

Technical Paper No. 331

**Final Report: Subsistence Fisheries Harvest Database
Update and Report Preparation**

by

James A. Fall

and

David Koster

October 2007

Alaska Department of Fish and Game

Division of Subsistence



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The Division of Subsistence Technical Paper Series was established in 1979 and represents the most complete collection of information about customary and traditional uses of fish and wildlife resources in Alaska. The papers cover all regions of the state. Some papers were written in response to specific fish and game management issues. Others provide detailed, basic information on the subsistence uses of particular communities which pertain to a large number of scientific and policy questions. Technical Paper Series reports are available through the Alaska State Library and on the Internet: <http://www.subsistence.adfg.state.ak.us/>

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ABSTRACT

The overall goal of this project was to improve access to harvest data for Alaska's subsistence fisheries. The project updated the Alaska Subsistence Fisheries Database by adding the findings of 22 annual subsistence salmon harvest monitoring programs in 2003, 2004, and 2005. Annual reports that summarize the subsistence salmon fisheries in 11 management areas were produced and distributed for 2003, 2004, and 2005. A prototype of an online database system to present harvest information from the Alaska Subsistence Fisheries Database was developed and is under review and revision. Also, a subsistence fisheries information page was added to the Alaska Department of Fish and Game website with background on subsistence regulations and links to the annual reports in PDF format.

Data presented in the annual reports for 2003, 2004, and 2005 suggest stable to slightly declining subsistence salmon harvests from 1994 through 2005. The recent 12-year average annual harvest was an estimated 1.112 million salmon; the recent 5-year average annual harvest was an estimated 1.005 million salmon. Limitations to complete analysis of trends in Alaska subsistence salmon fisheries include a lack of pre-1994 data in the database for some of the largest subsistence fisheries; lack of coverage of the Cook Inlet personal use salmon fisheries; incomplete coverage of harvests in the Northwest Management Area; and an incomplete record of subsistence harvests for some subsistence fisheries or areas, due to low levels of participation in the harvest monitoring programs or the harvests of significant numbers of salmon for home use with rod and reel or removal from commercial catches that are not recorded on subsistence permits. Evaluation of trends for some fisheries is also limited by a lack of systematic contextual information.

The report concludes by noting that uncertain funding threatens the sustainability of annual subsistence fisheries harvest assessment programs. Rather than cutting back on programs, efforts to expand communication of program findings, outreach about the importance of the documentation of subsistence harvests, and further development of collaborative programs are needed. Also needed is additional technical review of current programs by fisheries managers, subsistence researchers, and data management personnel.

Key words: Alaska subsistence fisheries, harvest monitoring methods, Chinook salmon, *Oncorhynchus tshawytscha*, sockeye salmon, *Oncorhynchus nerka*, coho salmon, *Oncorhynchus kisutch*, pink salmon, *Oncorhynchus gorbuscha*, chum salmon, *Oncorhynchus keta*

INTRODUCTION

Access to reliable, comprehensive, and up-to-date harvest data for Alaska's subsistence fisheries is essential for effective fisheries management and for providing subsistence fishing opportunities. As a step towards that goal, a working group of federal, state, and tribal representatives, convened as part of U.S. Fish and Wildlife Service (USFWS) Fishery Information Service (FIS) Study No. 00-017. The group recommended maintenance of a comprehensive database on statewide subsistence fisheries harvests with annual updates and publication of annual reports on these harvests. The working group also stressed improving access to harvest data collected through annual harvest monitoring programs. In response, through FIS projects 00-017 and 01-107, the Alaska Subsistence Fisheries Database (ASFDB) was enhanced and an annual Alaska subsistence fisheries report series was initiated. In addition, the Working Group developed a set of "guiding principles" for "a unified subsistence fisheries harvest assessment program in Alaska," which are listed in Table 1.

The project summarized in this final report, FIS 04-751, built upon several of the initiatives begun under FIS 00-017 and FIS 01-107. The overall goal was to continue to implement some of the recommendations of the Subsistence Fisheries Harvest Assessment Working Group (SFHAWG) in its "Statewide Subsistence Fisheries Harvest Monitoring Strategy" report (SFHAWG 2000) pertaining to database development, dissemination of information, and assisting public access to and use of the harvest data. These recommendations included the following (from Appendix B in SFHAWG 2000):

J.4. A statewide written annual report is necessary. The Working Group recommends that it provide an overview of Alaska subsistence fisheries, be prepared by ADF&G Division of Subsistence and other cooperating organizations, and follow the prototype developed by this project.

J.7. The Alaska Subsistence Fisheries Database maintained by the Division of Subsistence of ADF&G must continue to be the primary repository of subsistence fisheries harvest data.

J.8. Consideration should be given to using the Internet to report harvest assessment data and other program information through the ADF&G Division of Subsistence Web site. However, this should not be the exclusive means of reporting these data because public access to the Internet is not universal.

K.2. Electronic data should be archived with the Division of Subsistence of ADF&G, as the basis of the Alaska Subsistence Fisheries Database. The database must be updated in a timely manner.

Table 2 summarizes ADF&G Division of Subsistence staffing for database development and production of the annual subsistence salmon reports for the duration of this project.

OBJECTIVES

As listed in the investigation plan, this 3-year project had the following objectives:

1. Update the Alaska Subsistence Fisheries Database (ASFDB) with data from state and federally managed subsistence salmon harvest assessment programs for 2003, 2004, and 2005, and identify and add historic (pre-1988) salmon fisheries information.
2. Expand the database to include results from programs for nonsalmon fish and marine invertebrates for 2003, 2004, and 2005, and identify and add historic (pre-2003) nonsalmon fisheries information.
3. Continue development and operation of the Alaska Subsistence Fisheries Web Site to provide access to the most currently available data to the widest possible set of users.
4. Prepare and distribute annual reports on Alaska subsistence fisheries for 2003, 2004, and 2005.
5. Prepare and distribute stand-alone, regional components to the database on an annual basis.

METHODS

OBJECTIVE 1: UPDATE THE ALASKA SUBSISTENCE FISHERIES DATABASE (ASFDB)

For each study year, information management staff received data for each subsistence salmon harvest monitoring program and added the data to the database. A list of these programs appears in Table 3. Figure 1 depicts the salmon management areas in Alaska. An important development since the inception of the ASFDB was the creation of separate federal permit programs in some management areas (e.g., Southeastern Alaska and upper Copper River). Integration of data from these programs into the database was accomplished as a necessary step to maintain a complete statewide picture and to avoid the potential of double-counting harvest

records. The Appendix includes details about each harvest monitoring program. This appendix has been included in annual subsistence fisheries reports since 2003.

At the end of each calendar year, information management staff requested data from the managers of each of the annual harvest monitoring programs identified in Table 3. The data were in a variety of formats, reflecting the information systems used to store and process the source data. Program specific procedures were developed at the inception of the ASFDB to ingest, transform, and calculate statistics of interest for each of these data sets. Various utilities (e.g., DBMS/Copy, MS SQL Server Data Transformation Services, commercial application software, generic ODBC drivers, etc.) were used to ingest and transform the data sets received. The Statistical Package for the Social Sciences (SPSS) Version 11.5 was used to calculate estimates, using standardized procedures developed for the first versions of the ASFDB. Long-term storage of estimates occurred through the MS SQL Server operated by ADF&G, Division of Sport Fish, Research and Technical Services in Anchorage. Project funding allowed for access to this database server through cost-sharing with other applications on the server. The database structure for this project contains rules, constraints, and referential integrity to insure that data are stored completely and accurately. Daily incremental backups of the database occurred, and transaction logs were backed up hourly. A full backup occurred weekly. This ensured that no more than one hour of data editing would be lost in the unlikely event of a catastrophic failure. Details on database structure were made available to Division of Commercial Fisheries staff who are creating other subsistence-related fisheries databases. Coordination will continue to ensure compatibility between datasets maintained by either division.

In developing the database, the most complete data were used, which in many cases were more up to date than that reported in Area Management Reports (AMRs) and Fisheries Management Reports (FMRs). In most fisheries, reported harvests were expanded to account for unreturned permits or unsurveyed households. In a few cases, this resulted in a larger estimate than what appeared in those AMR/FMRs that routinely only summarize data from returned permits (the AMR/FMR for the Kodiak Area is an example.) Also, the database calculated harvest estimates first for all permit holders living in particular communities represented in the fishery, and then added these community estimates for a fishery total. This contrasts with the conventional expansion method for a few fisheries (for example, the Glennallen Subdistrict of the Prince William Sound Area) which only considers the total number of issued and returned permits in the expansion, and results in a slightly different estimate of the total harvest for those fisheries as reported in AMR/FMRs. The goal of the ASFDB is to provide consistent and systematic estimates for each community and each fishery, rather than to reiterate previously published data.

In addition to processing annual salmon harvest data for 2003, 2004, and 2005, staff identified and evaluated historic (pre-1988) salmon fisheries data. Fisheries and years that data sets are not available or for which estimates cannot be made were documented. See the “results” section for more detail.

Subsistence salmon harvest estimates for 2003, 2004, and 2005 were calculated and organized for 22 subsistence fisheries, mostly reflecting unique harvest assessment programs and regulatory structures. The ASFDB contains subsistence salmon harvest estimates by species, year, community of residence of permit holder, and gear type. The number of permits issued and returned each year is reported as well. Tables containing draft annual estimates were sent to regional authors for review and confirmation. Final estimates and their analyses were included in

the annual reports on Alaska subsistence salmon fisheries for 2003, 2004, and 2005 (objective 4) and were also available for distribution on CD.

OBJECTIVE 2: EVALUATE NONSALMON FISH AND MARINE INVERTEBRATE SUBSISTENCE HARVEST MONITORING PROGRAMS AND CONSIDER ADDING HARVEST DATA TO THE ASFDB

The ASFDB does not contain any information from harvest assessment programs for nonsalmon fish or marine invertebrates. Although not as geographically comprehensive as the harvest monitoring programs for subsistence salmon, a few state and federal programs (either annual or less frequent) exist for some nonsalmon and shellfish species. A list of these programs appears in Table 4. As described in the investigation plan, project managers intended to collect the data for the programs listed in Table 4 and add the data to the ASFDB, following the procedures described for salmon, above. However, following investigation of these programs and evaluation of their results, additional work on these datasets to transform them into a format compatible with the ASFDB did not occur. See the “results” section, below, for more discussion.

