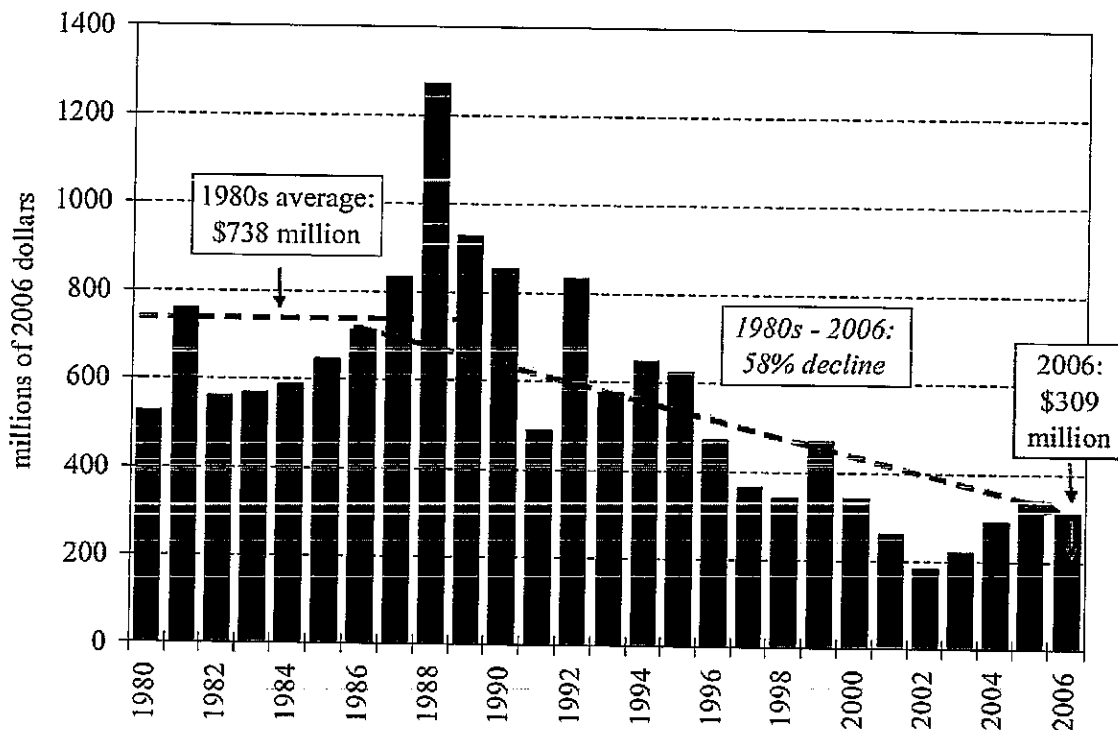


Figure 28. Real Alaska salmon harvest values (adjusted for inflation) 1980-2006. Source: Knapp 2006.

Estimates based on high ex-vessel (commercial catch) values of the mid-1990s attribute 500 average annual jobs and \$15 million in annual income to harvesting, processing, and indirect and induced employment from commercial salmon harvests in Upper Cook Inlet.

A 2001 ISER study estimates that commercial fishing and fish processing in Alaska in 1995 supported about 20,000 average annual (full-time equivalent) jobs and produced an estimated \$584 million (in 1998 dollars) in direct income (Colt 2001, 11-13). Of these, about 9,000 (45%) jobs were in fish harvesting and produced income estimated at \$240 million. This represents 41% of total direct income and average annual earnings per worker of \$26,610. Another 11,000 (55%) jobs were in fish processing and produced an estimated income of \$344 million which represents 59% of total direct income and average annual earnings per worker of \$31,534.

Direct participation in harvesting and processing and the incomes derived from this employment created additional economic activity in the state economy generating an additional 13,700 jobs and \$427 million in indirect and induced income which represents average annual earnings per worker of \$31,075. Total jobs attributed to commercial fishing in the state were estimated at 33,700 and total income at \$1.01 billion (in 1998 dollars), which represents average annual earnings per worker of \$30,028. The study placed the ex-vessel values of the statewide commercial salmon harvest at \$261 million in 1998 and \$363 million in 1999, which represents an average 29% of the total statewide commercial fisheries harvest ex-vessel values for those years.²³

23. The study evaluated ex-vessel values by the categories of salmon, herring, halibut, groundfish, and shellfish (Colt 2001, 12).



Economic Significance of All Commercial Fishing in Alaska

	Jobs (average annual employment)	Income (millions of 1998 dollars)
Direct Jobs and Income		
Fish Harvesting	9,019	240
Fish Processing	10,909	344
Total Direct Jobs and Income	19,928	584
Indirect and Induced Jobs & Income	13,741	427
Total Jobs and Income attributable to Fishing and Seafood Industries	33,669	1,011

Source: Author calculations based on data in Goldsmith (1997)

Table 4. Average annual jobs and income (1998 dollars) resulting from commercial fish harvesting, processing, and indirect and induced jobs and income in Alaska, 1995. Source: Colt 2001.

If fish harvesting, fish processing, and indirect and induced jobs and income in Upper Cook Inlet are proportional to the ratio of Upper Cook Inlet ex-vessel values to statewide salmon harvest and commercial seafood harvest totals²⁴, commercial salmon harvests in Upper Cook Inlet in 1995 generated 131 average annual jobs in fish harvesting and \$3.5 million (in 1998 dollars) in income, 158 average annual jobs in fish processing and \$5.0 million in income for total direct employment of 289 and \$8.5 million (in 1998 dollars) in income. This economic activity generated an additional 199 jobs and \$6.2 million in income for an overall total of 488 jobs and \$14.7 million (in 1998 dollars) in income. Including salmon harvest numbers in Lower Cook Inlet would add another 98 average annual jobs and \$2.9 million in income to the overall Cook Inlet total. Total 1995 income from all sources attributable to Upper Cook Inlet commercial salmon activity expressed in (inflation adjusted) 2006 dollars is \$17.7 million and income for Lower Cook Inlet is \$3.5 million.

Economic Significance of Commercial Salmon Fishing in Upper Cook Inlet

	Average number of annual jobs	Income (\$)
Fish Harvesting	131	\$3.5 million
Fish Processing	158	\$5.0 million
Total Direct Employment	289	\$8.5 million
Additional Indirect Employment	199	\$6.2 million
Total	488	\$14.7 million

Table 5. Average annual jobs and income (1998 dollars) resulting from commercial salmon fish harvesting, processing, and indirect and induced jobs in Upper Cook Inlet, 1995. Source: Calculations based on data reported in ADF&G 2005b, ISER 1996, and Colt 2001.

At current (2000-2006) average annual commercial harvest values for salmon in Upper Cook Inlet, employment arising from commercial harvesting and processing as well as indirect and induced employment is estimated to be between 275 and 500 average annual jobs and average annual income is estimated to be between \$10 and \$18 million (2006 dollars).

Most workers in salmon harvesting in Cook Inlet are paid a share of the ex-vessel value of the catch as their earnings

24. Cook Inlet salmon ex-vessel values in 1995 represented 5.3% of the statewide salmon total (ADF&G <http://www.cf.adfg.state.ak.us/geninfo/finfish/salmon/catchval/blusheet/04exvesl.php>). The higher average ratios of 6% for Cook Inlet and 5% for Upper Cook Inlet were used for purposes of this calculation. The average proportion of 1998 and 1999 statewide salmon ex-vessel values to total statewide seafood ex-vessel values (29%) assessed in the ISER study (Colt 2001, 12) were also applied here.

(ISER 1996, VIII-4 to VIII-5),²⁵ and therefore earnings are lower when ex-vessel values are lower. The ex-vessel value of the total Cook Inlet salmon harvest in 1995 (the harvest year evaluated in the ISER study) was \$25.8 million (ADF&G <http://www.cf.adfg.state.ak.us/geninfo/finfish/salmon/catchval/blusheet/04exvesl.php>) and the ex-vessel value of the Upper Cook Inlet portion of the salmon harvest in 1995 was \$22.0 million (ADF&G 2006, App A7). The 1995 Upper Cook Inlet salmon harvest value total expressed in (inflation adjusted) 2006 dollars is \$28.1 million. The average annual ex-vessel value of salmon harvests in Upper Cook Inlet from 2000 to 2006 expressed in 2006 dollars is \$15.5 million (ADF&G 2006, App. A7, ADL&WD 2007), a little more than half (55%) of the inflation-adjusted ex-vessel value in 1995. Employment and incomes arising out of current commercial salmon harvesting in Cook Inlet must therefore be substantially less than in 1995.

If 1995 employment (500 average annual jobs) and income (\$17.7 million in 2006 dollars) estimates for harvesting and processing and indirect and induced effects of commercial salmon fishing in Upper Cook Inlet are reduced by the same percentage (45%) as the reduction in the value of the Upper Cook Inlet salmon harvest from 1995 to the average annual harvest value in the 2000-2006 period, current employment averages would be 275 average annual jobs and average annual income would be \$9.7 million. At some threshold harvest value level, increases in employment and income correspond directly to incremental increases in harvest values (through increased hire and/or overtime pay or through increased percentages and bonuses), but incremental reductions below that threshold level may be absorbed in varying proportions by decreases in return on investment and/or short term losses as well as decreased employment and income.²⁶ Therefore, at current average annual harvest values for commercial salmon in Upper Cook Inlet, employment is estimated to be below 500 but above 275 and income is estimated (in 2006 dollars) to be below \$17.7 million but above \$9.7 million.

About three-quarters of commercial salmon processing in Cook Inlet occurs in the Kenai Peninsula Borough, which reports a 60% decline in seafood processing employment in recent years.

ISER estimated that in 1992 almost three-quarters (73%) of the salmon processed in the Cook Inlet region was processed in Kenai with 16% being processed in Homer and 11% in Anchorage. However, not all of this salmon was from Cook Inlet because in some years excess capacity from other regions is transported to the region for processing (ISER 1996, IX-27 to IX-28). ADF&G identified 34 firms that purchased fishery products in Upper Cook Inlet during 2006 and identified 25 catcher/seller or direct marketers. Of the 20 major buyers identified by ADF&G, only one is located outside Cook Inlet (Seward); two are located in the Northern District area of Upper Cook Inlet (Anchorage); 14 are in the Central District area (Kenai, Soldotna, Kasilof); and three are located in Lower Cook Inlet (Homer) (ADF&G 2007, 21, 101 Table 14).

