

Summary information about new AKFIN Reports for NPFMC salmon bycatch genetics¹

Background

Since 2013, Rob Ames and Bob Ryznar at the Pacific States Marine Fish Commission (PSMFC) have been working with the Auke Bay Laboratories (ABL) Genetics Program to produce online Alaska Fisheries Information Network (AKFIN) reports that provide data about the prohibited species catch (PSC), hereafter and commonly referred to as bycatch, of salmon from pollock and other groundfish fisheries (NMFS 2016). Specifically, this includes salmon bycatch from 1) Bering Sea catch from all pollock catcher vessels, during plant deliveries, and all pollock catcher processor and mothership hauls at sea, and 2) Gulf of Alaska (GOA) catch from observed pollock catcher vessels, during plant deliveries, and observed non-pollock groundfish vessel hauls at sea (AFSC 2014). The AKFIN reports are useful tools for organizing genetic stock identification (GSI) analyses (e.g., Guthrie et al. 2017a,b; Kondzela et al. 2017). The AKFIN reports are updated weekly with data consolidated from the PSMFC AKFIN Program, Alaska Fisheries Science Center (AFSC) Observer Program, and Alaska Regional Office (AKR) database sources.

Two AKFIN reports have been produced with data from 2013 to present. The first report contains data at the genetic sample level. The second report contains Bering Sea-Aleutian Islands (BSAI) salmon bycatch data at the haul/offload level. A third report for the GOA salmon bycatch data at the haul/offload level from 2014 to present is under development. The reports contain data in tabular, map, and graphical formats. Numerous filters can be applied to access subsets of data; filter search criteria settings can be saved and re-used. The map format is especially useful for visualizing and comparing the spatial distribution of sample sets. The maps can be scaled from 2-500 km. The tabular results can be exported as several file types: pdf, Excel, PowerPoint, web archive, and data in csv, tab-delimited, or xml formats. The reports are restricted to users with access to confidential fishery data at the AFSC².

AKFIN Report Details

1. ABL Salmon Bycatch Report

This report provides data about the chum and Chinook salmon that were caught in the BSAI and GOA groundfish fisheries and genetically sampled by the North Pacific Groundfish and Halibut Observer Program of the National Marine Fisheries Service (NMFS). The report contains detailed and summary data views in tabular and map format.

Each record contains data associated with an individual specimen (Appendix 1). Records can be filtered by year, observer last name, cruise number, haul/offload number, delivery vessel code, trip target species code, NMFS reporting area, primary Alaska Department of Fish and Game (ADFG) statistical area³, fishery management plan (FMP) area, FMP subarea, salmon species

¹ Prepared by Chris Kondzela, Jeff Guyon and Chuck Guthrie of the NOAA Auke Bay Lab, Juneau AK

² Currently only AFSC stock assessors and genetics employees can access these reports, although reports could be made available to others who have signed the State of Alaska and NOAA non-disclosure of confidential information form.

³ In the “ABL Salmon Bycatch Report” and the “Genetic BSAI Salmon Bycatch Report”, the primary ADFG statistical area assigned to a record is either the ADFG area translated from the latitude and longitude reported by an

code, specimen number, sex, sample from haul or offload, haul/offload date, length (fork length in cm), and weight (kg). The “ABL Salmon Bycatch Report” is useful for 1) inventorying genetic samples received at ABL, and 2) sorting genetic data such as by time period or location for mixed-stock analyses on subsets of samples.

The map provides a view of the concentration and location of genetic samples in the BSAI and GOA. Genetic samples collected in the Bering Sea are representative of the total salmon bycatch from the Bering Sea pollock fishery, given the systematic sampling method that is employed in collecting chum and Chinook salmon bycatch samples. For this report, there are two map views available. In the first view, the primary ADFG statistical areas where bycatch samples were collected are highlighted by color, with darker color associated with higher numbers of samples (Fig. 1a). When the computer mouse hovers over a highlighted ADFG area, the number of genetic samples collected and the primary ADFG statistical area code are indicated. In the second view, the location of samples collected from single trawl hauls are indicated by red bubbles (maximum of 10,000 displayed; Fig. 1b). When the computer mouse hovers over a bubble on the map, information from that haul is indicated: the number of genetic samples collected, haul-end longitude, haul-end latitude, observer last name, cruise number, delivery vessel code, haul number, haul date, ADFG statistical area, salmon species code, and specimen number⁴.

at-sea observer or it is the ADFG area with the highest landed weight of the target species fished (assigned by the skipper or their proxy) when more than one area is associated with an offload. If an offload contains catch from multiple ADFG areas fished, a single ADFG area cannot be assigned to genetic samples collected from shoreside deliveries because the number of salmon caught in each area fished is unknown.

⁴ For hauls with more than one sample, the specimen number is provided for only one of the samples.