OBJECTIVE 3: DEVELOP THE ALASKA SUBSISTENCE FISHERIES WEB SITE

Project funds contributed to the operation, development, and management of web and database servers, including the incremental costs of needed developer software licenses for existing servers and base software. The Program Coordinator provided project, web and database administration support, and database and web site development. The Analyst/Programmer supported acquisition, conversion and importing of data sets into the database server, data analysis needed for the annual report, and development of the web site and distributable database.

When operational, the Alaska Subsistence Fisheries Web Site will be a public Internet site which provides most of the data query, reporting, and extraction capabilities previously available only through the MS Access database. The site will be located on a web server managed by the ADF&G Division of Sport Fish, Research and Technical Services in Anchorage. Project funding allowed for access to this database server through cost-sharing with other applications on the server. A specific web address will be set up for the Division of Subsistence. The web site is running on a Windows 2000 server and uses MS IIS 5 in conjunction with Macromedia’s Cold Fusion MX. Cold Fusion MX is scripting environment, which provides connectivity to enterprise data, and a suite of built-in application services to build and deploy dynamic content publishing systems. Applications developed in Cold Fusion MX connect to the data that reside in the MS SQL database server.

The web site will also allow users to search for and download annual reports for Alaska subsistence fisheries in PDF format, MS Access versions (statewide and regional) of databases, and user-driven query extracts in MS Excel format. When this final report was completed, the schedule for the remaining steps towards an operational web site was uncertain.

OBJECTIVE 4: PREPARE AND DISTRIBUTE ANNUAL REPORTS OF ALASKA SUBSISTENCE FISHERIES

As the data for each management area were finalized in the database, division researchers wrote chapters of the annual report with the year’s findings. The chapters include contextual information, as available, to help discuss trends in harvests, and include supplemental harvest

data, if available, to evaluate the results of the annual programs. The reports followed the same outline as those prepared for 1999 (ADF&G 2001), 2000 (ADF&G 2002), 2001 (ADF&G 2003a), and 2002 (ADF&G 2003b). In addition to chapters on each management area, the annual reports include a statewide overview chapter.

OBJECTIVE 5: PRODUCE REGIONAL COMPONENTS TO THE DATABASE

As this project matures, information management is transitioning to use of an enterprise-type database, such as MS SQL server for data security and processing, and broadening timely data access through the development and maintenance of an Internet site. However, the Internet should not be the exclusive means of reporting these data because public access to the Internet is not universal. The data will continue to be available in MS Access microcomputer file format in situations where Internet access is not practical. When this project began, processing a database the size of a multiyear, statewide dataset such as the ASFDB exceeded the capabilities of computers available to typical users. However, this limitation no longer exists. Regional data sets can be generated directly from the database. See further discussion under the “results” section, below.

RESULTS

OBJECTIVE 1: UPDATE THE DATABASE

Following the procedures described in the “methods” section above, the ASFDB was updated with data for salmon for 2003 (Brown 2005), 2004 (Fall et al. 2007a), and 2005 (Fall et al. 2007b), the 3 years of the project. Data from all active subsistence salmon harvest monitoring programs were included in these annual updates.

Part of this objective included identifying and adding “historic (pre-1988) salmon fisheries information” to the database. Table 5 lists the years for which harvest data are available in the ASFDB for each current subsistence salmon harvest monitoring program. Of the 22 programs listed, the ASFDB includes data for all years for 10 programs. For 4 other programs (Copper River Flats, Prince William Sound General District, Kodiak, and Chignik), the ASFDB coverage reflects the full extent to which permit-level records exist. For the other 8 programs, ASFDB coverage includes all years for which a database was developed. Earlier harvest data as reported in AMRs often represent hand-tallies of data from individual permit returns (for Bristol Bay and the Alaska Peninsula areas, for example). Summary data for these earlier years for districts and in some cases community of residence are available in AMR tables and can be added to the ASFDB. Expanding the permit-level database back in time for these fisheries, however, would be a time-consuming task that available project funds could not support. The Kuskokwim, Yukon, and Bristol Bay area harvest information is available in AMRs, but given the available project funds, could not be added into the ASFDB.

OBJECTIVE 2: NONSALMON FISH AND MARINE INVERTEBRATES

Staff evaluations of existing programs and datasets concluded that adding any additional programs to the database was premature or unwarranted in some cases because of incomplete coverage of the available data and consequent difficulties in interpretation and compatibility with the generally complete records for salmon fisheries. In other cases, devoting project resources to this task was unnecessary because the data were already generally available upon request from the responsible division in the ADF&G. Following is a synopsis of the study findings for each program.

Yakutat Area and Southeastern Alaska Area

For the Yakutat Area, state regulations require subsistence fishing permits for trout and char, in addition to salmon (5 AAC 01.680(a)). Also, the ADF&G issues subsistence permits for the taking of steelhead in the Situk and Ahrnklin rivers, with a guideline annual harvest limit of 300 steelhead (5 AAC 01.680(d)). Federal subsistence regulations for the Yakutat Area require a federal subsistence fishing permit for taking steelhead trout in the Situk and Ahrnklin rivers. Federal regulations also require permits for the taking of Dolly Varden and trout.

Southeastern Alaska Area

State regulations require subsistence fishing permits for trout, char, herring spawn on kelp, and eulachon in the Unuk River, in addition to salmon (5 AAC 01.730(a)). The department does not issue subsistence permits for the taking of steelhead, but steelhead taken incidentally in other subsistence fisheries are legally taken; these incidentally harvests must be reported on the permit calendar (5 AAC 01.730(i)). Federal subsistence fishing regulations require permits for the taking of steelhead, trout, grayling, or char. Although this information is collected and was requested, it was not made available to us. It would be cost prohibitive to go back to the original permits to extract these data for inclusion in the ASFDB.

Upper Copper River Nonsalmon Fish

Few permits are issued by ADF&G and it is uncertain if the data are a thorough representation of local subsistence harvests and uses. A report prepared for FIS Project 01-110 (Simeone and Kari 2004) is the best recent source on contemporary subsistence harvests and uses on nonsalmon fish in the upper Copper River basin. Data from that project are available in the Community Subsistence Information System (CSIS) (ADF&G 2007).

Prince William Sound Area Shrimp

Beginning April 15, 2001, ADF&G regulations required a permit for subsistence, personal use, or sport harvesting shrimp in the Prince William Sound Area. By Alaska Board of Fisheries action, the permit requirement was eliminated beginning in 2006. In the future, harvest data will be collected solely through the Division of Sport Fish statewide harvest survey mail-out. On the permits, fishers were asked to check a box on the permit as to whether they were participating as a sport, personal use, or subsistence fisher, but responses to this question were incomplete (Matt Miller, ADF&G Division of Sport Fish, personal communication, 2007). Results from the 5 years of this permit program are summarized in the Division of Sport Fish area management report for Prince William Sound (Marston 2005:56-58). The vast majority of permits were issued to residents of communities along the south-central Alaska road system. For example, of the 1,965 permits issued for 2005, 72% were issued to residents of Anchorage, the Mat-Su Borough, or the Kenai Peninsula Borough. In 2005, 278 (14%) subsistence shrimp permits were issued to residents of Prince William Sound communities, including 193 to Valdez, 56 to Cordova, 24 to Whittier, 3 to Chenega Bay, and 2 to Tatitlek. Because of the ready availability of these permit data through the Division of Sport Fish, it was unnecessary to devote project resources to conversion of the data to the ASFDB.

Kodiak Area Crab

State subsistence regulations require a permit for taking crab in the Kodiak Area (5 AAC 02.405). Subsistence fishers record harvests of crab on the same permit used for subsistence

salmon harvests. Because of uncertainties about the scope of the coverage of the subsistence crab harvest in the permit records, data requests for the Kodiak Area focused on salmon harvest information. Adding the crab data to the ASFDB must await future evaluation of the available information.

Bristol Bay Area Rainbow Trout

A federal permit program administered by the USFWS office in King Salmon began in 2003. No permits were issued in 2003 or 2004 (M. Edwards, USFWS, personal communication, 2004). Subsequently, the FSB eliminated the permit requirement. Periodic household surveys, as reported in the CSIS, provide harvest estimates for rainbow trout and other nonsalmon fish in the Bristol Bay Area. Also, the final report for FIS Project 02-034 includes harvest estimates for 8 communities in the Kvichak watershed (Igiugig, Iliamna, Kokhanok, Levelock, Newhalen, Nondalton, Pedro Bay, Port Alsworth) for a 12-month period from October 2002 through September 2003 (Krieg et al. 2005).

Kuskokwim Area Miscellaneous Finfish

For the most part, subsistence harvest data for nonsalmon fish are available only through periodic household surveys conducted in selected communities by the Division of Subsistence. Harvest data from these studies are available in the CSIS (ADF&G 2007). The exception is that in Bethel, collection of harvest data for nonsalmon fish was part of the post-season harvest survey conducted by ONC in collaboration with the Division of Subsistence from 2000 through 2004. Questions about nonsalmon fish harvests were dropped from the survey beginning in 2005. Nonsalmon fish harvests for Bethel were reported in annual fisheries reports for 2000 through 2004, inclusive. These data were routinely included in the annual update of the ASFDB as part of the Kuskokwim Area harvest monitoring program.