Cook Inlet Salmon Processors & Percentages of Harvest Processed

Year	City	Number of Salmon Processors	Percentage of Total Pounds Processed*
1985	Anchorage	10	11%
	Homer	6	20%
	Kasilof	4	
	Kenai	10	69%
	Ninilchik	1	
	Seward	1	
	<i>Total</i>	32	100%
1992	Anchorage	15	11%
	Homer	5	16%
	Kasilof	2	
	Kenai	23	73%
	Seward	4	
	Soldotna	3	
	<i>Total</i>	52	100%

Table 6. Cook Inlet salmon processors and percentages of the harvest processed, 1985 and 1992. Source: NPFMC data reported in ISER 1996.

While the great bulk of commercial seafood processing in the Cook Inlet region takes place in the Kenai Peninsula Borough (KPB), most of the processed harvest is shipped outside. The KPB 2005 Comprehensive Plan reports that commercial salmon landings accounted for more than 38 million pounds of fish purchased by Cook Inlet processors

25. An ISER study evaluating commercial salmon fishing in the Central District of Upper Cook Inlet in 1994 reported that there were 825 heads of operations, 210 other workers paid as owners, and 1,858 individuals paid as crew for a total of 2,893 workers (ISER 1996, VIII-4 to VIII-5). Crew were paid estimated total earnings of \$6.6 million, which represented 20% of total revenues (ex-vessel value) or \$3,579 per crew member for the season.

26. In the absence of publicly reported data, especially from seafood processors, such a threshold harvest value for a given fishery or segment of a fishery is very difficult to establish and could be expected to change as frequently as existing technology, infrastructure, and levels of investment change.



in 2002. This poundage represented 62% of the total volume for all species, yet only 17% of the value. Processing of halibut represented 26% of the volume and 62% of the value. The KPG Comprehensive Plan reports that seafood employment in the Borough peaked with 3,367 seasonal workers in July of 1997 at the height of salmon season, but only 40% of that number were employed in 2002 (a decline of 60%) and these workers took home just half the earnings (KPB Comprehensive Plan draft 2005, 3-11 to 3-12). Current employment and income arising out of commercial salmon processing in Cook Inlet is therefore substantially less than in 1995. The very substantial reductions in harvesting and processing employment and income have led to substantial declines in indirect and induced jobs and income.

NET ECONOMIC VALUE (NEV)

The collective economic gain or net economic value (NEV) of Upper Cook Inlet commercial salmon fishing to Alaskan and nonresident permit holders is less than \$1 million.

An ISER study evaluating the values of Alaska's renewable resources estimated the net economic value (NEV) of all commercial fishing in Alaska in 1999 at between \$192 and \$360 million using a measure most closely associated with profits or return on investment (Colt 2001, 32-34).²⁷ The author of this study, Dr. Steve Colt, estimated a range of market values for commercial fishing permits based on the ex-vessel value of commercial harvests.²⁸ The study formula also assumed a 10% rate of return on the market value of commercial fishing permits.

Net Economic Value of All Alaska Commercial Fishery Harvests

	Low estimate	High estimate
1999 Total Ex-vessel commercial fish value (\$ million)	1,201	1,201
Ratio of limited entry permit value to ex-vessel value of the annual catch	1.6	3.0
Estimated market value of the perpetual right to catch the entire commercial fish catch (\$ million)	1,922	3,603
Estimated Net Economic Value of Alaska Commercial fish caught in 1999 (\$ million) (annualized value of catching rights for 1999 using a 10% rate of return on the perpetual rights)	192	360

source: Author calculations based on Commercial Fisheries Entry Commission (2000) and Pierce (1993).

Table 7. Net economic value of all Alaska commercial fish harvests based on values of 1999 catch. Source Colt 2001.

27. This measure of net economic value does not include the value that commercial crews place on commercial fisheries work over and above other types of employment or the additional value that consumers of commercially caught fish would be willing to pay over and above actual retail prices.

28. The author of the study, Dr. Steve Colt, used a report by the Alaska Office of Management and Budget (Pierce 1993) estimating the market value of Alaska limited entry permits from 1984 to 1992 to compute the ratio between the ex-vessel value of fish caught commercially in each of these years to the averaged total permit value over this period arriving at a multiplier of 1.6. The product of this multiplier and ex-vessel harvest values was taken to represent the low range market value of the perpetual legal right to commercial harvests. The study also used data for the Bristol Bay gillnet fishery from 1995 to 1999 showing that the average price of a limited entry commercial fishing permit in that fishery was about three times the average annual ex-vessel value of fish harvested by the permit holders to arrive at a multiplier of 3. The study used the product of this multiplier and ex-vessel harvest values to make a high range estimate of the market value of the perpetual legal right to commercial fisheries harvests (Colt 2001, 32-34). Dr. Colt apparently intended these estimates be considered as very rough indicators of net economic values and therefore presented the estimate as a broad range.

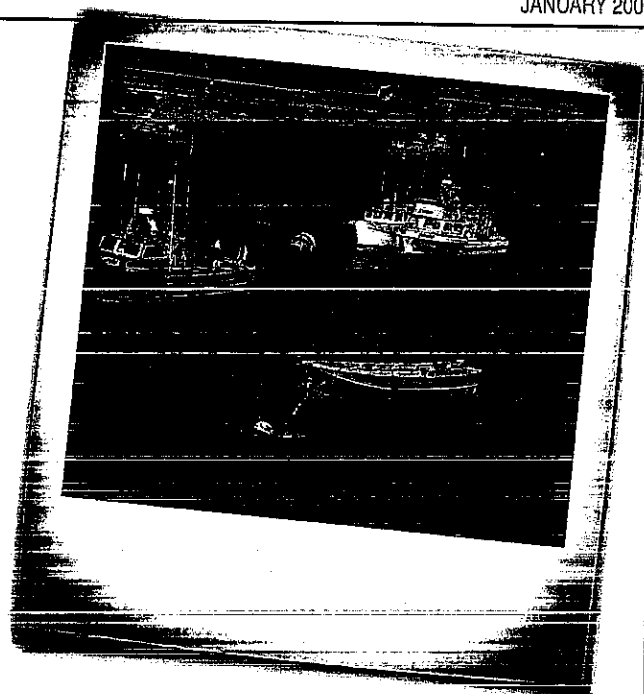
The average annual ex-vessel value of salmon harvests in Upper Cook Inlet from 2000 to 2006 expressed in 2006 dollars is \$15.5 million (ADF&G 2007, 130 App. A7, ADL&WD 2007). Applying the formula used by Dr. Colt in the ISER study to the average annual harvest value from 2000 to 2006 in Upper Cook Inlet yields an estimated NEV for commercial salmon fisheries in Upper Cook Inlet at current annual harvest value levels between \$2.5 and \$4.7 million (in 2006 dollars).

However, unlike the estimate ranges used for approximating the combined market value of all of Alaska's commercial fishing, the market value of the rights to commercial salmon harvests in Cook Inlet can be more specifically calculated. The Commercial Fisheries Entry Commission (CFEC) reports that in 2006 there were 570 active drift gillnet permits for the Cook Inlet area, with 71% issued to Alaskan residents. Of the total, 396 reported making a catch in Upper Cook Inlet in 2006 (ADF&G 2007, 81, Table 9). CFEC also reported 738 active set gillnet permits in Cook Inlet with 83% issued to residents. Of the total, 448 reported making a catch in Upper Cook Inlet in 2006 (ADF&G 2007, 81 Table 9). The average price for a Cook Inlet salmon set gillnet permit in 2006 was \$12,500 (CFEC http://www.cfec.state.ak.us/pmtvalue/X_S04H.htm). The average price for a Cook Inlet salmon drift gillnet permit in 2006 was \$28,800 (CFEC http://www.cfec.state.ak.us/pmtvalue/X_S03H.htm).

Using the average permit market values to estimate the combined value of the 395 drift gillnet permits fished in Upper Cook Inlet in 2006 yields a total of \$11.4 million. The combined value of the 448 set gillnet permits fished in Upper Cook Inlet is \$5.6 million for a total value of both drift and set gillnet permits of \$17 million. Assuming a 10% rate of return, the net economic value of commercial salmon fishing to permit holders in Upper Cook Inlet in 2006 would be \$1.7 million and at a 5% rate of return it would be \$0.85 million (2006 dollars).

An ISER study evaluating commercial salmon fishing in the Central District of Upper Cook Inlet in 1994 provides an additional and more detailed basis for estimating the NEV of this commercial fishery.²⁹ This study reported that there were 825 heads of operations, 210 other workers paid as owners, and 1,858 individuals paid as crew for a total of 2,893 workers (ISER 1996, VIII-4 to VIII-5). Crew were

29. This ISER assessment of commercial fishing in Upper Cook Inlet in 1994 evidenced that the Central District accounted for almost all (98%-99%) of the fish harvested in Upper Cook Inlet and almost all of the ex-vessel value (96%) (ISER 1996). This suggests that an estimate of the net economic value of the Central District fishery provides a rough estimate of the net economic value of Upper Cook Inlet as a whole.



paid estimated total earnings of \$6.6 million, which represented 20% of total revenues (ex-vessel value) or \$3,579 per crew member for the season. ISER estimated total revenues for the Central District commercial salmon harvest at \$33 million.

ISER estimated that permit holders in the Central District in 1994, in addition to payments to crew of \$6.6 million, had variable costs of \$6.2 million and fixed costs of 7.3 million for total costs of \$20.1 million. The difference between total revenues of permit holders and their total costs was \$13 million. ISER estimated the total value of permits in the Central District in 1994 at \$52.3 million and the total value of permit holders' boats, equipment, and business property at \$132 million for total investment costs of \$184.8 million (ISER 1996, 7, VIII-6 Table VIII-4). If the labor of heads of operations (825 individuals) and others paid as owners (210 individuals) are assigned the same per capita value as the labor of crew, the value of owner labor is \$3.7 million making the surplus accrued over costs \$9.3 million for a return on total investment of 5%. This suggests that the appropriate rate of return for estimating the net economic value of commercial salmon fisheries in Upper Cook Inlet in high ex-vessel value years is 5%.