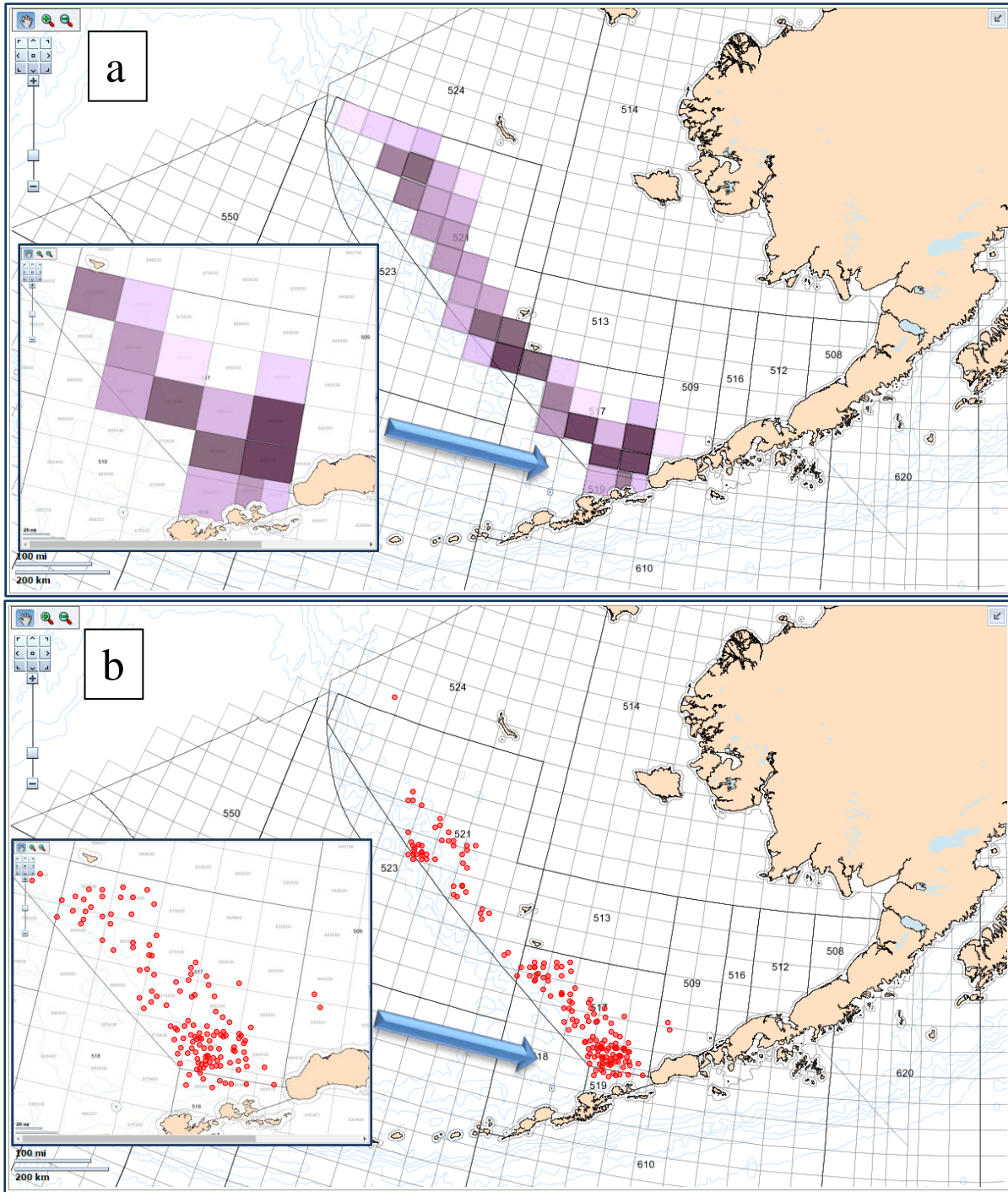


Figure 1. An example of the map produced in the AKFIN “ABL Salmon Bycatch Report” that a) highlights the counts of salmon bycatch samples by ADFG statistical area, and b) indicates the location of samples collected from single trawl hauls. To avoid disclosure of confidential fishery data, ADFG areas with fewer than three vessels have been removed in the top map and the haul locations are from a simulated dataset in the bottom map.

2. Genetic BSAI Salmon Bycatch Report

This report provides the census of all five species of Pacific salmon caught in the BSAI pollock trawl fisheries and the number of chum and Chinook salmon genetic samples collected by the North Pacific Groundfish and Halibut Observer Program. The report contains data views in detailed tabular format, and in both summary map and graphical formats.