Yukon Area Miscellaneous Finfish

State regulations require subsistence permits for the taking of pike in waters of the Tolovana River drainage upstream of its confluence with the Tanana River, October 15 to April 14. Since 1993, subsistence harvest data for pike, sheefish, and whitefish harvests have been collected during the ADF&G subsistence salmon harvest monitoring survey. These data are summarized each year in annual reports prepared by the Division of Commercial Fisheries. How comprehensive these data are in comparison to the subsistence salmon information is uncertain, however. Therefore, limited project resources were not directed towards adding these data to the ASFDB. FIS Project 01-100 (Andersen et al. 2004) and FIS Project 02-037 (Brown et al. 2005) collected comprehensive harvest information for non-salmon fish in Koyukuk River communities and in the middle Yukon River communities of Grayling, Anvik, Shageluk, and Holy Cross, respectively.

Northwest Area

Beginning in 1994 and through 2004, post-season subsistence salmon harvest surveys conducted by the Division of Subsistence in selected communities of the Kotzebue Area also collected harvest data for sheefish, whitefish, and char/trout. These data have been routinely entered into the ASFDB. Summaries of the finding have appeared in the annual fisheries reports for 1999 through 2004. The post-season subsistence fisheries harvest monitoring program for the Kotzebue Area was discontinued beginning in 2005 due to lack of funding.

OBJECTIVE 3: DEVELOP WEB SITE

The website that will present the harvest information from the ASFDB to the public is currently in development, although exactly when it will be available is uncertain. Under agreements with the Division of Sport Fish, a prototype of online database systems has been developed for the CSIS and is still under review and revision. Recently, the Division of Commercial Fisheries has devoted significant resources to the development of an integrated fisheries harvest information system. Continued development of the SQL Server database and Cold Fusion interface on the ASFDB has paused in order to assess the viability of integrating subsistence fisheries data into the commercial fisheries system. This would achieve a department goal of integrating information technology resources and reduce the number of required access points for harvest information in general. In the interim, a subsistence fisheries information page has been developed with background on subsistence regulations (http://www.adfg.state.ak.us/special/special_fisheries/pers_substist_home.php) with a link on the Division of Subsistence website. Also, links to annual reports in PDF format have been placed on the Division's website.

OBJECTIVE 4: ANNUAL REPORTS

Annual reports were prepared for 2003 (Brown et al. 2003), 2004 (Fall et al. 2007a), and 2005 (Fall et al. 2007b). The annual report series presently covers the years 1999 through 2005. All 7 annual reports are available in PDF format at the Division of Subsistence webpage at www.subsistence.adfg.state.ak.us under "publications." These are also available at the Office of Subsistence Management web site at <http://alaska.fws.gov/asm/fisreports.cfm>.

OBJECTIVE 5: REGIONAL COMPONENTS TO THE DATABASE

With the proliferation of access to the Internet, it has become unnecessary to provide Microsoft access databases limited to regional information. Since the identification of this objective, evolving technology and end-user products have resulted in more users having Internet access than have a license for Microsoft Access. Given the limitations of Microsoft Access, viability of a regional product would become limited within 2 to 3 years, negating the benefits intended by this objective. In order to satisfy the needs of researchers seeking region-specific data, the database and interface provide a mechanism for extraction of regional data.

DISCUSSION

As noted at the outset of this report, reliable information about Alaska's subsistence fisheries is necessary for providing effective management and continued subsistence fishing opportunities. Reliable harvest data for particular fisheries assists managers, advisory bodies, regulatory boards, and the public to develop management and regulatory regimes that provide these opportunities. Participation rates and harvest levels are necessary indices for evaluating the performance of these regimes. The Alaska Subsistence Fisheries Database and the annual report series, along with annual fisheries management reports for particular management areas, are now the key sources of information about the many subsistence harvest monitoring programs in Alaska.

Based upon the data compiled in the ADFDB, what can be said about recent trends in Alaska subsistence salmon fisheries? Statewide harvest estimates from the ASFDB for 1994 through 2005 by species are summarized in Table 6. Figure 2 illustrates total subsistence salmon harvests from 1994 through 2005 based on data in the ASFDB. These data suggest stable to slightly declining subsistence harvests over the 12-year time span, with an estimated 12-year

average harvest of 1,112,078 salmon and an estimated recent 5-year annual average harvest of 1,005,158 salmon.

This comparison has at least 4 limitations, however. First, the trend only covers a 12-year time span. To address a longer perspective, data from the largest subsistence fisheries (Yukon, Kuskokwim, Bristol Bay, Copper River, Southeastern) need to be added to the ASFDB and methods need to be developed to address gaps in data coverage for particular areas or years. A second limitation for the trend analysis is that the large personal use fisheries in the Cook Inlet Area are missing from the statewide total. This results in an incomplete accounting of trends in the statewide “noncommercial, nonrecreational” fishery. The third limitation of the recent 12-year trend in subsistence salmon fisheries is incomplete coverage of the subsistence salmon fisheries in the Northwest Area. Kotzebue, the regional center, was not included in the post-season surveys in 1994, and 2002 through 2004. No data collection took place in any Kotzebue Area communities in 2005. In the years for which fairly complete coverage of this area’s subsistence salmon fishery took place, harvests were estimated at between 50,000 and 110,000 salmon. Absence of these estimates results in a significant gap in the statewide total. A fourth limitation for discussion of recent trends is the incomplete record of subsistence harvests for some subsistence fisheries or areas, due to low levels of participation in the harvest monitoring programs or the harvests of significant numbers of salmon for home use with rod and reel gear or removal from commercial catches that are not recorded on subsistence permits. (See, for example, Williams et al. *In prep*, on the Kodiak Area, and Walker *In prep* on the Southeastern Area).

Discussion of trends in subsistence harvests levels must also recognize that such trends are often indicative of changes in salmon abundance. Some of the past 12 years have had very low salmon returns, disastrous in some cases. For example, in several years, subsistence salmon fisheries along the Yukon and Kuskokwim Rivers were severely restricted and closed.

As presented in the annual report series, interpretation of annual variations and more long-term trends in subsistence fisheries is problematic in some cases because of the lack of collection of systematic contextual information. Recommendation E.1 by the SFHAWG (2000:B-15) stated:

Contextual information must be collected on a regular basis to assist in evaluating and interpreting the subsistence harvest data. Such information is available from users and other sources.

Finally, as noted above, one major subsistence harvest monitoring program (the Kotzebue Area) was eliminated in 2005 due to a loss of funding, and others may be eliminated or reduced in the coming years.

CONCLUSIONS

The critical importance of collecting, reporting, and evaluating information about Alaska’s subsistence fisheries has been demonstrated by this project and its two predecessors. This importance is two-fold: the information is necessary for fisheries management and for providing opportunities for subsistence uses.

Follow-up to progress made in this project is necessary regarding annual updates of harvest data and upgrades and expansion of the ASFDB and the website. Further progress requires commitment of funds and staff to complete the evaluation of existing subsistence fisheries data

sets and adding them to the ASFDB, if appropriate. Final steps towards access to the ASFDB on the Internet need to be taken.

However, uncertain funding raises questions not only about these necessary enhancements to the current programs, but about the sustainability of the annual subsistence harvest monitoring and assessment programs themselves. Subsistence fisheries sustain Alaska communities and are the priority consumptive use of fisheries resources under state and federal law, yet programs to monitor and assess these fisheries are at best only marginally funded and are at risk of further reduction or elimination.

Rather than cutting back on current subsistence fisheries harvest monitoring programs, continued and expanded outreach and further development of collaborative efforts to maintain and strengthen local support for these programs are needed. This was stated as a “cautionary note” in the conclusions of the final report for FIS Project 01-107, as follows:

While [area] workshop participants from tribes and other rural communities are in favor of subsistence fisheries harvest assessment, they report that support for such programs within their communities is not universal. Suspicions of misuse of data, respondent burden, the potential of being prosecuted for exceeding harvest limits, or puzzlement over why the information is needed are some still common reasons why not all fishers participate in the programs, or for why their participation might be tenuous.

Finally a broader range of information is needed for evaluation of trends and a better understanding of the cultural, economic, and social context of contemporary Alaska subsistence fisheries.

RECOMMENDATIONS

1. Consistent with the prior recommendation of the statewide working group, the ASFDB needs to continue to be updated annually. Additionally, the annual subsistence fisheries report series needs to continue to be published. Presently, no funding is available to continue either task. Production of the database and annual report would be best accomplished through permanent funding commitments, rather than through a competitive funding process as has been the case since the inception of the annual report series.
2. Data from the Cook Inlet personal use salmon fisheries should be added to the ASFDB, and a brief discussion of these fisheries should appear in future annual reports. The result would be a thorough presentation of the noncommercial, nonrecreational salmon fisheries in Alaska. Further, this step would address the present inconsistent treatment of personal use salmon fisheries in the ASFDB and annual reports.
3. The final steps need to be taken to make the ASFDB accessible through the Division of Subsistence web page.
4. Adding contextual information about Alaska’s subsistence fisheries, including photographs, maps, histories, TEK, and ethnographic descriptions, should be the next step in developing the web page. Information similar to that developed about the Yukon River subsistence salmon fishery in the late 1980s (ADF&G 1987a, 1987b, and 1988) should be designed for other subsistence fisheries. Information upon which to base these overviews can be drawn from existing descriptions (e.g. Fall et al. 1984 on Tyonek;

Andersen et al. 2004 on non-salmon fish in the Koyukuk River drainage; Brown et al. 2005 on non-salmon fish in several middle Yukon River communities; Georgette and Shiedt 2005 on whitefish in the Kotzebue Sound region), and from the findings of current research (e.g. FIS Project 07-452 on the Kvichak drainage subsistence salmon fishery in the Bristol Bay Area; FIS Project 06-252 on Yukon Flats non-salmon fish; FIS Project 06-253 on Middle Yukon River non-salmon fish). This suggestion is similar to Recommendation 2 for Project FIS 01-107 (Fall 2003:30)

5. Design, fund, and implement ethnographic studies of selected fisheries, modeled after FIS Project 01-100 (Andersen et al. 2004), FIS Project 02-040 (Georgette and Shiedt 2005), FIS Project 02-037 (Brown et al. 2005), and FIS Project 07-452 on the Kvichak drainage subsistence salmon fishery in the Bristol Bay Area.
6. Two recommendations from FIS Project 01-107 remain to be considered. First is Recommendation 7 (Fall 2003:30-31), which suggested that “a standing committee of mid-level resource managers and data management personnel” be established within ADF&G to continue the review of department subsistence fisheries harvest monitoring programs in light of the recommendations developed by the Working Group in FIS 00-017 and FIS 01-107. Technical review of data management and analysis procedures in each of these programs could be a priority for this committee. For example, as noted above, total subsistence harvest estimates developed for the ASFDB for each subsistence fishery treat each community of residence of permit holders as a separate stratum, thus recognizing differences in community harvest patterns. However, in some cases (such as the upper Copper River), the entire pool of permit holders is treated as a single stratum. Differences in published harvest estimates result. With the development of federal subsistence fisheries permit programs in some management areas, this technical review may need to involve federal management and data management personnel also.
7. A second recommendation from FIS Project 01-107 that merits timely consideration is Number 8 (Fall 2003:31), which suggested that “a workshop involving senior staff (e.g. ADF&G division directors and deputy commissioners) could provide direction through producing a policy paper to address issues of coordination” of subsistence harvest monitoring programs. The recommendation added that, “What is needed at this stage is a clear endorsement by agency leadership of the process begun by the Working Group and a commitment to developing a unified harvest assessment program consistent with the principles developed by this group.” Such a workshop, or discussion, has not taken place, but it remains important. Senior staff of federal agencies that now administer some subsistence fisheries harvest monitoring programs may need to be included in this discussion as well.