ADF&G estimated the ex-vessel value of the total Upper Cook Inlet salmon harvest in 1994 at \$34.5 million and Cook Inlet as a whole at \$35.5 million. Expressed in inflation-adjusted 2006 dollars, the ex-vessel value of the Upper Cook Inlet salmon harvest in 1994 is \$45.2 million and the harvest value for Cook Inlet as a whole is \$46.6



million. The average annual ex-vessel value of salmon harvests in Upper Cook Inlet from 2000 to 2006 expressed in 2006 dollars is \$15.5 million (ADF&G 2007, 130 App. A7, ADL&WD 2007), about one-third (34%) of the 1994 harvest value. This means that Upper Cook Inlet permit holders' fixed costs plus the value of the owners' own labor (when adjusted for inflation) almost equals current total revenue levels (ex-vessel value totals) without taking into account payments to crew or variable costs accrued at average annual harvest levels that have remained within 20% of the average annual harvest level from 1991 to 2000. This suggests that commercial salmon permit holders are receiving no profits or return on investment at current ex-vessel salmon price levels. If commercial salmon permit holders in Upper Cook Inlet receive no profit or return on investment under current market conditions, the economic gain or net economic value of this activity to permit holders is zero.³⁰

Current values of commercial salmon permits in Cook Inlet are about one-tenth of the all-time high values in the late 1980s and early 1990s.

Market values of commercial fishing permits fluctuate as expectations about profits or return on investment change over time. According to CFEC records, Cook Inlet commercial salmon gillnet permit values peaked in 1990 at \$98,514, which is the equivalent of \$147,273 in 2006 dollars. The record 1990 average price followed a record high year of average gross earnings for Cook Inlet set gillnet permits in 1989 that exceeded \$105,000, or \$166,665 in 2006 dollars. Permit values, along with average gross earnings, have declined steadily since the peak in 1990. In 2004 the average Cook Inlet salmon set gillnet permit values was \$7,600. This is the lowest value on record for this fishery. The average value of a commercial salmon set gillnet permit in Cook Inlet between 2000 and 2006 was \$9,929 (CFEC http://www.cfec.state.ak.us/pmtvalue/X_S04H.htm). The average value of a commercial salmon set gillnet permit in Cook Inlet in 2006 was \$12,500, less than one tenth (8.5%) of its peak value in 1990.

Cook Inlet salmon drift gillnet permits also reached all-time high values in 1990 at \$202,058 or \$302,065 in 2006 dollars. The 2002 Cook Inlet salmon drift gillnet permit estimated value was \$11,700, the lowest value on record. The average value of a commercial salmon drift gillnet permit in Cook Inlet between 2000 and 2006 was \$24,343 (CFEC http://www.cfec.state.ak.us/pmtvalue/X_S04H.htm). The average value of a commercial salmon drift gillnet permit in Cook Inlet in 2006 was \$28,800, less than one-tenth (9.5%) of its peak value in 1990.

Average Annual Permit Values for Cook Inlet Salmon Set Gillnet Permits

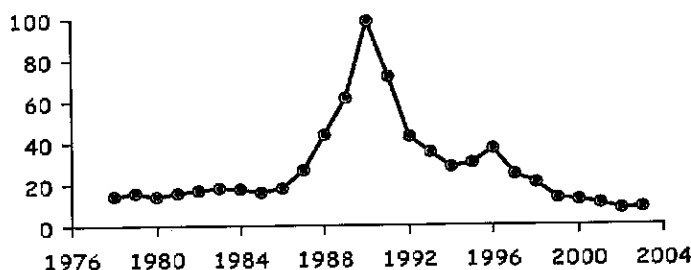


Figure 29. Average annual permit values for Cook Inlet salmon set gillnet permits. Source: CFEC data.

The steep declines in the value of commercial salmon permits in Upper Cook Inlet reflect trends statewide. The total value of Alaska's limited entry salmon permits in 2002 and 2003 was about one-sixth of former high values during the late 1980s and early 1990s.

30. Even under more favorable ex-vessel price regimes, only a fraction of the net economic value of commercial harvesting goes to those Alaskans who own commercial permit rights. Much of the net economic value of commercial salmon harvests accrues to nonresidents (mostly the Japanese) in the form of commercial salmon that is cheaper than what they might otherwise be willing to pay.

Total Value of Alaska Limited Entry Salmon Permits

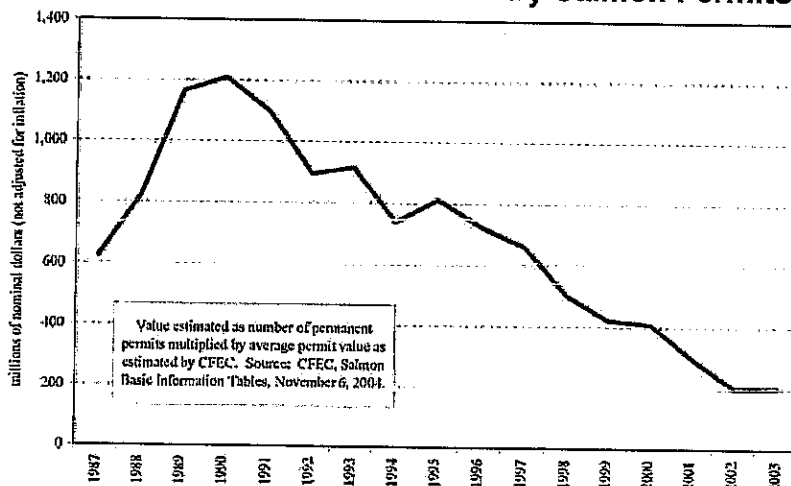


Figure 30. Estimated total value of Alaska limited entry salmon permits in millions of dollars (not adjusted for inflation). Source: Knapp 2005.

FUTURE TRENDS

Markets for wild Alaska salmon have been fundamentally altered under ongoing pressure from increasing production of farmed salmon and globalization of world seafood markets.

After rising during the 1980s, prices for all salmon species fell dramatically from 1986-1990 levels to 2005. For most species the single most important factor contributing to the decline in prices has been growing competition from farmed salmon (Knapp et al. 2007, x).

Total world salmon and salmon trout supply increased more than four-fold between 1980 and 2001. Global farmed salmon production exceeded the world's total commercial harvest of wild salmon by 1996 (Knapp et al. 2007, xi). By 2004, farmed salmon and salmon trout accounted for five-sixths of total world supply (Knapp et al. 2007, xv).

World Production of Salmon & Trout: Wild Capture vs. Aquaculture

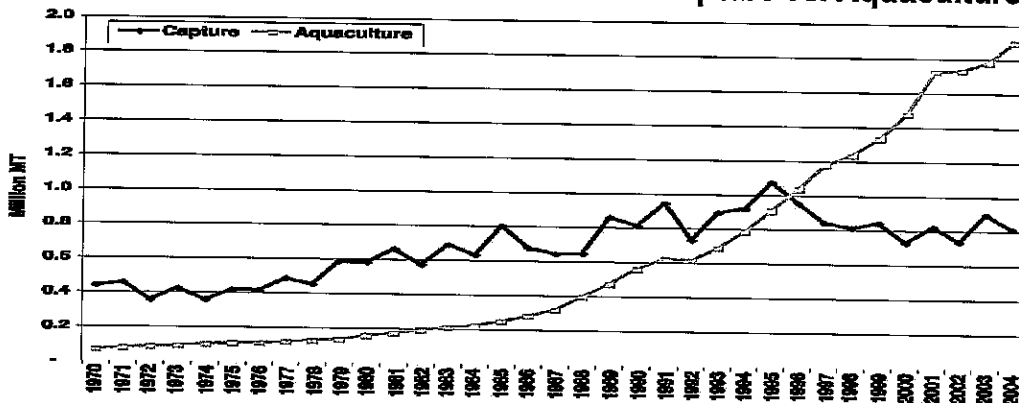


Figure 31. World salmon and trout production: wild capture versus aquaculture. Source: Knapp et al. 2007.

From 1996 to 2000, Alaska's commercial salmon catch accounted for 90% of the total North American harvest (Knapp et al. 2007, vii). Even though North American wild salmon harvests increased from about 300,000 metric tons in 1980 to 400,000 metric tons in 2004, North American wild salmon declined during this same period from more than one-half to about one-sixth of world production, primarily because of increased farmed salmon production (Knapp et al. 2007, xv). Prior to the 1990s, Alaska was the dominant supplier for world salmon markets. Since 1980, farmed salmon has increased from 2% of world salmon supply to 60%. From 1980 to 2004, Alaska wild salmon has fallen from more than 42% to 15% of world supply (Knapp 2005, 2006).



World Salmon Supply

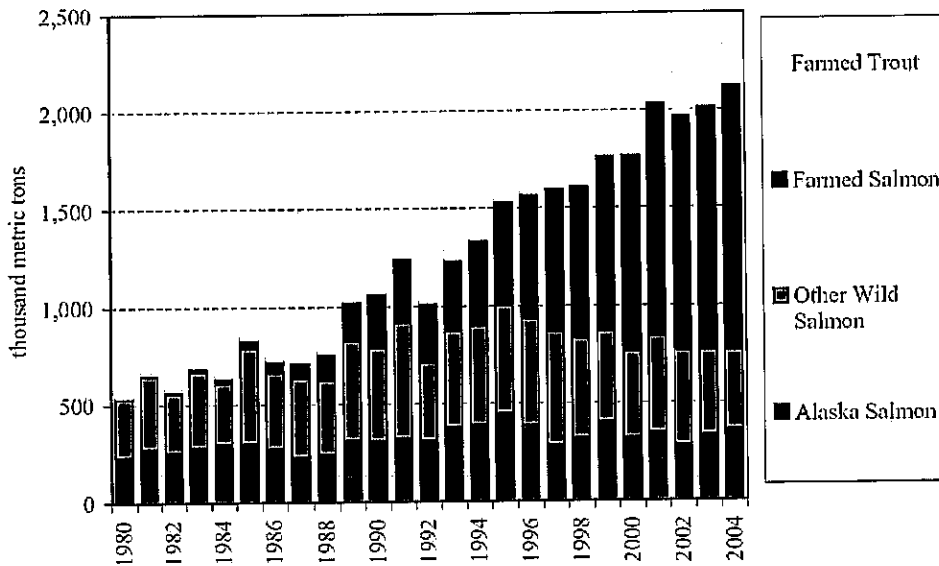


Figure 32. World salmon supply: Wild, farmed, and wild Alaska salmon. Source: Knapp 2006.