Each record contains data associated with a single haul or offload (Appendix 2). Records can be filtered by observer last name, cruise number, year, catcher vessel code, trip target species code, haul/offload number, NMFS reporting area, primary ADFG statistical area, sample from haul or offload, haul/offload date, and week-ending date. The “Genetic BSAI Salmon Bycatch Report” is useful for checking that the genetic samples are spatially and temporally representative of the total Bering Sea chum and Chinook salmon bycatch (census) since the systematic sampling protocol of the BSAI salmon bycatch was implemented in 2011 by the North Pacific Groundfish and Halibut Observer Program (Faunce 2015). One in ten Chinook salmon and one in thirty chum salmon caught are genetically sampled from each trawl haul or offload (AFSC 2014).

The map provides a view of the location of areas fished and the concentration of total salmon bycatch and genetic samples. For this report, there are four map views available. In the first and second views, by chum and Chinook salmon, respectively, there are two data layers that can be chosen, one or both at a time, from the Data Layer box to the right of the map. The layer for proportion of salmon bycatch sampled highlights the primary ADFG statistical areas in which fishing activity took place with color in proportion to the salmon bycatch sampled (Fig. 2a), and includes hauls or offloads with zero salmon bycatch. In this view when the computer mouse hovers over an ADFG statistical area, the proportion of salmon bycatch sampled in that area, primary ADFG statistical area, number of genetic samples, and number of salmon bycatch from that area are shown. The layer for number of salmon bycatch produces a gray bubble sized proportionally on each primary ADFG statistical area fished. In this view when the computer mouse hovers over a bubble, the number of salmon bycatch and the primary ADFG statistical area are shown. When the first or second map views are chosen (chum or Chinook), the number of salmon bycatch and genetic samples per year are plotted as two graphs below the map. In the first graph, the number of salmon bycatch, number of samples, and proportion of salmon bycatch sampled is plotted by the week-end date. In the second graph, the number of salmon bycatch and number of genetic samples is plotted by the haul or offload delivery date. Multiple years may be plotted.

In the third and fourth map views, by chum and Chinook salmon, respectively, there are two data layers that can be chosen, one or both at a time, from the Data Layer box to the right of the map. In one layer, the locations of individual at-sea trawl hauls in which salmon were caught are indicated by red bubbles sized proportionally to the number of salmon bycatch (maximum of 10,000 displayed; Fig. 2b). When the computer mouse hovers over a red bubble on the map, the number of salmon bycatch and number of genetic samples collected, as well as other information from that haul is indicated: haul-end longitude, haul-end latitude, primary ADFG statistical area, haul date, cruise number, haul number, and proportion of salmon bycatch sampled. In the second layer, the locations of trawl hauls in which no salmon were caught are represented by small green bubbles on the map, with similar fishery information available.