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TABLES AND FIGURES

Table 1.—Guiding principles developed by the statewide working group for a unified subsistence fisheries harvest assessment program in Alaska.

- 1) Collection of accurate harvest data is an essential component of any effective resource management program.
- 2) Both baseline and time series data are needed, with frequency of updates dependent upon management and user needs.
- 3) Partnerships strengthen harvest assessment programs.
- 4) New programs need to build upon successful existing programs and coordination of programs should be a primary goal.
- 5) Programs must be developed to fit local circumstances and needs.
- 6) Costs, including the potential for long term funding sources, must be considered when designing and modifying programs.
- 7) Programs need to foster communication and trust.
- 8) Ultimately, program success depends upon acceptance by the participants in the fishery.
- 9) Program results need to be available in a timely manner, understandable to the public, and readily accessible through both written reports and a centralized database.
- 10) Collection and application of traditional ecological knowledge and other contextual information are integral components of successful harvest assessment programs.
- 11) Confidentiality of information will be protected consistent with state and federal law.
- 12) Harvest assessment programs need to be subject to systematic and periodic evaluation.

Source: Fall 2003: 1

Table 2.–Division of Subsistence staffing for Study No. FIS 04-751.

Name	Title	Role & Time Frame
James Fall	Program Manager	Principal Investigator (2004; 2007); report writing
Robert Walker	Program Coordinator	Principal Investigator (2004); data management supervision
Jesse Dizard	Program Manager	Principal Investigator (2004 - 2006); report editing
Bridget Easley	Program Coordinator	Data management supervision, 2004 - 2005
Brian Davis	Program Coordinator	Data management supervision, 2005 - 2006
David Koster	Program Coordinator	Data management supervision, 2006 - 2007
Dave Caylor	Analyst/Programmer	Database development, 2004 - 2006
Jeannie Heltzel	Analyst/Programmer	Database development, 2006
Pippa Kenner	Subsistence Resource Specialist	Report editing, 2006 - 2007
Michael Turek	Subsistence Resource Specialist	Report writing, 2004 - 2007
Tracie Krauthoefer	Subsistence Resource Specialist	Report writing, 2004 - 2007
James Magdanz	Subsistence Resource Specialist	Report writing, 2007
Susan Georgette	Subsistence Resource Specialist	Report writing, 2004 - 2005
Caroline Brown	Subsistence Resource Specialist	Report writing, 2004 - 2007
James Simon	Regional Program Manager	Report writing and editing, 2003 - 2007

Table 3.—Annual harvest assessment programs for subsistence salmon in Alaska.

Area/Fishery	Responsible Agency(ies)
Southeast Alaska	ADF&G Division of Commercial Fisheries US Forest Service (coho salmon)
Upper Copper River	ADF&G Division of Sport Fish (all Alaska residents) National Park Service for federally-qualified fishers
Prince William Sound	
Copper River Flats	ADF&G Division of Commercial Fisheries
Eastern District	ADF&G Division of Commercial Fisheries
SW District	ADF&G Division of Commercial Fisheries
Cook Inlet	
Yentna River	ADF&G Division of Sport Fish
Tyonek	ADF&G Division of Subsistence
Seldovia	ADF&G Division of Subsistence
Port Graham	ADF&G Division of Subsistence
Kodiak	ADF&G Division of Commercial Fisheries
Chignik	ADF&G Division of Subsistence
Alaska Peninsula	ADF&G Division of Commercial Fisheries
Aleutian Islands	ADF&G Division of Commercial Fisheries
Bristol Bay	ADF&G Division of Subsistence
Kuskokwim	ADF&G Division of Subsistence
Yukon	ADF&G Division of Commercial Fisheries
Northwest	ADF&G Division of Subsistence (2003 & 2004); ADF&G Division of Commercial Fisheries (2005)

Table 4.—Harvest assessment programs for subsistence nonsalmon fish and marine invertebrates.

Area	Resource	Responsible Agency
Southeast	Steelhead	US Forest Service
Upper Copper River	Nonsalmon fish	ADF&G Division of Sport Fish
Prince William Sound	Shrimp	ADF&G Division of Sport Fish
Kodiak	Crab	ADF&G Division of Commercial Fisheries
Bristol Bay	Rainbow Trout	US Fish and Wildlife Service
Kuskowkim	Misc. finfish	ADF&G Division of Subsistence
Yukon	Misc. finfish	ADF&G Division of Commercial Fisheries
Northwest	Sheefish, whitefish, char	ADF&G Division of Subsistence

Note: list includes current annual programs only

Table 5.—Overview of coverage of annual subsistence fisheries harvest monitoring programs by year in the Alaska Subsistence Fisheries Database.

Area/Fishery	Years of Coverage	Notes
Southeast Alaska	1985 - 2005	
Upper Copper River		
Batzulnetas	1987 - 2005	Includes all years of the harvest assessment program.
Glennallen	1988 - 2005	Includes state and federal permits
Chitina - state	1988 - 2005	
Chitina - federal	2002 - 2005	Includes all years of separate federal permit
Prince William Sound		
Copper River Flats	1965 - 2005	
Eastern District	1988 - 2005	Includes all years of present harvest assessment program
SW District	1988 - 2005	Includes all years of present harvest assessment program
General	1960 - 2005	
Cook Inlet		
Yentna River	1996 - 2005	Includes all years of the harvest assessment program.
Tyonek	1980 - 2005	Includes all years of the harvest assessment program.
Seldovia	1996 - 2005	Includes all years of present harvest assessment program
Port Graham	1981 - 2005	Includes all years of present harvest assessment program
Kodiak	1981 - 2005	
Chignik	1980 - 2005	
Alaska Peninsula	1985 - 2005	
Aleutian Islands		
Adak	1988 - 2005	Includes all years of present harvest assessment program
Unalaska	1985 - 2005	
Bristol Bay	1983 - 2005	
Kuskokwim	1989 - 2005	
Yukon	1992 - 2005	
Northwest	1975 - 2005	Program had very incomplete coverage until 1994

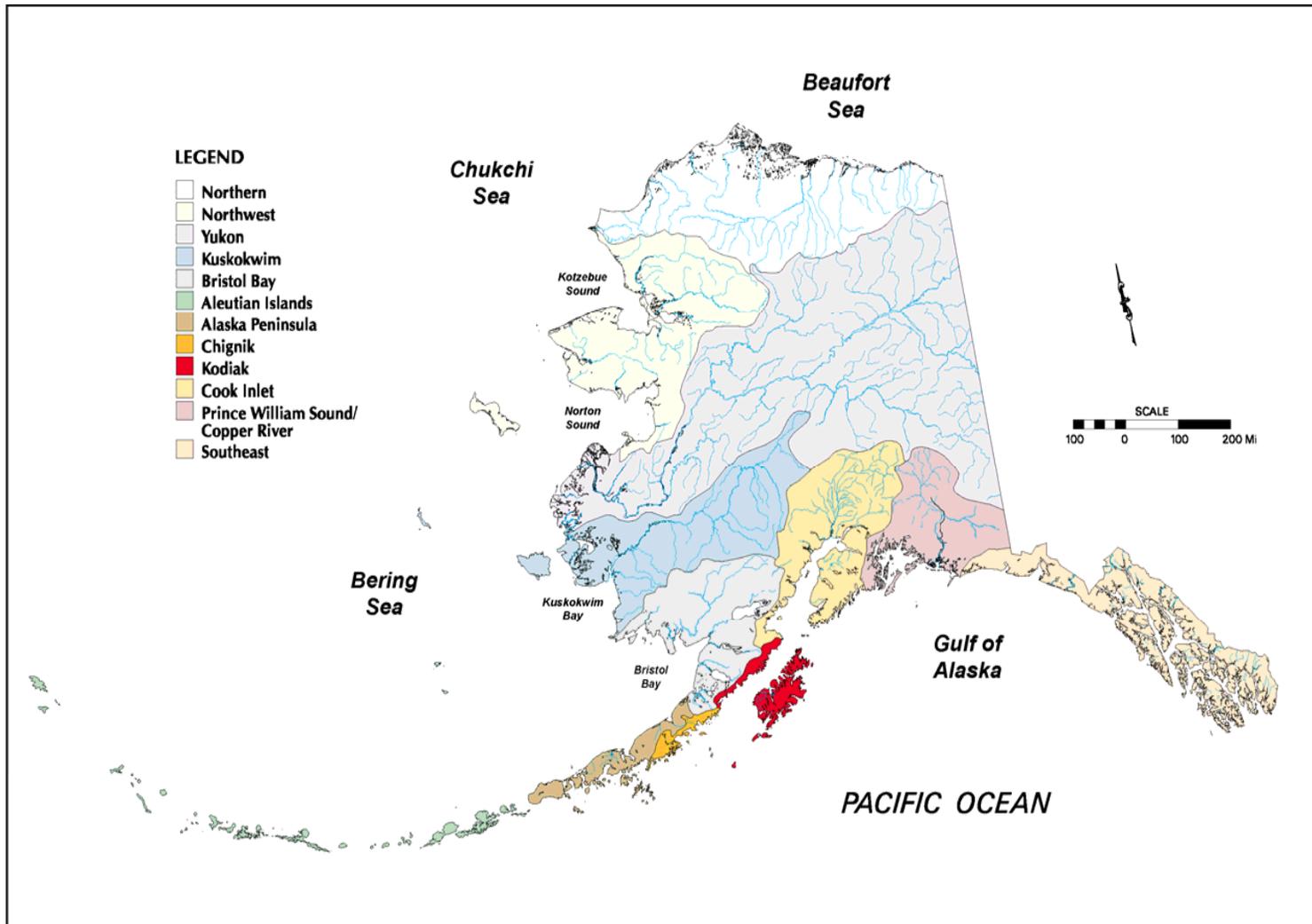


Figure 1.—Alaska subsistence fisheries areas.