After farmed salmon, one of the most important factors affecting salmon prices has been globalization of world food markets, which has resulted in relatively few large retail and foodservice buyers dominating increasing shares of the general seafood and salmon markets. In general, farmed salmon meets the needs of these buyers better than wild salmon (Knapp et al. 2007, 219).

Pink, sockeye, and chum salmon account for the largest shares of total North American wild salmon production. For sockeye, the most important market is the Japanese frozen salmon market (Knapp et al. 2007, xvii). The most significant effects of increased farmed salmon production on Alaska wild salmon occurred in the Japanese market where in ten years farmed salmon captured most of the Japanese frozen salmon market formerly dominated by wild Alaska sockeye salmon (Knapp 2005). This fundamental market restructuring has had a substantial impact on Upper Cook Inlet commercial salmon fisheries where sockeye salmon constitutes about 85% of the annual salmon harvest (ADF&G 2005b, 90 App. A7, ISER 1996).

Japanese Frozen Salmon Supply

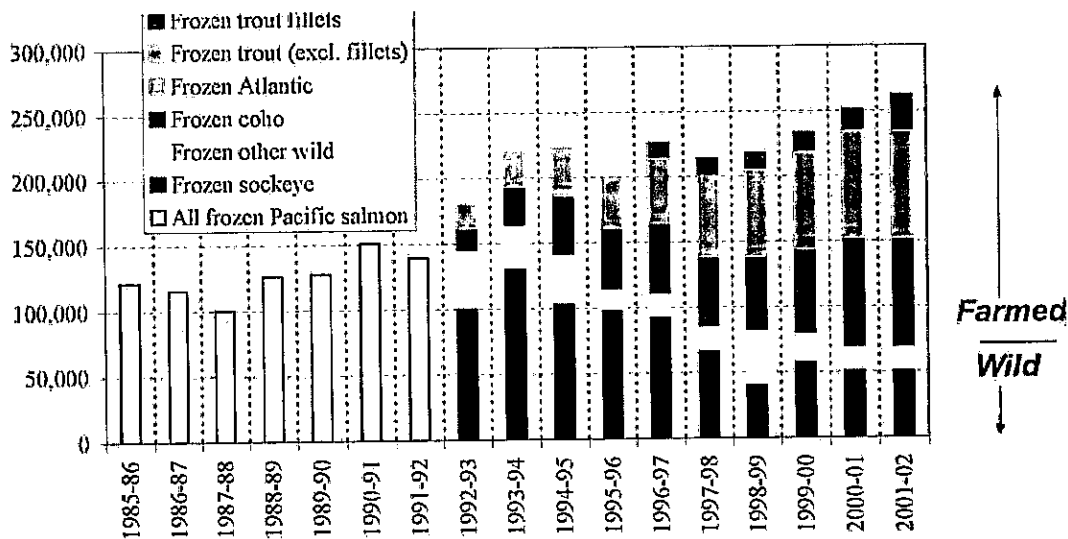


Figure 33. Japanese frozen salmon supply: Farmed and wild by species. Source: Knapp 2005.

Although Alaska continues to be an important supplier of the world wild salmon supply, increased supply of wild salmon from Russia traded in global markets as well as larger domestic harvests in Japan have negatively impacted Alaska wild salmon prices. North American wild salmon will continue to face increasing competition from Russian wild salmon in Japanese markets (Knapp et al. 2007, xxviii).

Regional Sources & Total Wild Salmon Supply

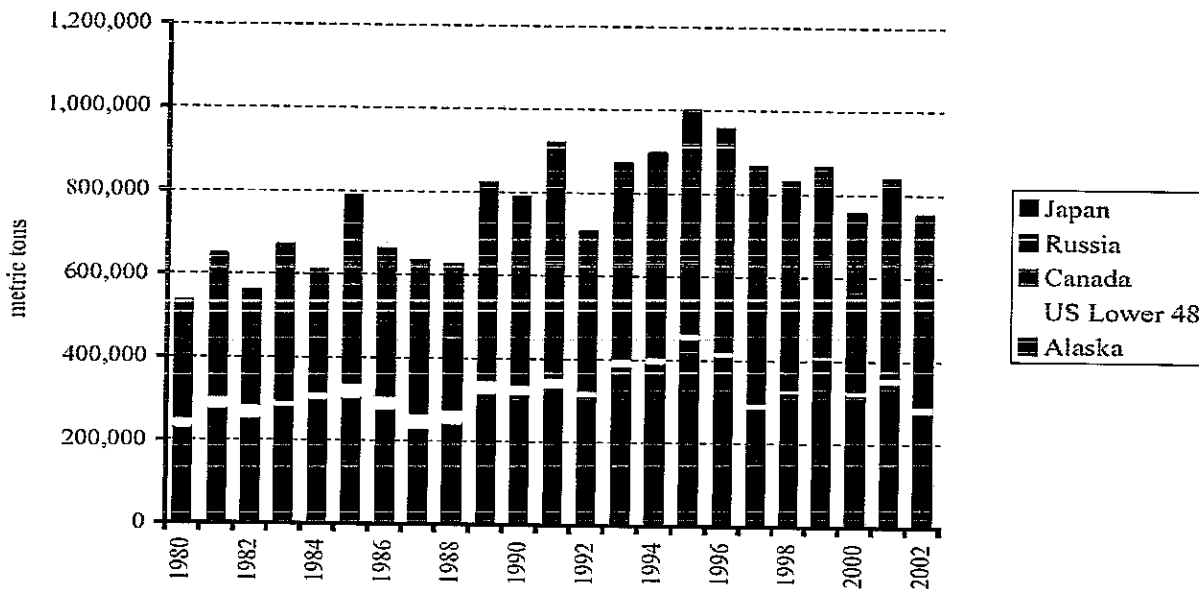


Figure 34. Regional sources of world wild salmon supply. Source: Knapp 2005.

However, increased supply of Russian and Japanese wild salmon and farmed Atlantic salmon are not the only factors in the globalization of seafood markets that contribute to downward pressure on wild Alaska salmon prices. Increased aquaculture production of various finfish species—including Rainbow trout, tilapia, and catfish—also contribute to overall increases in the global supply of seafood that can act as consumer substitutes for salmon (Knapp 2005).

Total World Fish Production

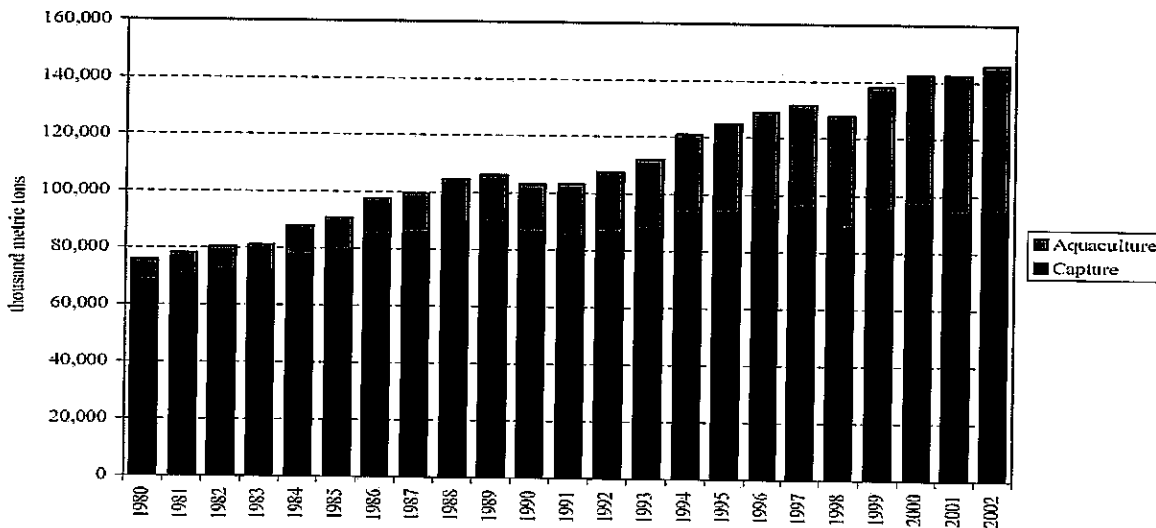


Figure 35. Total world fish production: Aquaculture and wild capture. Source: FAO Fishstat database, Knapp 2005.



The exceptional values of commercial salmon harvests in Upper Cook Inlet from the late 1980s to the early 1990s can no longer realistically be used to set benchmarks for fisheries management goals and objectives.

The fundamental changes in seafood markets caused by globalization and aquaculture mean that financial expectations developed over the last three decades by unprecedented commercial values in Upper Cook Inlet salmon fisheries can no longer be used to set realistic benchmarks for fisheries management goals and objectives.

The average annual value (calculated in constant 2006 dollars) of commercial salmon harvests in Upper Cook Inlet from 1961 to 1970 was \$14.7 million; from 1971 to 1980 the average was \$33.1 million; from 1981 to 1990 the average was \$82.9 million; and from 1991 to 2000 the average was \$39.6 million. Thus, after more than doubling each decade following the 1960s, average salmon harvest values in Upper Cook Inlet fell back in the 1990s to the levels of the 1970s.³¹

Upper Cook Inlet Commercial Salmon Ex-Vessel Values by Decade & Most Recent Period (Inflation Adjusted)

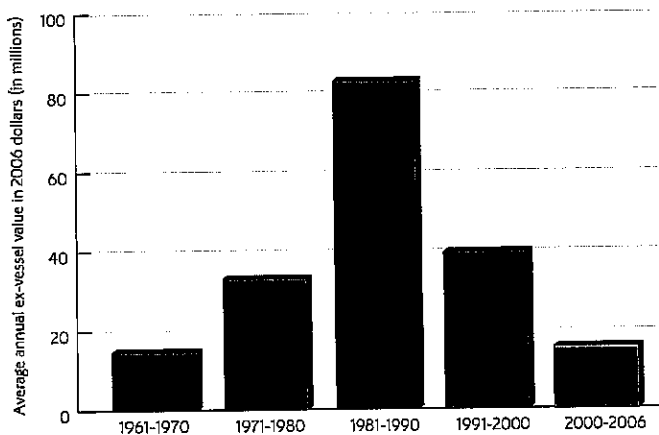


Figure 36. Average annual ex-vessel value of commercial salmon harvests in Upper Cook Inlet by decade and most recent period. Source: ADF&G 2007, ADL&WD 2007.

The average value of salmon harvests in Upper Cook Inlet for the most recent period of 2000 to 2006 (again calculated in constant 2006 dollars) was \$15.5 million, a level of value equivalent to that last seen in the 1960s. By contrast, the average value of salmon harvests in Upper Cook Inlet at the all-time height of ex-vessel values from 1986 to 1992, \$108.1 million (2006 dollars), is almost seven times the average value of current harvests (2000-2006). Recent salmon harvest value averages (2000-2006) are about one-third (39%) of the next most recent historical period (1991-2000).

Comparisons of historical harvest data show that the size of the current commercial salmon catch in Upper Cook Inlet cannot be used as the explanation for current low commercial salmon harvest values.

Comparisons of historical harvest data show that the size of the current commercial salmon harvest cannot be used as the explanation for current low commercial salmon values. For example, the average annual commercial harvest of all salmon species in Upper Cook Inlet from 1971 to 1980 was 2.8 million fish and the average annual value of the commercial harvests during this same period (calculated in constant 2006 dollars) was \$33.1 million. By contrast, the average annual commercial harvest of all salmon species in Upper Cook Inlet in recent years (2000-2006) was 3.7 million fish, yet the average annual value of salmon harvests (again calculated in constant 2006 dollars) was \$15.5 million. Even with an average of almost a million more fish each year from 2000 to 2006, the average annual value of the harvest was still less than half (47%) of the average value from 1971 to 1980.

31. Annual ex-vessel salmon harvest values for Upper Cook Inlet reported by the Alaska Department of Fish and Game can be converted into inflation adjusted constant dollars using the Anchorage Consumer Price Index reported by the Alaska Department of Labor and Workforce Development (ADF&G 2006, App. A7, ADL&WD 2007). ADF&G harvest data for 2006 is preliminary and will probably increase slightly after final prices, including post-season bonuses, are calculated.

Upper Cook Inlet Commercial Salmon Ex-Vessel Value & Catch Size, 1966-2006

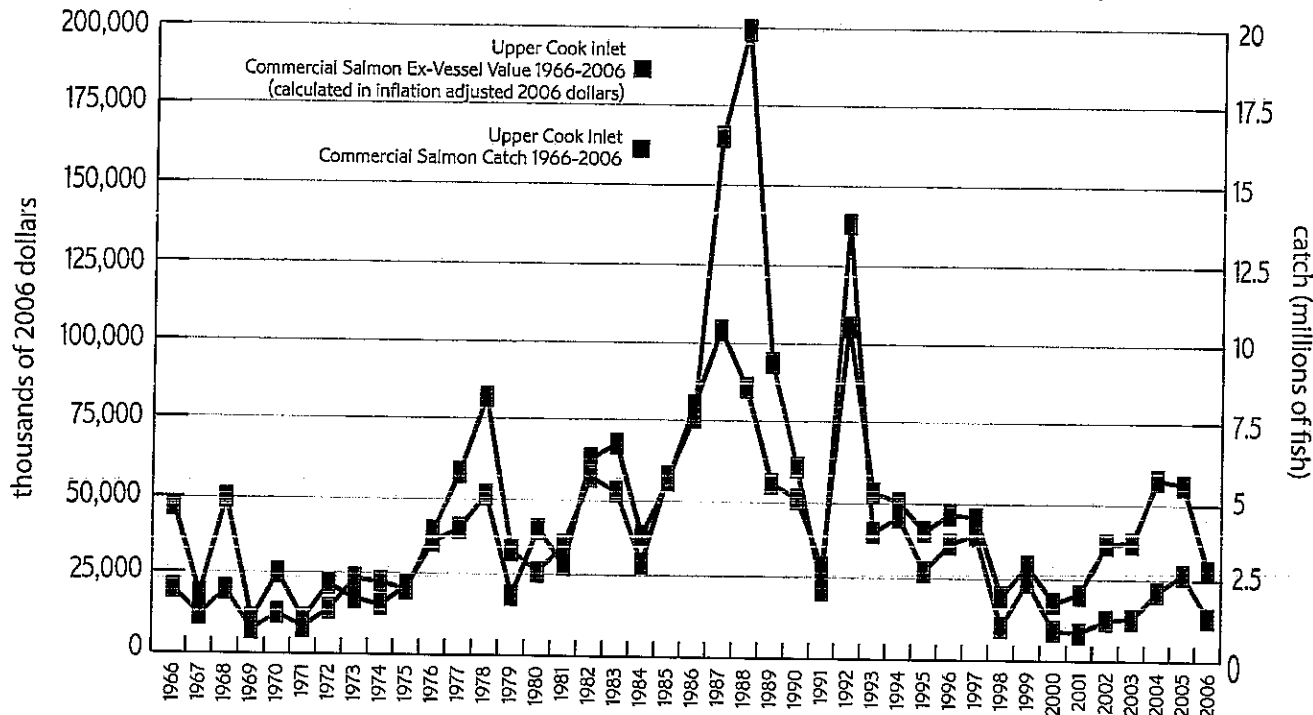


Figure 37. Upper Cook Inlet harvest size and inflation adjusted ex-vessel values in constant 2006 dollars. Source: ADF&G 2007, ADL&WD 2007.

While the average annual commercial harvest in Upper Cook Inlet was just 20% higher from 1991 to 2000 (4.4 million fish) than from 2000 to 2006 (3.7 million fish), the average annual value of the 1991 to 2000 harvests (\$39.6 million) was almost two and a half times greater (255%) than the average annual value from 2000 to 2006 (\$15.5 million). And while the average annual harvest in Upper Cook Inlet was 72% higher from 1981 to 1990 (6.3 million fish) than from 2000 to 2006, the average annual value of the harvest from 1981 to 1990 (\$82.9 million) was over five times (535%) greater than the average annual harvest value from 2000 to 2006.

According to Dr. Gunnar Knapp—a fisheries economist at the University of Alaska and a recognized expert on world salmon markets—the dramatically reduced share of Alaska salmon in world salmon and seafood markets means that the size of Alaska’s salmon catch no longer influences world salmon prices as it has in the past (Knapp et al. 2007, xxiii).

To match the historic financial yields of Upper Cook Inlet commercial salmon permit holders, the average annual commercial salmon catch in Upper Cook Inlet would have to be increased by two (200%) to five (500%) times and exceed the highest average annual catch of any decade on record.

At current (2000-2006) average annual ex-vessel prices (\$15.5 million), the average annual commercial salmon harvest of 3.7 million fish would have to be increased over two and a half times (257%) to 9.5 million fish to yield the same average annual commercial harvest value as 1991 to 2000 of \$39.6 million, the next most recent historical period. The 2000 to 2006 average annual commercial salmon harvest would have to be increased over five and a third times (535%) to 19.8 million fish to yield the same average annual harvest value as the \$82.9 million value of the 1981-1990 period; and it would have to be more than doubled (214%) to 7.9 million fish to yield the same average annual harvest value as the \$33.1 million value of the 1971-1980 period.

The highest average annual commercial harvest in Upper Cook Inlet of any historical decade within the last half century was 6.3 million fish from 1981 to 1990, an unprecedented level by comparison to any other decade. The harvest levels that would be required to meet the financial commitments and expectations of commercial salmon fishermen in Upper Cook Inlet set over the prior three decades or to significantly mitigate the decline in value of the commercial fishery are not within the realm of biological possibility.



Salmon farming and globalization of seafood markets will continue to exert downward pressure on prices and values in Alaska's commercial salmon fisheries and act as a driving force for changes in salmon fisheries management.

According to Dr. Knapp globalization and aquaculture will continue to exert downward pressure on prices for wild fisheries products³² and act as a driving force for change in the management of wild fisheries (Knapp 2005).³³

Salmon farming has led to a dramatic growth in total salmon supply, changes in the kinds of salmon products that are available to consumers, salmon production that is precisely timed to meet consumer demand, higher quality standards for salmon products, and cost effective organization of salmon production and supply (Knapp et al. 2007, xxiii).

Salmon farming has a number of significant advantages over wild salmon harvests such as consistency of supply and year-round availability leading to the possibility for longer-term supply contracts, greater quality control, and greater ability to respond to market demands (Knapp et al. 2007, xxvi). Farmed salmon is sold primarily as a fresh product in the United States, Europe, and Japan (Knapp et al. 2007, xviii). As a fresh product, farmed salmon receives a price premium compared to most frozen wild salmon (Knapp et al. 2007, xiii).

As the production costs of farming salmon have declined, farmed salmon production has continued to grow. With increased production, prices for both wild and farmed salmon have trended downwards (Knapp et al. 2007, xii). Overall costs of production of farmed salmon will continue their downward trend (Knapp et al. 2007, xxvii).

Wild salmon marketing faces significant inherent challenges such as variability and uncertainty of quantity of catches, short supply seasons, highly variable fish quality, and variable fish size (Knapp et al. 2007, 189).

32. Dr. Knapp is not the only Alaskan economist to make this assessment. See, for example, the discussion by Neal Gilbertsen, an economist for the Alaska Department of Labor and Workforce Development, entitled "The Global Salmon Industry and Its Impacts in Alaska" in *Alaska Economic Trends*, October 2003, <http://www.labor.state.ak.us/research/trends/oct03ind.pdf>.

33. While increased wild salmon marketing efforts and niche production of high quality wild salmon may create limited opportunities in some commercial fisheries, these strategies cannot undo the effects of underlying market forces. As the marginal supply of wild salmon to niche markets expands, prices paid by these markets will decline.

Wild salmon returns and catches vary widely from year to year and over longer periods of time due to natural causes such as ocean conditions (Knapp et al. 2007, 5).

Over time, wild salmon is likely to be sold increasingly either in relatively small higher-end niche and regional markets or in lower-end markets such as canned, frozen portions, and value added products where wild salmon has a cost advantage over farmed salmon. However these niche and regional markets will remain relatively small in comparison with total salmon supply (Knapp et al. 2007, xxvi-xxvii). Total niche market demand is limited. As more fishermen engage in direct marketing, they will find themselves in competition with other direct marketers, which will tend to lower prices and profits (Knapp et al. 2007, 197).