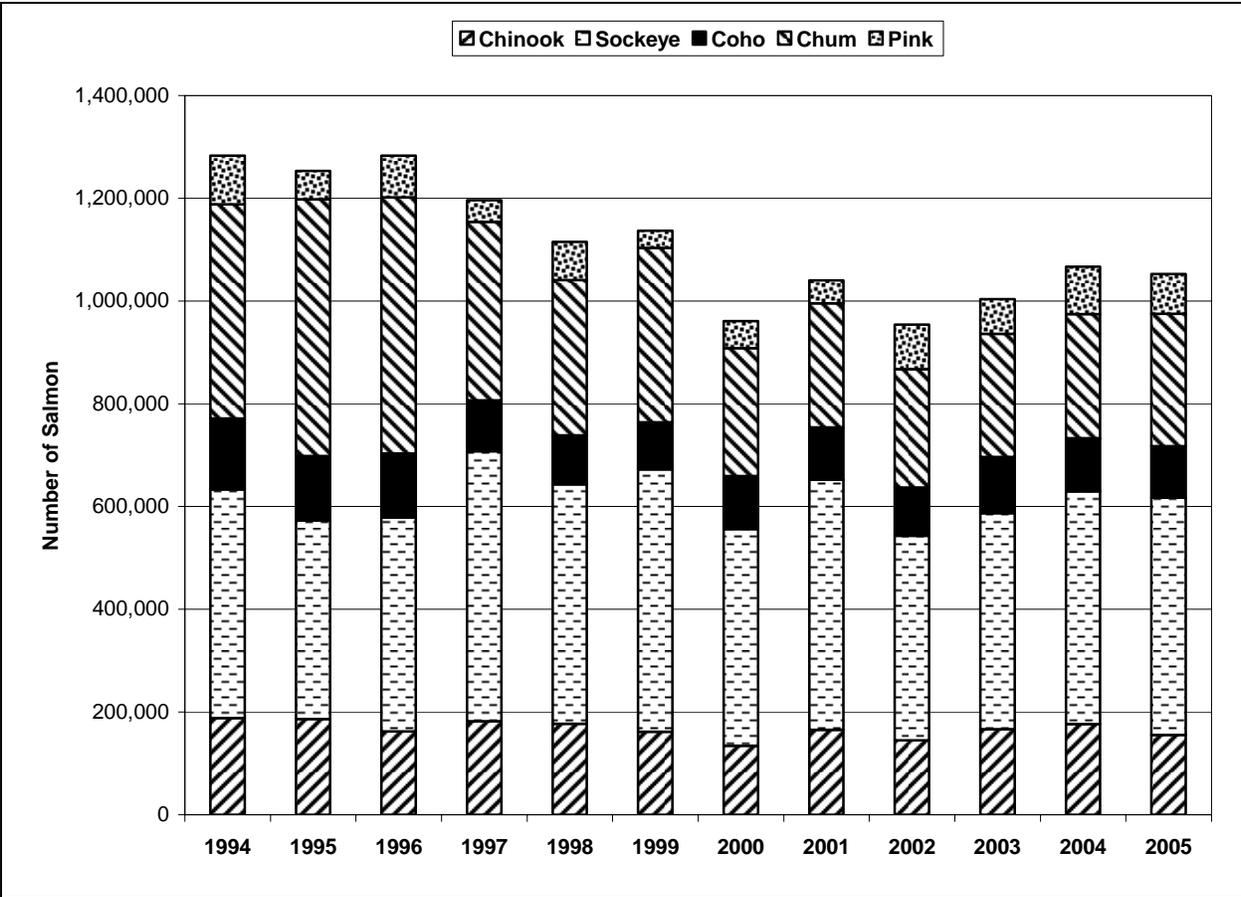


Figure 2.—Alaska subsistence salmon harvests, 1994-2005.

APPENDIX: METHODS

INTRODUCTION

The estimated and reported harvests presented in this report result from the efforts of many people: subsistence fishers who record their harvests on permits or catch calendars; residents of rural communities who volunteer subsistence fishing information during annual household surveys; people who respond to mailed inquiries about their subsistence fishing activities; cooperating local government offices and businesses; and employees of numerous tribal organizations, three Alaska Department of Fish and Game (ADFG) divisions, and the National Park Service.

More than two-dozen annual harvest assessment projects are supported by the efforts of these people and organizations. Most of these projects were designed independently of the others, were initially quite different from one another, and have been further modified over time. Today, they produce results that are not always comparable across fisheries.

Most of these annual projects are conducted in order to satisfy specific reporting requirements such as the inclusion of subsistence fish harvest information in the ADFG Division of Commercial Fisheries and Division of Sport Fish annual management reports. To the extent that agency or regional reporting requirements vary, different report authors may summarize subsistence harvest information differently—in more or less detail, for example—making the summary results even less comparable across fisheries.

This Alaska Subsistence Fisheries 2004 Annual Report, along with the Alaska Subsistence Fisheries Database upon which many of its tables are based, is a statewide compilation of subsistence harvest information from all of the individual harvest assessment projects. Because Alaska's individual harvest assessment projects vary widely in the methods they use and the information they report, special measures were necessary before some of their results became compatible with this statewide approach. Results from some of the individual harvest assessment projects are reported here without modification, while the data from other projects were reanalyzed for more detail or otherwise distilled into more compatible and more combinable results.

This appendix provides brief overviews of how each subsistence salmon fishery's results in this report were arrived at and what, if any, special measures were taken to modify individual harvest assessment project findings into formats compatible with this statewide compilation.

Project descriptions appearing in this appendix appear in the same order their corresponding fisheries were discussed in the main body of the report. (See table of contents.)

NORTHWEST ALASKA: NORTON SOUND – PORT CLARENCE AREA

Data Sources

- Household surveys
- Subsistence fishing permits
- Test fishery records

Annual Harvest Assessment Project – Tasks

- Division of Commercial Fisheries
 - Issued subsistence fishing permits, required in some fishing areas
 - Conducted household surveys in Unalakleet and Shaktoolik
 - Compiled reported harvest data from returned permits and household surveys into Excel spreadsheets
 - Distributed salmon harvested by ADFG test fisheries to local communities and kept records of how many were distributed to each village by species
 - Provided fishing permit and test fishery data to Division of Subsistence

Annual Harvest Assessment Project – Analysis

- Household surveys
 - Reported harvests were analyzed separately by type.
 - Subsistence harvests (harvested under subsistence regulations)
 - Commercial harvests retained for home use
 - Rod and reel harvests (by regulation, these are sport fishing harvests in most areas, but subsistence harvests in others—accurate separation not possible)
 - Reported harvests expanded to community harvest estimates within each of two harvest strata
 - Usually fish
 - Do not usually fish
 - Harvest estimates
 - For community i , species j : $E_{i,j} = \sum_{k=1}^2 \left((N_{i,k} / n_{i,k}) \times R_{i,j,k} \right)$, where...
 - E = estimated harvest,
 - R = reported harvest,
 - N = total number of households,
 - n = number of households sampled, and
 - k = harvest stratum.
 - For species j fishery total: $E_j = \sum_{i=1}^n E_{i,j}$, where...
 - E = estimated harvest and
 - i = community

NORTHWEST ALASKA: NORTON SOUND – PORT CLARENCE AREA (Continued)

- Subsistence fishing permits
 - Reported harvests by permit area—as compiled by Division of Commercial Fisheries—are included in project tables.
 - Reported harvests are not expanded into community estimates.
- Test fishery records
 - Salmon harvested by ADFG test fisheries and distributed to communities are included in results tables.

Statewide Compilation – Included Data and Special Measures

- Results of five types are included in the report tables.
 - Subsistence harvests from household surveys
 - Subsistence permit harvests
 - Commercial harvests retained for home use
 - Rod and reel harvests
 - Test fishery harvests distributed to communities
- No special measures were necessary to include project results in this statewide report.

NORTHWEST ALASKA: KOTZEBUE AREA

Note: the information below describes how data have been collected and analyzed for the Kotzebue Area in the past. These data appear in the Alaska Subsistence Fisheries Database and in historic tables in this annual report. However, no subsistence fisheries data collection program occurred in the Kotzebue Area for 2005 due to lack of funding.