One effect of the decline in value of wild salmon harvests and production has been increasing economic and political pressure to restructure salmon fisheries to make them more efficient, such as permit buyback programs (Knapp et al. 2007, 227). In most wild salmon fisheries it would be possible to catch the available fish at lower cost by using fewer boats or more efficient gear (Knapp et al. 2007, 271).

ECONOMIC IMPACTS

ISER study models suggest that at current commercial prices and values, increasing salmon allocations for recreational fishing in Upper Cook Inlet would generate overall economic gains in the region.

In 1996 ISER published a study entitled "Economic Effects of Management Changes for Kenai River Late-Run Sockeye" performed under contract for ADF&G. This study assessed the potential economic impacts³⁴ of increasing the management target for late-run Kenai River sockeye by 200,000 fish thus making more fish available to sport and personal use participants while potentially reducing commercial harvests.³⁵

The study modeled scenarios projecting ranges of sockeye salmon run sizes (fewer than 2 million to more than 5 million) and ex-vessel sockeye salmon prices—reflective of values in the early 1990s—from a low price of \$1.00/lb. to a high of \$1.75/lb. with a medium price of \$1.43/lb. The study concluded that during high runs, managers wouldn't need to make any changes to put 200,000 more sockeye in the Kenai River, so there would be no gains or losses. When prices were low and runs were medium, the study found that sport gains with increased escapements would exceed commercial losses. During low runs, commercial losses would be greater than sport gains—and the higher the price of sockeye, the larger the losses.

In more than half of the scenarios, the study concluded that the range of uncertainty in the results exceeded the projections of gains or losses. The study's authors note that "given the range of uncertainty in our estimates, we can't definitely conclude that actual commercial losses would be larger than sport gains" (ISER 1996, 1, 11).

For purposes of the study, ADF&G tasked ISER to recognize but not to include in its analysis the economic gains that would accrue to commercial set gillnetters and recreational anglers in the Northern District of Upper Cook Inlet (the Matanuska-Susitna Borough and Municipality of Anchorage drainages) that would result from increased escapements of other sockeye salmon stocks past the nets of the Central District commercial fishery (ISER 1996, 2). This means not only that the study is not an assessment of economic impacts in the Upper Cook Inlet region as a whole but that the net economic gains in the region

from increased Kenai sockeye escapements are not fully represented in the study.³⁶

The nominal price per pound paid for commercially harvested sockeye in Upper Cook Inlet from 1990 to 1996 ranged from \$1.15 to \$1.60 (ADF&G 2007, 135 App. 11). Stated in constant 2006 dollar values using the Anchorage Consumer Price Index, the price per pound from 1990 to 1996 ranged from \$1.34 to \$2.32. The average annual price per pound from 1990 to 1996 (in 2006 dollars) was \$1.73. If the nominal annual price per pound from 1990 to 1996 had been \$1.75—ISER's modeled high value—the average annual price per pound stated in 2006 dollars would have been \$2.37. If the nominal annual price per pound from 1990 to 1996 had been \$1.00—ISER's modeled low value—the average annual price per pound stated in 2006 dollars would have been \$1.35. If the nominal annual price per pound from 1990 to 1996 had been \$1.43—ISER's modeled median value—the average annual price per pound stated in 2006 dollars would have been \$1.94.

This means that the real (inflation adjusted) price per pound values of commercially caught sockeye salmon modeled in the ISER study are much higher than the nominal (non-inflation adjusted) values that were current at the time of the study. Stated in constant value 2006 dollars, ISER effectively modeled commercially harvested sockeye salmon for purposes of the study at a high value of \$2.37 per pound, a low value of \$1.35 per pound, and a median value of \$1.94 per pound.

The nominal value paid for commercially harvested sockeye salmon in Upper Cook Inlet from 2000 to 2006 ranged between \$1.10 and \$0.60 per pound. The average annual price per pound from 2000 to 2006—calculated in constant 2006 dollars—is \$0.83 per pound. This means that the median value used in the ISER study is two and a third times (234%), the high value is almost triple (286%), and the low value is almost one and two-thirds times (163%) greater than the current average annual value. No real or nominal price per pound value from 2000-2006 approximates ISER's real modeled low value. Moreover, commercial permit values, harvesting and processing jobs and income, and commercial fisheries net economic values are now fractions of the values used in the ISER study.

34. To assess economic impacts, ISER evaluated changes that would occur in economic significance or economic effects (expenditures, jobs, and income) and net economic values of both recreational and commercial fisheries in the Central District of Upper Cook Inlet.

35. This study may be the only contemporary broad scope economic impact assessment of recreational and commercial salmon fisheries to have been performed in the Upper Cook Inlet area.

36. The study also takes note of but does not assess the potential negative impacts of an over-escapement of sockeye that might affect the size of future runs. The study notes that biologists haven't established an over-escapement estimate for Kenai River late-run sockeye.



The ISER study concluded that during high run years in Upper Cook Inlet, the additional allocation of sockeye salmon to recreational users would not negatively affect the commercial fisheries regardless of the price regime. In these years economic gains in recreational fisheries would constitute a net economic gain in the region. The study found that in medium run years, if prices were low—modeled at \$1.35/lb. in real (2006) dollars—economic gains in the sport fisheries from the increased allocation exceeded any losses in the commercial fisheries. None of the nominal values for commercially harvested sockeye salmon in Upper Cook Inlet from 2000 to 2006—\$0.60 to \$1.10 per pound—have approximated the modeled low value. This means that under the ISER study, scenarios increasing the allocation of salmon for recreational users under current price regimes would create net economic gains in the region in all high and medium run years, which would, on average, represent two out of every three years.

The ISER study concluded that during low run years in Upper Cook Inlet, commercial losses would be greater than sport gains—and the higher the price of sockeye, the larger the losses. However, the ISER study concluded that in more than half of the scenarios the range of uncertainty in the results exceeded the projections of gains or losses. The study notes that given this uncertainty it could not definitely conclude that actual commercial losses would be larger than sport gains. The current average annual price per pound (\$0.83) is three-fifths (61%) of ISER's modeled low price (\$1.35). This suggests that scenarios modeling current commercial salmon fishery price regimes and values in Upper Cook Inlet would show economic gains in sport fisheries in the region that would exceed regional losses in the commercial fisheries in essentially all of the critical harvest level study scenarios. This would indicate that increasing salmon allocations for recreational fishing in Upper Cook Inlet would generate overall economic gains in the region.

ALLOCATION AND MANAGEMENT

Commercial fisheries are allocated about five-sixths (82%) of the Upper Cook Inlet salmon catch while sport, personal use, and subsistence fisheries are allocated about one-sixth (18%) of the catch.

For the most recent five-year period (2002-2006), the average annual take by the commercial fisheries in the Upper Cook Inlet salmon catch (all species) was 4.4 million (4,343,000) fish or about five-sixths (82%) of the average annual catch of 5.3 million (5,278,000) fish. Sport, personal use, and subsistence fisheries took an average annual 0.9 million (935,000) fish or about one-sixth (18%) of the average annual catch (ADF&G 2007, 109 Table 19; Reimer & Sigurdsson 2004; ADF&G 2007, personal communication).

are prized by anglers since they generally run later than other salmon and are known for providing a satisfying fight. Coho have been designated to be managed as a priority species for recreational fisheries. From 2002 to 2006, the average annual take of coho by the commercial fisheries in Upper Cook Inlet was 0.2 million (212,000) or more than half (53%) of the average annual coho catch of 0.4 million (398,000) fish. Sport, personal use, and subsistence fisheries harvested an average annual 0.2 million (186,000) coho or less than half (47%) of the total (ADF&G 2007, 109 Table 19; Reimer & Sigurdsson 2004; ADF&G 2007, personal communication).

Allocation of Upper Cook Inlet Salmon Harvest by User Group, 2002-2006

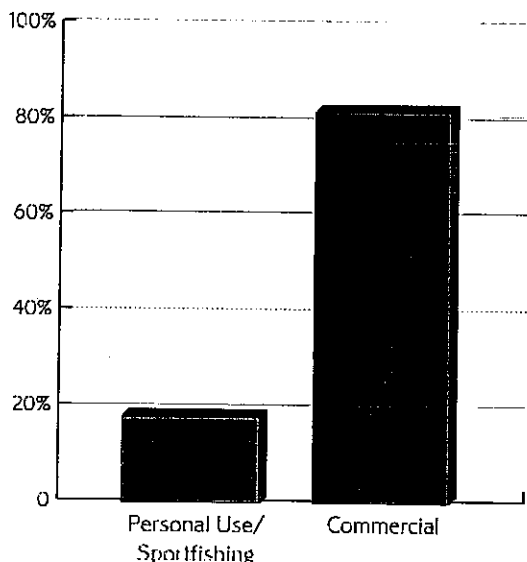


Figure 38. From 2002-2006 commercial fishing was allocated 82% of the Upper Cook Inlet salmon harvest and sport and personal fishing were allocated 18%. 1999-2004. Source: ADF&G 2007.

In Upper Cook Inlet, sockeye salmon constitute the great bulk of the commercial and recreational salmon catch. From 2002 to 2006, the average annual take of sockeye by the commercial fisheries in Upper Cook Inlet was 3.7 million (3,721,000) or about six-sevenths (85%) of the average annual sockeye catch of 4.4 million (4,371,000) fish. Sport, personal use, and subsistence fisheries harvested an average annual 0.7 million (650,000) sockeye or about one-seventh (15%) of the total (ADF&G 2007, 109 Table 19; Reimer & Sigurdsson 2004; ADF&G 2007, personal communication).

Although pink salmon have alternating strong run years, pinks follow coho fairly closely as an average annual percentage of the Upper Cook Inlet salmon catch. From 2002 to 2006, the average annual take of pink salmon by the commercial fisheries in Upper Cook Inlet was 0.3 million (261,000) or almost all (90%) of the average annual pink harvest of 0.3 million (290,000) fish. Sport, personal use, and subsistence fisheries harvested an average annual 0.03 million (29,000) pink salmon or one-tenth (10%) of the total (ADF&G 2007, 109 Table 19; Reimer & Sigurdsson 2004; ADF&G 2007, personal communication).