Data Sources

- Household surveys
- Test fishery records

Annual Harvest Assessment Project – Tasks

- Division of Subsistence
 - Coordinated postseason household survey process, conducted surveys
 - Conducted analysis of data from all sources
 - Provided results to Division of Commercial Fisheries for inclusion in annual management report
 - Included more detailed results in annual Northwest Alaska subsistence salmon report
- Division of Commercial Fisheries
 - Distributed salmon harvested by ADFG test fisheries to local communities and kept records of how many were distributed to each village by species
 - Provided test fishery data to Division of Subsistence

Annual Harvest Assessment Project – Analysis

- Household surveys
 - Reported harvests were analyzed separately by type.
 - Subsistence harvests (harvested under subsistence regulations)
 - Commercial harvests retained for home use
 - Rod and reel harvests (by regulation, these are sport fishing harvests)
 - Reported harvests expanded to community harvest estimates within each of two harvest strata
 - Usually fish
 - Do not usually fish
 - Harvest estimates
 - For community i , species j : $E_{i,j} = \sum_{k=1}^2 \left((N_{i,k} / n_{i,k}) \times R_{i,j,k} \right)$, where...
 - E = estimated harvest,
 - R = reported harvest,
 - N = total number of households,
 - n = number of households sampled, and
 - k = harvest stratum.

NORTHWEST ALASKA: KOTZEBUE AREA (Continued)

- For species j fishery total: $E_j = \sum_{i=1}^n E_{i,j}$, where...
 - E = estimated harvest and
 - i = community
- Test fishery records
 - Salmon harvested by ADFG test fisheries and distributed to communities are included in results tables.

Statewide Compilation – Included Data and Special Measures

- Results of four types are included in the report tables.
 - Subsistence harvests from household surveys
 - Commercial harvests retained for home use
 - Rod and reel harvests
 - Test fishery harvests distributed to communities
- No special measures were necessary to include project results in this statewide report.

YUKON AREA

Data Sources

- Household surveys
- Harvest calendars
- Subsistence fishing permits
- Personal use fishing permits
- Test fishery records

Annual Harvest Assessment Project – Tasks

- Division of Commercial Fisheries
 - Distributed preseason subsistence harvest calendars to selected households
 - Coordinated postseason household survey process, conducted surveys
 - Distributed salmon harvested by ADFG test fisheries to local communities and kept records of how many were distributed to each village by species
 - Conducted detailed analysis of data from all sources
 - Included detailed results in annual Yukon River drainage subsistence salmon report
 - Provided selected raw data to Division of Division of Subsistence
 - Provided analysis results to Division of Division of Subsistence

Annual Harvest Assessment Project – Analysis

- Household surveys
 - Reported harvests expanded to community harvest estimates within each of five harvest strata
 - Unknown
 - Do not fish
 - Light harvester
 - Medium harvester
 - Heavy harvester
 - Harvest estimates
 - For community i , species j : $E_{i,j} = \sum_{k=1}^5 \left((N_{i,k} / n_{i,k}) \times R_{i,j,k} \right)$, where...
 - E = estimated harvest,
 - R = reported harvest,
 - N = total number of households,
 - n = number of households sampled, and
 - k = harvest stratum.
 - For species j fishery total: $E_j = \sum_{i=1}^n E_{i,j}$, where...
 - E = estimated harvest and
 - i = community

YUKON AREA (Continued)

- Harvest calendars
 - Not normally calculated into harvest estimates
 - Data may substitute for survey if household not contacted
 - Special treatment of some cases, e.g. may include calendar in survey estimates if calendar harvest is especially high
- Subsistence fishing permits
 - Reported harvests not expanded into community estimates—only reported harvests included in project results
 - Assumption is unreturned permits were not fished
- Personal use fishing permits
 - Reported harvests not expanded into community estimates—only reported harvests included in project results
 - Assumption is unreturned permits were not fished
- Test fishery records
 - Salmon harvested by ADFG test fisheries and distributed to communities reported at the community level.
 - Test fishery harvests sometimes included in community survey estimates

Statewide Compilation – Included Data and Special Measures

- Results of five types are included in the report tables.
 - Subsistence harvests from household surveys
 - Subsistence harvests from permits
 - Personal use harvests from permits
 - Commercial harvests retained for home use
 - Test fishery harvests distributed to communities
- Special measures necessary to include project results in this statewide report.
 - Subsistence harvests from household surveys
 - Division of Commercial Fisheries harvest estimates were adjusted to remove non-survey amounts (e.g. test fishery harvests) and to accommodate several Division of Commercial Fisheries special case adjustments.
 - Subsistence harvests from permits
 - Permit data analyzed to separate harvests by community
 - Permit-survey overlap removed, i.e. permit data from residents of surveyed communities not included.
 - Reported harvests were expanded into community estimates for non-response.
 - Harvest estimates
 - For community i , species j : $E_{i,j} = ((N_i/n_i) \times R_{i,j})$, where...
 - E = estimated harvest,
 - R = reported harvest,
 - N = number of permits issued, and
 - n = number of permits returned.

YUKON AREA (Continued)

- For species j fishery total: $E_j = \sum_{i=1}^n E_{i,j}$, where...
 - E = estimated harvest and
 - i = community
- Personal use harvests from permits
 - Permit data analyzed to separate harvests by community
 - Expansion for non-response unnecessary due to 100 percent response rate.
- Commercial harvests retained for home use
 - Information not available in Division of Commercial Fisheries project results
 - Household survey data analyzed according to established Division of Commercial Fisheries methods, i.e. reported harvests were expanded into community estimates using five harvest strata.
 - Harvest estimates
 - For community i , species j : $E_{i,j} = \sum_{k=1}^5 \left((N_{i,k} / n_{i,k}) \times R_{i,j,k} \right)$, where...
 - E = estimated harvest,
 - R = reported harvest,
 - N = total number of households,
 - n = number of households sampled, and
 - k = harvest stratum.
 - For species j fishery total: $E_j = \sum_{i=1}^n E_{i,j}$, where...
 - E = estimated harvest and
 - i = community
- Test fishery harvests distributed to communities
 - Distributions reported by community
 - No special measures necessary

KUSKOKWIM AREA

Data Sources

- Household surveys
- Harvest calendars

Annual Harvest Assessment Project – Tasks

- Division of Subsistence
 - Coordinated postseason household survey process
 - Conducted postseason household surveys in all surveyed communities except Bethel and Aniak
 - Conducted analysis of data from all sources
 - Provided results to Division of Commercial Fisheries for inclusion in annual management report
- Orutsarmiut Native Council (ONC)
 - Conducted postseason household surveys in Bethel
- Kuskokwim Native Association
 - Conducted postseason household surveys in Aniak

Annual Harvest Assessment Project – Analysis

- Household surveys
 - Three types of harvests were analyzed and reported together.
 - Subsistence harvests
 - Commercial harvests retained for home use
 - Rod and reel harvests
 - Reported harvests expanded to community harvest estimates using two harvest strata
 - Usually fish
 - Do not usually fish
 - Harvest estimates
 - For community i , species j : $E_{i,j} = \sum_{k=1}^2 \left((N_{i,k} / n_{i,k}) \times R_{i,j,k} \right)$, where...
 - E = estimated harvest,
 - R = reported harvest,
 - N = total number of households,
 - n = number of households sampled, and
 - k = harvest stratum.
 - For species j fishery total: $E_j = \sum_{i=1}^n E_{i,j}$, where...
 - E = estimated harvest and
 - i = community

KUSKOKWIM AREA (Continued)

- Harvest calendars
 - For surveyed households, harvests reported on calendars used in place of postseason survey reports; analyzed with survey data.
 - For households not surveyed, harvests reported on calendars used instead of household survey; analyzed with survey data.

Statewide Compilation – Included Data and Special Measures

- Results of three types are included in the report tables.
 - Subsistence harvests from household surveys
 - Commercial harvests retained for home use
 - Rod and reel harvests
- No special measures were necessary to include project results in this statewide report.

BRISTOL BAY AREA

Data Sources

- Subsistence fishing permits

Annual Harvest Assessment Project – Tasks

- Division of Subsistence
 - Issued subsistence salmon fishing permits
 - Conducted all data analysis
 - Provided results to Division of Commercial Fisheries for inclusion in annual management report

Annual Harvest Assessment Project – Analysis

- Subsistence fishing permits
 - Only subsistence harvest data analyzed.
 - Reported harvests expanded to community harvest estimates using a single harvest stratum.
 - Harvest estimates
 - For community i , species j : $E_{i,j} = ((N_i/n_i) \times R_{i,j})$, where...
 - E = estimated harvest,
 - R = reported harvest,
 - N = number of permits issued, and
 - n = number of permits returned.
 - For species j fishery total: $E_j = \sum_{i=1}^n E_{i,j}$, where...
 - E = estimated harvest and
 - i = community

Statewide Compilation – Included Data and Special Measures

- Only subsistence harvests from subsistence fishing permits included in report tables.
- No special measures were necessary to include project results in this statewide report.

CHIGNIK AREA

Data Sources

- Subsistence fishing permits
- Follow-up household surveys

Annual Harvest Assessment Project – Tasks

- Division of Subsistence
 - Coordinated issuing of subsistence salmon permits through local vendors, businesses, and public offices
 - Conducted follow-up household surveys
 - Conducted all data analysis
 - Provided results to Division of Commercial Fisheries for inclusion in annual management report

Annual Harvest Assessment Project – Analysis

- Subsistence fishing permits
 - Only subsistence harvest data analyzed.
 - Reported harvests expanded to community harvest estimates using a single harvest stratum.
- Follow-up household surveys
 - Used to supplement permit data for households not obtaining permits
 - Analyzed with permit data
 - Harvest estimates
 - For community i , species j : $E_{i,j} = ((N_i/n_i) \times R_{i,j})$, where...
 - E = estimated harvest,
 - R = reported harvest,
 - N = number of permits issued¹, and
 - n = number of permits returned.¹
 - For species j fishery total: $E_j = \sum_{i=1}^n E_{i,j}$, where...
 - E = estimated harvest and
 - i = community

Statewide Compilation – Included Data and Special Measures

- Only subsistence harvests included in report tables.
- No special measures were necessary to include project results in this statewide report.

¹ Includes number of households surveyed post-season, whether or not permits were issued.