Upper Cook Inlet Salmon Harvest Allocation by User Group & Species, 2002-2006

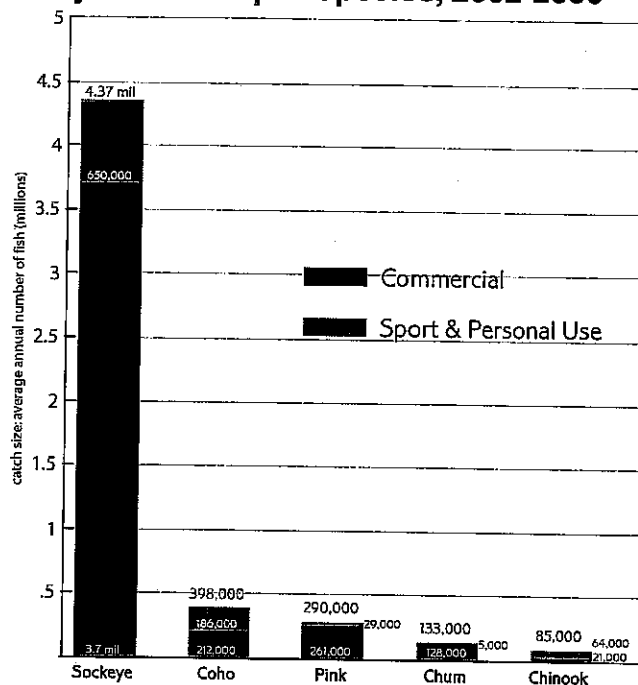


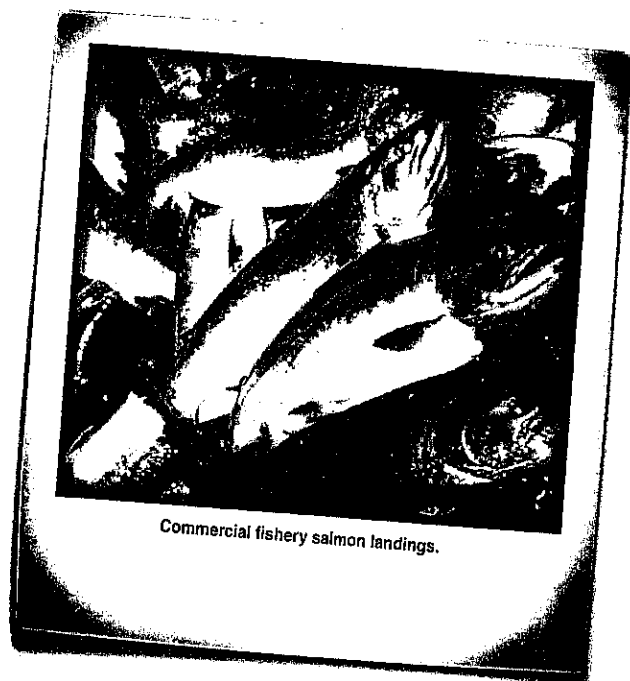
Figure 39. Upper Cook Inlet annual average harvest share by species for commercial and recreational (sport and personal use) fishing from 2002-2006. Source: ADF&G 2007.

Coho salmon are a distant second, after sockeye, as a percentage of the Upper Cook Inlet salmon catch. Coho



In recent years, the chum salmon catch in Upper Cook Inlet has averaged less than one half the size of the pink salmon catch. From 2002 to 2006, the average annual take of chum salmon by the commercial fisheries in Upper Cook Inlet was 0.1 million (128,000) or almost all (96%) of the average annual chum harvest of 0.1 million (133,000) fish. Sport, personal use, and subsistence fisheries harvested an average annual 0.005 million (5,000) chum salmon or one-twenty-fifth (4%) of the total (ADF&G 2007, 109 Table 19; Reimer & Sigurdsson 2004; ADF&G 2007, personal communication).

Chinook or king salmon constitute by far the smallest percentage (1.7%) of the Upper Cook Inlet Salmon catch. However, due to chinook's large size (and rich flavorful meat), it is arguably the species most prized by anglers. Chinook have been identified as a priority species for recreational fisheries. From 2000 to 2006, the average annual take of chinook salmon by the commercial fisheries was 0.02 million (21,000) fish or one quarter (25%) of the average annual harvest of 0.09 million (85,000) fish. Sport, personal use, and subsistence fisheries harvested an average annual 0.005 million (64,000) chinook salmon or three-quarters (75%) of the total (ADF&G 2007, 109 Table 19; Reimer & Sigurdsson 2004; ADF&G 2007, personal communication).



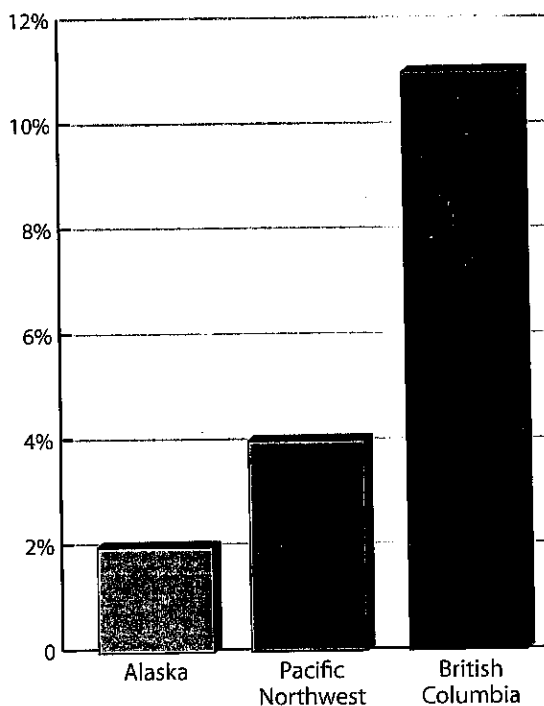
Commercial fishery salmon landings.

For Alaska to be comparable with proportionate distributions in other North American Pacific salmon fisheries, allocations for recreational salmon fishing in the state would need to be increased by two (200%) to five and a half (550%) times.

In 1999 the proportions of the salmon harvest allotted to commercial versus recreational uses was 89% to 11% in British Columbia, 96% to 4% in the Pacific Northwest, and 98% to 2% in Alaska, making Alaska the jurisdiction with the smallest proportion of the salmon harvest allocated to recreational fishing of any North American Pacific salmon fishery (Knapp et al. 2007, vi). For Alaska to be comparable with proportionate distributions in other North American salmon fisheries, allocations for recreational salmon fishing in the state would need to be increased by two (200%) to five and a half (550%) times.


Percentage of Pacific Salmon Harvest Allocated for Recreational Fishing by Region

Figure 40. Upper Cook Inlet annual average harvest share by species for commercial and recreational (sport and personal use) fishing from 2002-2006. Source: Knapp et al, 2007.



Optimal recreational fisheries management is based on providing anglers and personal use participants with routine and reliable opportunities to harvest a meaningful number of fish incrementally over the entire course of the fishing season.

The success of sport and personal use fisheries relies not only on receiving an appropriate share of the salmon harvest but also on receiving those fish in a way that is meaningful to recreational users. Sport fishing is pursued, in large part, for enjoyment. Many anglers will



return multiple times to fish over the course of a season if they have the opportunity to catch enough fish to make their trip worthwhile. For other anglers and personal use participants, there are only certain times—weekends, for example, or scheduled time off from work—when fishing is a possibility. If there are not enough fish in accessible areas at those times, the occasion to fish is lost entirely. Visitors, like some Alaskans, will have the opportunity to go fishing only if fish are in accessible areas during their scheduled vacation time.

Management practices that optimize commercial fisheries performance in Upper Cook Inlet often negate management practices that sustain recreational fisheries.

Even though commercial and sport fisheries management share the common objectives of conservation and rehabilitation, the success of each fishery is measured by mutually conflicting standards. Success in commercial fishery management is measured primarily in terms of pounds of fish produced. Commercial salmon harvesting can be concentrated within periods of intense activity without affecting overall economic outcomes. Commercial fishery management strategies negate recreational fishery management strategies when commercial harvest allocations are set at levels where the number of fish escaping the commercial fishery and entering river systems is insufficient to provide sport anglers and personal use fisheries with consistent and meaningful fishing opportunities throughout the season.

Continuous commercial fishing periods designed to maximize commercial harvests can result in low fish availability in sport and personal use fisheries that effectively shut down recreational fisheries for extended periods, sometimes at the economically most critical times of the recreational fishing season. Similarly, management to maximize harvests for Upper Cook Inlet commercial sockeye salmon—a commercially valuable species—often results in a large incidental take of chinook and coho salmon despite a sport fishery priority for these species. As noted above, in recent years sport, personal use, and subsistence fisheries harvested less than half (47%) of the total Upper Cook Inlet coho harvest even though these fisheries are designated as having priority over commercial harvests for this species.



CONCLUSIONS

The economic activity generated by recreational salmon fishing in Upper Cook Inlet is many times greater than commercial salmon fishing because of much higher participation levels. Recreational fishing also attracts visitors from outside of the state who bring new dollars into local economies.

The very significant economic differences between commercial and recreational salmon fishing in Upper Cook Inlet are not generally understood or widely recognized. Because participation levels in recreational salmon fishing in Upper Cook Inlet are so much greater than those in commercial fishing, recreational fishing produces much greater activity in local economies than does a comparable commercial harvest. In addition, recreational fishing attracts visitors from outside of Alaska who bring new wealth into the state in the form of dollars spent in local economies.

PARTICIPATION

Some 20,000 Alaskans obtain personal use permits each year to harvest salmon in Upper Cook Inlet for household use. By contrast, between 1,375 and 2,500 individuals are estimated to be employed in harvesting and processing or in jobs arising out of the indirect economic effects of commercial salmon harvests in Upper Cook Inlet. This would mean that there are about eight (800%) to 15 (1,454%) times as many Alaskans who obtain personal use permits to harvest salmon in Upper Cook Inlet as there are individuals—Alaskans and nonresidents—who are employed in or have jobs arising out of commercial salmon harvests in Upper Cook Inlet.

Some 82,000 Alaskans sport fish for salmon in Upper Cook Inlet each year. This would mean that there are about 32 (3,240%) to 58 (5,890%) times as many Alaskans who sport fish for salmon in Upper Cook Inlet as there are individuals—Alaskans and nonresidents—who are employed in or have jobs arising out of commercial salmon harvests in Upper Cook Inlet (1,375-2,500).