ALASKA PENINSULA AREA

Data Sources

- Subsistence fishing permits

Annual Harvest Assessment Project – Tasks

- Division of Commercial Fisheries
 - Issued subsistence salmon permits
 - Conducted all data analysis
 - Published results in Division of Commercial Fisheries annual management report
 - Provided data to Division of Subsistence for further analysis and inclusion in statewide database and annual report

Annual Harvest Assessment Project – Analysis

- Subsistence fishing permits
 - Only subsistence harvest data analyzed.
 - Reported harvests from local communities expanded to community harvest estimates.
 - Non-local communities grouped into categories, then harvests expanded together to non-local estimate

Statewide Compilation – Included Data and Special Measures

- Only subsistence harvests from permits included in report tables.
- Data reanalyzed to generate community harvest estimates without grouping non-local communities.
- Harvest estimates
 - For community i , species j : $E_{i,j} = ((N_i/n_i) \times R_{i,j})$, where...
 - E = estimated harvest,
 - R = reported harvest,
 - N = number of permits issued, and
 - n = number of permits returned.
 - For species j fishery total: $E_j = \sum_{i=1}^n E_{i,j}$, where...
 - E = estimated harvest and
 - i = community

ALEUTIAN ISLANDS AREA: UNALASKA DISTRICT

Data Sources

- Subsistence fishing permits

Annual Harvest Assessment Project – Tasks

- Division of Commercial Fisheries
 - Issued subsistence salmon permits
 - Conducted all data analysis
 - Published results in Division of Commercial Fisheries annual management report
 - Provided data to Division of Subsistence for further analysis and inclusion in statewide database and annual report

Annual Harvest Assessment Project – Analysis

- Subsistence fishing permits
 - Only subsistence harvest data analyzed.
 - Reported harvests from local communities expanded to community harvest estimates.
 - Non-local communities grouped into categories, then harvests expanded together to non-local estimate

Statewide Compilation – Included Data and Special Measures

- Only subsistence harvests from permits included in report tables.
- Data reanalyzed to generate community harvest estimates without grouping non-local communities.
- Harvest estimates
 - For community i , species j : $E_{i,j} = ((N_i/n_i) \times R_{i,j})$, where...
 - E = estimated harvest,
 - R = reported harvest,
 - N = number of permits issued, and
 - n = number of permits returned.
 - For species j fishery total: $E_j = \sum_{i=1}^n E_{i,j}$, where...
 - E = estimated harvest and
 - i = community

ALEUTIAN ISLANDS AREA: ADAK DISTRICT

Data Sources

- Subsistence fishing permits

Annual Harvest Assessment Project – Tasks

- Division of Commercial Fisheries
 - Issued subsistence salmon permits
 - Conducted all data analysis
 - Published results in Division of Commercial Fisheries annual management report
 - Provided data to Division of Subsistence for further analysis and inclusion in statewide database and annual report

Annual Harvest Assessment Project – Analysis

- Subsistence fishing permits
 - Only subsistence harvest data analyzed.
 - Reported harvests from local communities expanded to community harvest estimates.
 - Non-local communities grouped into categories, then harvests expanded together to non-local estimate

Statewide Compilation – Included Data and Special Measures

- Only subsistence harvests from permits included in report tables.
- Data reanalyzed to generate community harvest estimates without grouping non-local communities.
- Harvest estimates
 - For community i , species j : $E_{i,j} = ((N_i/n_i) \times R_{i,j})$, where...
 - E = estimated harvest,
 - R = reported harvest,
 - N = number of permits issued, and
 - n = number of permits returned.
 - For species j fishery total: $E_j = \sum_{i=1}^n E_{i,j}$, where...
 - E = estimated harvest and
 - i = community

KODIAK AREA

Data Sources

- Subsistence fishing permits

Annual Harvest Assessment Project – Tasks

- Division of Commercial Fisheries
 - Issued subsistence salmon permits
 - Conducted all data analysis
 - Published results in Division of Commercial Fisheries annual management report
 - Provided data to Division of Subsistence for further analysis and inclusion in statewide database and annual report

Annual Harvest Assessment Project – Analysis

- Subsistence fishing permits
 - Only subsistence harvest data analyzed.
 - Reported harvests not expanded into estimates.
 - Harvests tabulated and reported only at the fishery level.

Statewide Compilation – Included Data and Special Measures

- Only subsistence harvests from permits included in report tables.
- Data reanalyzed to generate reported community harvests.

COOK INLET AREA: PORT GRAHAM & KOYUKTOLIK SUBDISTRICTS

Data Sources

- Subsistence fishing permits

Annual Harvest Assessment Project – Tasks

- Division of Subsistence
 - Issued subsistence fishing permits in Anchorage
 - Conducted all data analysis
 - Provided results to Division of Commercial Fisheries for inclusion in annual management report
- Port Graham Tribal Council
 - Issued subsistence fishing permits in Port Graham
 - Entered data into local database
 - Forwarded data to Division of Subsistence for analysis
- Nanwalek Tribal Council
 - Issued subsistence fishing permits in Nanwalek
 - Entered data into local database
 - Forwarded data to Division of Subsistence for analysis

Annual Harvest Assessment Project – Analysis

- Subsistence fishing permits
 - Reported harvests were analyzed separately by type.
 - Subsistence harvests
 - Rod and reel harvests
 - Harvests reported at the community level and not expanded into community harvest estimates.

Statewide Compilation – Included Data and Special Measures

- Results of two types are included in the report tables.
 - Subsistence harvests
 - Rod and reel harvests
- No special measures were necessary to include project results in this statewide report.

COOK INLET AREA: SELDOVIA FISHERY

Data Sources

- Subsistence fishing permits

Annual Harvest Assessment Project – Tasks

- Division of Subsistence
 - Issued subsistence fishing permits
 - Conducted all data analysis
 - Provided results to Division of Commercial Fisheries for inclusion in annual management report

Annual Harvest Assessment Project – Analysis

- Subsistence fishing permits
 - Only subsistence harvest data analyzed.
 - Reported harvests expanded into harvest estimates.
 - Single stratum expansion at the community level.
 - Harvest estimates
 - For community i , species j : $E_{i,j} = ((N_i/n_i) \times R_{i,j})$, where...
 - E = estimated harvest,
 - R = reported harvest,
 - N = number of permits issued, and
 - n = number of permits returned.
 - For species j fishery total: $E_j = \sum_{i=1}^n E_{i,j}$, where...
 - E = estimated harvest and
 - i = community

Statewide Compilation – Included Data and Special Measures

- Only subsistence harvests included in report tables.
- No special measures were necessary to include project results in this statewide report.

COOK INLET AREA: TYONEK SUBDISTRICT

Data Sources

- Subsistence fishing permits

Annual Harvest Assessment Project – Tasks

- Division of Subsistence
 - Issued subsistence fishing permits in Anchorage
 - Conducted all data analysis
 - Provided results to Division of Commercial Fisheries for inclusion in annual management report
- Tyonek Tribal Council
 - Issued subsistence fishing permits in Tyonek

Annual Harvest Assessment Project – Analysis

- Subsistence fishing permits
 - Only subsistence harvest data analyzed.
 - Reported harvests *not* expanded into harvest estimates.
 - Harvests reported at the community level.

Statewide Compilation – Included Data and Special Measures

- Only subsistence harvests included in report tables.
- No special measures were necessary to include project results in this statewide report.

COOK INLET AREA: UPPER YENTNA FISHERY

Data Sources

- Subsistence fishing permits

Annual Harvest Assessment Project – Tasks

- Division of Sport Fish
 - Issued subsistence fishing permits
 - Compiled data from returned permits into Excel spreadsheet
 - Provided data to Division of Subsistence for further analysis
- Division of Subsistence
 - Provided Division of Subsistence analysis results (see “Statewide Compilation” description below) to Division of Commercial Fisheries for inclusion in annual management report.

Annual Harvest Assessment Project – Analysis

- Subsistence fishing permits
 - Only subsistence harvest data analyzed.
 - Harvests reported at the fishery level and not expanded into estimates.

Statewide Compilation – Included Data and Special Measures

- Only subsistence harvests included in report tables.
- Reported harvests expanded into harvest estimates.
 - Single stratum expansion at the community level.
- Harvest estimates
 - For community i , species j : $E_{i,j} = ((N_i/n_i) \times R_{i,j})$, where...
 - E = estimated harvest,
 - R = reported harvest,
 - N = number of permits issued, and
 - n = number of permits returned.
 - For species j fishery total: $E_j = \sum_{i=1}^n E_{i,j}$, where...
 - E = estimated harvest and
 - i = community

PRINCE WILLIAM SOUND AREA: GLENNALLEN SUBDISTRICT

Data Sources

- State subsistence fishing permits
- Federal subsistence fishing permits

Annual Harvest Assessment Project(s) – Tasks

- Division of Sport Fish
 - Issued state subsistence fishing permits
 - Conducted all data analysis
 - Provided data to Division of Subsistence for further analysis
- National Park Service
 - Issued federal subsistence fishing permits
 - Compiled data from returned permits into Excel spreadsheet
 - Provided data to Division of Subsistence for further analysis

Annual Harvest Assessment Project(s) – Analysis

- State subsistence fishing permits
 - Only subsistence harvest data analyzed.
 - Detailed analysis guided by Division of Sport Fish operational plan
 - Reported harvests expanded into fishery-level estimates.
- Federal subsistence fishing permits
 - Only subsistence harvest data analyzed.
 - Data from returned permits compiled into Excel spreadsheet.

Statewide Compilation – Included Data and Special Measures

- Only subsistence harvests included in report tables.
- Data from the state and federal permit systems combined and controlled for state-federal data overlap.²
- Reported harvests expanded into harvest estimates.
 - Single stratum expansion at the community level.
- Harvest estimates
 - For community i , species j : $E_{i,j} = ((N_i/n_i) \times R_{i,j})$, where...
 - E = estimated harvest,
 - R = reported harvest,
 - N = number of permits issued, and
 - n = number of permits returned.
 - For species j fishery total: $E_j = \sum_{i=1}^n E_{i,j}$, where...
 - E = estimated harvest and
 - i = community

² State-federal data overlap occurs in the Glennallen fishery when a household obtains both state and federal permits and then reports the same harvests on each. When such cases were identified, only one permit's harvests were included in the combined data set.

PRINCE WILLIAM SOUND AREA: CHITINA SUBDISTRICT (STATE)

Data Sources

- State personal use fishing permits

Annual Harvest Assessment Project – Tasks

- Division of Sport Fish
 - Issued state personal use fishing permits
 - Conducted all data analysis
 - Provided data to Division of Subsistence for further analysis

Annual Harvest Assessment Project – Analysis

- State personal use fishing permits
 - Only personal use harvest data analyzed.
 - Detailed analysis guided by Division of Sport Fish operational plan
 - Reported harvests expanded to fishery-level estimates.

Statewide Compilation – Included Data and Special Measures

- Only personal use harvests included in report tables.
- Reported harvests expanded into harvest estimates.
 - Single stratum expansion at the community level.
- Harvest estimates
 - For community i , species j : $E_{i,j} = ((N_i/n_i) \times R_{i,j})$, where...
 - E = estimated harvest,
 - R = reported harvest,
 - N = number of permits issued, and
 - n = number of permits returned.
 - For species j fishery total: $E_j = \sum_{i=1}^n E_{i,j}$, where...
 - E = estimated harvest and
 - i = community

PRINCE WILLIAM SOUND AREA: CHITINA SUBDISTRICT (FEDERAL)

Data Sources

- Federal subsistence fishing permits

Annual Harvest Assessment Project – Tasks

- National Park Service
 - Issued federal subsistence fishing permits
 - Compiled data from returned permits into Excel spreadsheet
 - Provided data to Division of Subsistence for further analysis

Annual Harvest Assessment Project – Analysis

- Federal subsistence fishing permits
 - Only subsistence harvest data analyzed.
 - Data from returned permits compiled into Excel spreadsheet.

Statewide Compilation – Included Data and Special Measures

- Only subsistence harvests included in report tables.
- Reported harvests expanded into harvest estimates.
 - Single stratum expansion at the community level.
- Harvest estimates
 - For community i , species j : $E_{i,j} = ((N_i/n_i) \times R_{i,j})$, where...
 - E = estimated harvest,
 - R = reported harvest,
 - N = number of permits issued, and
 - n = number of permits returned.
 - For species j fishery total: $E_j = \sum_{i=1}^n E_{i,j}$, where...
 - E = estimated harvest and
 - i = community

PRINCE WILLIAM SOUND AREA: BATZULNETAS FISHERY

Data Sources

- State subsistence fishing permits
- Federal subsistence fishing permits
 - Only one permit issued

Annual Harvest Assessment Project – Tasks

- Division of Sport Fish
 - Available to issue permits if requested (none were)
- National Park Service
 - Issued federal subsistence fishing permit (only one)
 - Provided data to Division of Subsistence

Annual Harvest Assessment Project – Analysis

- State subsistence fishing permits
 - No data; no analysis
 - Similar treatment as other Copper River fisheries if any permits issued
- Federal subsistence fishing permits
 - Only subsistence harvest data included.
 - No analysis.

Statewide Compilation – Included Data and Special Measures

- Only subsistence harvests included in report tables.
- Harvest reported at the community level.

PRINCE WILLIAM SOUND AREA: COPPER RIVER DISTRICT

Data Sources

- Subsistence fishing permits

Annual Harvest Assessment Project – Tasks

- Division of Commercial Fisheries
 - Issued subsistence fishing permits
 - Compiled data from returned permits into Excel spreadsheet
 - Published results in Division of Commercial Fisheries annual management report
 - Provided data to Division of Subsistence for further analysis

Annual Harvest Assessment Project – Analysis

- Subsistence fishing permits
 - Only subsistence harvest data analyzed.
 - Reported harvests not expanded into harvest estimates.
 - Harvests reported at the fishery level.

Statewide Compilation – Included Data and Special Measures

- Only subsistence harvests included in report tables.
- Reported harvests expanded into harvest estimates.
 - Single stratum expansion at the community level.
- Harvest estimates
 - For community i , species j : $E_{i,j} = ((N_i/n_i) \times R_{i,j})$, where...
 - E = estimated harvest,
 - R = reported harvest,
 - N = number of permits issued, and
 - n = number of permits returned.
 - For species j fishery total: $E_j = \sum_{i=1}^n E_{i,j}$, where...
 - E = estimated harvest and
 - i = community

PRINCE WILLIAM SOUND AREA: EASTERN DISTRICT

Data Sources

- Subsistence fishing permits

Annual Harvest Assessment Project – Tasks

- Division of Commercial Fisheries
 - Coordinated issuing of permits
 - Issued subsistence fishing permits in Cordova
 - Compiled data from returned permits into Excel spreadsheet
 - Published results in Division of Commercial Fisheries annual management report
 - Provided data to Division of Subsistence for further analysis
- Tatitlek Tribal Council
 - Issued subsistence fishing permits in Tatitlek
 - Provided data from returned permits to Division of Commercial Fisheries

Annual Harvest Assessment Project – Analysis

- Subsistence fishing permits
 - Only subsistence harvest data analyzed.
 - Reported harvests *not* expanded into harvest estimates.
 - Harvests reported at the fishery level.

Statewide Compilation – Included Data and Special Measures

- Only subsistence harvests included in report tables.
- Reported harvests expanded into harvest estimates.
 - Single stratum expansion at the fishery level.
 - Community harvest estimates not possible from available data.
 - Division of Commercial Fisheries did include residence community in compiled data.
- Harvest estimates
 - For fishery total, species j : $E_j = ((N/n) \times R_j)$, where...
 - E = estimated harvest,
 - R = reported harvest,
 - N = number of permits issued, and
 - n = number of permits returned.

PRINCE WILLIAM SOUND AREA: SOUTHWESTERN DISTRICT

Data Sources

- Subsistence fishing permits

Annual Harvest Assessment Project – Tasks

- Division of Commercial Fisheries
 - Coordinated issuing of permits
 - Issued subsistence fishing permits in Cordova
 - Compiled data from returned permits into Excel spreadsheet
 - Published results in Division of Commercial Fisheries annual management report
 - Provided data to Division of Subsistence for further analysis
- Chenega Bay Tribal Council
 - Issued subsistence fishing permits in Chenega Bay
 - Provided data from returned permits to Division of Commercial Fisheries

Annual Harvest Assessment Project – Analysis

- Subsistence fishing permits
 - Only subsistence harvest data analyzed.
 - Reported harvests not expanded into harvest estimates.
 - Harvests reported at the fishery level.

Statewide Compilation – Included Data and Special Measures

- Only subsistence harvests included in report tables.
- Reported harvests expanded into harvest estimates.
 - Single stratum expansion at the fishery level.
 - Community harvest estimates not possible from available data.
 - Division of Commercial Fisheries did include residence community in compiled data.
- Harvest estimates
 - For fishery total, species j : $E_j = ((N/n) \times R_j)$, where...
 - E = estimated harvest,
 - R = reported harvest,
 - N = number of permits issued, and
 - n = number of permits returned.

PRINCE WILLIAM SOUND AREA: GENERAL

Data Sources

- Subsistence fishing permits

Annual Harvest Assessment Project – Tasks

- Division of Commercial Fisheries
 - Issued subsistence fishing permits
 - Compiled data from returned permits into Excel spreadsheet
 - Published results in Division of Commercial Fisheries annual management report
 - Provided data to Division of Subsistence for further analysis

Annual Harvest Assessment Project – Analysis

- Subsistence fishing permits
 - Only subsistence harvest data analyzed.
 - Reported harvests *not* expanded into harvest estimates.
 - Harvests reported at the fishery level.

Statewide Compilation – Included Data and Special Measures

- Only subsistence harvests included in report tables.
- Reported harvests expanded into harvest estimates.
 - Single stratum expansion at the community level.
- Harvest estimates
 - For community i , species j : $E_{i,j} = ((N_i/n_i) \times R_{i,j})$, where...
 - E = estimated harvest,
 - R = reported harvest,
 - N = number of permits issued, and
 - n = number of permits returned.
 - For species j fishery total: $E_j = \sum_{i=1}^n E_{i,j}$, where...
 - E = estimated harvest and
 - i = community

SOUTHEAST/YAKUTAT REGION

Data Sources

- Yakutat Management Area subsistence fishing permits
- Haines Management Area subsistence fishing permits
- Juneau Management Area subsistence and personal use fishing permits
- Sitka Management Area subsistence and personal use fishing permits
- Petersburg/Wrangell Management Area subsistence and personal use fishing permits
- Ketchikan Management Area subsistence and personal use fishing permits

Annual Harvest Assessment Project – Tasks

- Division of Commercial Fisheries
 - Issued subsistence fishing permits in each management area
 - Entered data from returned permits into Southeast/Yakutat Region’s “Alexander Database”
 - Published results in Division of Commercial Fisheries regional report to the Alaska Board of Fisheries
 - Provided data to Division of Subsistence for further analysis

Annual Harvest Assessment Project – Analysis

- Subsistence fishing permits
 - Only subsistence harvest data analyzed for Yakutat and Haines Management Areas
 - Permits in these management areas are for subsistence fishing only.
 - Subsistence and personal use harvest data analyzed for Juneau, Sitka, Petersburg/Wrangell, and Ketchikan Management Areas
 - Permits in these management areas are dual subsistence *and* personal use permits.
 - Reported harvests *not* expanded into harvest estimates.
 - Harvests reported at the fishery level.

Statewide Compilation – Included Data and Special Measures

- Results of two types are included in the report tables.
 - Subsistence harvests
 - Personal use harvests
- Reported harvests expanded into harvest estimates.
 - Single stratum expansion at the community level.
- Harvest estimates
 - For community i , species j : $E_{i,j} = ((N_i/n_i) \times R_{i,j})$, where...
 - E = estimated harvest,
 - R = reported harvest,
 - N = number of permits issued, and
 - n = number of permits returned.
 - For species j fishery total: $E_j = \sum_{i=1}^n E_{i,j}$, where...
 - E = estimated harvest and
 - i = community