Unlike Alaskan residents, visitors from other states and foreign countries bring new dollars into local economies that can produce net economic gains in the state. Some 78,000 visitors fish for salmon in Upper Cook Inlet each year. This would mean that there are about 31 (3,120%) to 56 (5,670%) times as many visitors to Alaska who sport fish for salmon in Upper Cook Inlet as there are individuals—Alaskans and nonresidents—who are employed in or have jobs arising out of commercial salmon harvests in Upper Cook Inlet (1,375-2,500).

Combining the estimates for Alaskans and visitors would mean that there are some 160,000 anglers—Alaskans and visitors—who sport fish for salmon in Upper Cook Inlet each year. This would mean that there are about 63 (6,300%) to 115 (11,560%) times as many anglers who sport fish for salmon in Upper Cook Inlet as there are individuals—Alaskans and nonresidents—who are employed in or have jobs arising out of commercial salmon harvests in Upper Cook Inlet (1,375-2,500).

ECONOMIC SIGNIFICANCE: AVERAGE ANNUAL JOBS AND INCOME

Recreational salmon fishing in Upper Cook Inlet generates annual sales of \$316 million (2006 dollars) that support 3,400 average annual jobs producing an annual payroll of \$104 million in the region. Employment arising from commercial harvesting and processing of salmon in Upper Cook Inlet as well as indirect and induced employment is estimated between 275 and 500 average annual jobs and average annual income between \$10 and \$18 million (2006 dollars).

This would mean that recreational salmon fishing in Upper Cook Inlet generates about seven (680%) to 12 (1,236%) times as many average annual jobs and six (577%) to 10 (104%) times as much average annual income in the region as commercial salmon fishing.

NET ECONOMIC VALUE

The net economic value (NEV) of recreational salmon fishing in Upper Cook Inlet—to Alaskans and visitors—is estimated at \$115 million (2006 dollars) with \$62 million of that total going to Alaskans. The NEV of Upper Cook Inlet commercial salmon fishing to Alaskan and nonresident permit holders is less than \$1 million.

This means that the net economic value to Alaskans of recreational salmon fishing in Upper Cook Inlet is 62 (6,200%) times greater than the NEV of commercial salmon fishing to permit holders—Alaskans and nonresidents—in the region.

ECONOMIC IMPACT

ISER study models from the mid-1990s suggest that at current commercial prices and values, increasing salmon allocations for recreational fishing in Upper Cook Inlet would generate overall economic gains in the region.

ALLOCATION AND MANAGEMENT

Commercial fisheries are allocated about five-sixths (82%) of the Upper Cook Inlet salmon harvest, while sport, personal use, and subsistence fisheries are allocated about one-sixth (18%) of the catch. The percentage of the total salmon harvest that is allocated for recreational use in British Columbia is 11%, in the Pacific Northwest it is 4%, and in Alaska it is 2%. For Alaska to be comparable with proportionate distributions in other North American Pacific salmon fisheries, allocations for recreational salmon fishing in the state would need to be increased by two (200%) to five and a half (550%) times. Since Alaska's recreational salmon fishing is so heavily concentrated in Cook Inlet, this would mean that allocations in the region would need to be substantially increased.

The restructuring of salmon fisheries in Upper Cook Inlet necessitated by global market forces must be fully informed by an awareness of the immense economic value—to local economies and to individual participants—of sport and personal use fisheries.

Commercial salmon fisheries in Alaska will continue to be altered by mounting pressures from the globalization of seafood markets and an explosion in aquaculture production. There is no projected abatement of these trends, and they will continue to act as a driving force for changes in commercial salmon fisheries management. Falling salmon prices have led to tremendous pressure on commercial fishery managers to maximize harvests in an attempt to compensate for falling values. Fair, balanced, and economically rational management of recreational fisheries as well as basic biological limitations mean that it will not be possible for fisheries managers to expand commercial harvests sufficiently to offset market declines.

The future viability of Upper Cook Inlet commercial salmon fisheries will ultimately be secured only by making the fundamental changes in commercial fishing practices and management that will make wild salmon more competitive in world markets. It is crucial that the inevitable restructuring of fisheries management practices

in Upper Cook Inlet necessitated by global market forces be fully informed by an awareness of the immense economic value—to local economies and to individual participants—of sport and personal use fisheries.

Fisheries management in Upper Cook Inlet faces the ongoing challenge of adhering to policies and practices that recognize the central economic role of sport and personal use fisheries in the region.

Growth in Upper Cook Inlet sport and personal use fisheries over the last two decades has resulted in increased competition for fishery resources between commercial and recreational users. While sport fishing organizations have advocated for increased salmon allocations commensurate with ever growing numbers of sport and personal use participants, commercial fishing interests have sought increased harvest opportunities to offset commercial losses.

-----The state agencies that oversee and regulate fisheries were originally designed to address the needs and interests of commercial fisheries. Increased recognition of the importance of sport and personal use fisheries has taken time. Substantive consideration of the needs of recreational fisheries and informal representation of recreational fishing interests on the Board of Fisheries are relatively recent developments. Fisheries management that provides sport and personal use participants with routine and reliable opportunities to harvest a meaningful number of fish incrementally over the entire course of the fishing season continues to be a paramount need.

Ever increasing sport and personal use salmon fishing and dramatic declines in market prices and values of commercial salmon fisheries present fisheries managers in Upper Cook Inlet with complex new challenges. Chief among these is the need to adhere to management policies and practices that recognize the central economic role of sport and personal use fisheries in a region long administered principally as a commercial fishery.



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APPENDIX A: ECONOMIC ASSESSMENTS

Economists assess the economic values of sport, personal use, and commercial fishing—like many other types of activities—using three general categories of measurement: **economic significance**, **net economic value**, and **economic impact**.

Economic significance assessments take into account measurements of **direct expenditures**, **jobs**, and **income** that are associated with a certain type of activity such as sport or commercial fishing. Levels of **participation** in the activity may also be included. Evaluations of economic significance may also take into account the additional economic activity that is generated when businesses that receive direct expenditures from participants make business related purchases—often referred to as **induced expenditures**—and when employees of these businesses spend parts of their incomes with unrelated businesses thus producing **indirect expenditures**. In addition, economic significance assessments may take into account federal, state, or local **government revenues** associated with an activity such as boat landing taxes, hotel bed taxes, or commercial fishing permit or sport fishing license receipts. These various measures of economic significance are sometimes referred to as **economic effects** or **economic output**.

Both commercial and recreational fishing have very substantial economic worth in addition to the value created in local economies from sales, jobs, and income. Collective economic gain or “**net economic value**” (**NEV**) assessments consider the net or surplus value of the benefits that participants in an activity receive over and above what they actually pay to be involved. Measurements of the net economic values in both recreational and commercial fisheries provide economists with a tool for assessing the economic impact of alternative fisheries allocations.


Permit holders in commercial fisheries anticipate receiving profits or a return on investment over and above their expenses and the wage value of their own time. The collective economic gain or net economic value of commercial fishing is generally assessed by measures associated with profits or return on investment to commercial permit holders. Expectations about these gains or profits in turn determine the market value of commercial fishing permits and the willingness of permit holders to remain active in a fishery.

Participants in recreational fishing also expect to receive benefits of greater value than the expenses they incur in going fishing. The food and recreational enjoyment received by Alaskans and visitors who participate in sport fishing would cost hard dollars if these benefits were to be replaced by substitute foods and alternate forms of recreational activity. Economists attempt to quantify the collective economic gain or net economic value that accrues to sport and personal use fishers by assessing the monetary value that participants themselves place on the benefits they receive. This is done both by measuring recreational fishing participants’ actual costs and by evaluating what participants would have been willing to pay over and above these expenses. Economists refer to this “willingness to pay” as a “consumer surplus” or “compensating variation” (ISER 1996, Haley et al. 1999, Colt 2001, Herrmann et al. 2001).

Recreational fishing participants realize an economic gain from sport and personal use fishing by the amount they value the food and recreational enjoyment they receive over and above the cost of going fishing. The collective value of these individual gains is referred to by economists as the net economic value of recreational fishing. Expectations about these individual gains in turn determine the willingness of anglers to continue to make expenditures on recreational fishing and to remain active in recreational fisheries.

Economists also use a third economic assessment that focuses on relative changes in economic activity and economic values. **Economic impact** analysis assesses the extent to which economic activity and values increase or decrease in a particular area under given circumstances. An assessment of economic impacts may use declines and increases in measures of both economic significance and net economic value to determine if there are overall changes in economic activity and values in a given area.

Dr. Gunnar Knapp, a fisheries economist at the University of Alaska Anchorage, has identified a set of principles for making appropriate economic comparisons between sport and commercial fisheries. Measures of economic effects should be the same for both fisheries and should be relevant to the purpose of the comparison and the policy choices under consideration. To be relevant to policy choices, economic comparisons should address marginal effects of the policy choices under consideration rather than total or average economic effects of each fishery. Effects must be



measured and compared for a geographic area appropriate to the policy choices under consideration. Finally, indirect economic effects should be considered if relevant to the policy choices under consideration (Knapp 2001).

Economic factors are among the considerations taken into account by the Alaska Board of Fisheries when making allocations and other regulatory decisions. Virtually every fishery management and regulatory decision has some direct or indirect allocation effect with inevitable economic consequences. In the past, local fisheries managers often made regulatory decisions motivated by economic considerations that were not open to public discussion and debate. The Board of Fisheries regulatory process now provides an effective avenue for active and open involvement of a broad cross-section of the public in management decisions for all fisheries. This process fosters resource stewardship, consideration of the diverse needs and values of all stakeholders, and balanced decision-making.

This report reviews the available studies and agency data assessing the economic values of sport, personal use, and commercial fisheries in Cook Inlet and Upper Cook Inlet to serve as background for evaluating the potential impacts of fishery allocation decisions³⁷. The report includes information on participation, economic significance, and net economic values of each fishery as well as economic impact analysis.

37. The studies reviewed in this report may differ in the categories of activity and value that are taken into account in an economic assessment. All economic models and measurements are based on sets of assumptions that may or may not be entirely accurate. This limitation in any economic assessment model warrants a cautious interpretation of economic value estimates. But even though economic models and measures are unavoidably imperfect, decisions with economic consequences must still be made on the basis of the best information available as in any other area of human endeavor.