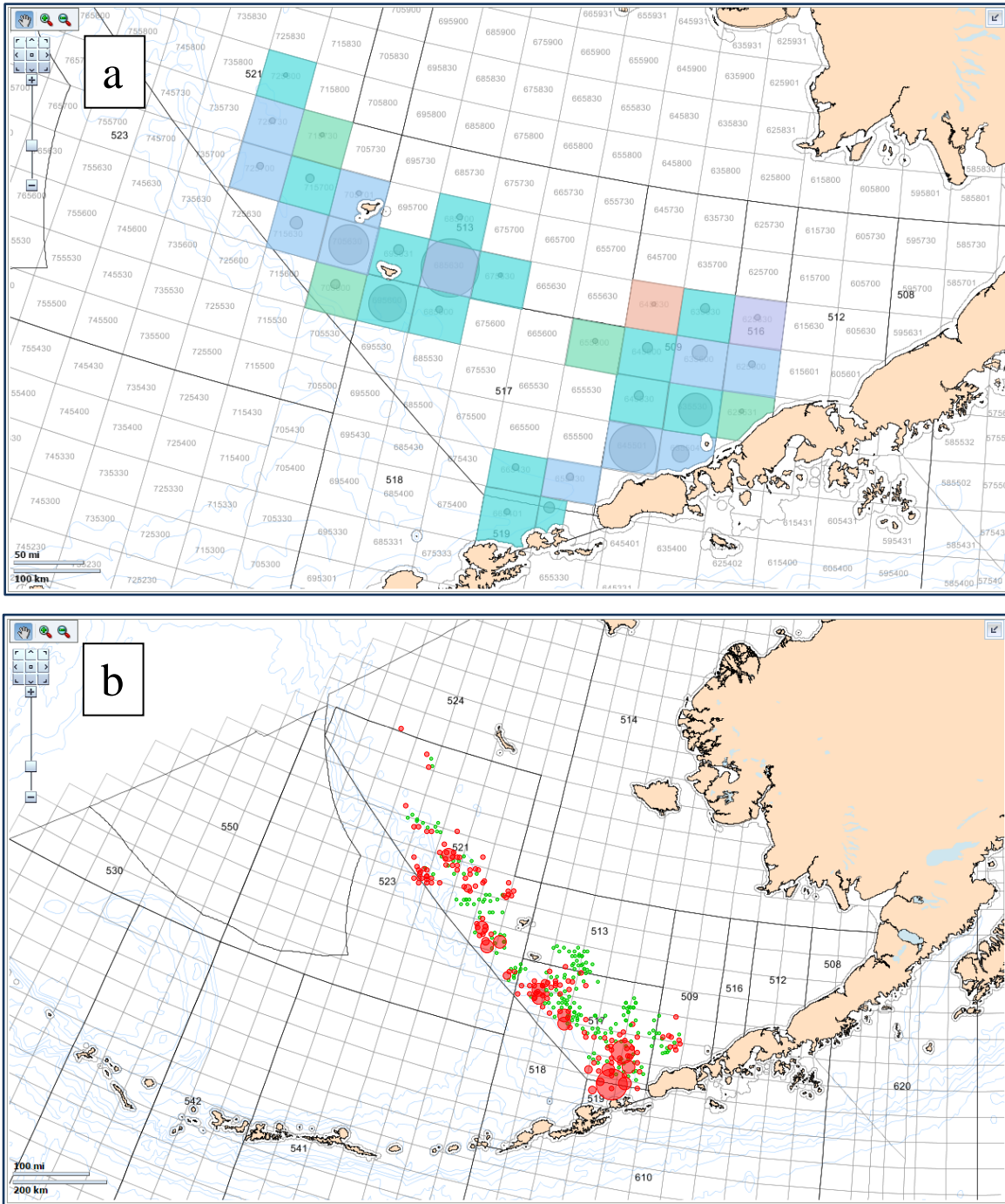


Figure 2. An example of the map produced in the AKFIN “Genetic BSAI Salmon Bycatch Report” that a) highlights the ADFG statistical areas by the proportion of salmon bycatch sampled, or the quantity of salmon bycatch per area by bubbles sized proportionally, or both (shown), and b) indicates the location of single trawl hauls: small green bubbles are locations fished where no salmon were caught and red bubbles are locations where salmon were caught, sized proportionally to the number of salmon bycatch. To avoid disclosure of confidential fishery data, ADFG areas with fewer than three vessels have been removed in the top map, and the haul locations are from a simulated dataset in the bottom map.

3. *Genetic GOA Salmon Bycatch Report (under development)*

This report provides the AKR bycatch estimates of Chinook and non-Chinook salmon (primarily chum salmon) for the Gulf of Alaska (GOA) groundfish trawl and hook-and-line fisheries, as well as the number of genetically sampled chum and Chinook salmon collected by the North Pacific Groundfish and Halibut Observer Program. The report is not available yet online.

Each record contains data associated with a single haul, offload, or hook-and-line trip, similar to that described in the “Genetic BSAI Salmon Bycatch Report” above.

The “Genetic GOA Salmon Bycatch Report” is useful for determining how spatially and temporally representative the genetic samples are of the estimated GOA salmon bycatch. On observed vessels in all groundfish fisheries, every Chinook and chum salmon in the biological sample of the catch is genetically sampled; at observed shoreside pollock deliveries, every Chinook and chum salmon available to the observer is genetically sampled (AFSC 2014).

Appendices

Appendix 1. Fields and field description in AKFIN report “ABL Salmon Bycatch Report”.

Field	Description
FIRST_NAME	NORPAC Observer's first name
LAST_NAME	NORPAC Observer's last name
CRUISE	Unique identifier for an observer cruise record.
PERMIT	Unique code identifying a Vessel or Processor.
SPECIMEN_NUMBER	A specimen number unique within a cruise and haul/offload.
HAUL_OFFLOAD	Unique number for an offload within a cruise/permit combination and for a haul within a trip.
YEAR	Year extracted from haul retrieval date or offload delivery end date.
SPECIES	Species
WEIGHT	Weight in kg of specimen.
LENGTH	Measured length of specimen.
SEX	Sex of specimen.
HAUL_OFFLOAD_DATE	Date of haul retrieval or date offload delivery was complete.
DELIVERY_VESSEL_ADFG	ADFG license number of the vessel that landed the catch.
SAMPLE_FROM	Offload delivery at plant or At-Sea haul.
LANDING_REPORT_ID	Unique identifier of the landing report.
NMFS_REPORTING_AREA	Code used to identify a federal reporting area.
PRIMARY_ADFG_STAT_AREA_CODE	Code for the ADFG state statistical area with either the ADFG area translated from the latitude and longitude reported by an at-sea observer or the ADFG area the highest landed weight of the target species fished when more than one area is associated with an offload.
ADFG_STAT_AREA_CODES	Codes for the ADFG state statistical areas where the harvest took place.
FMP_AREA	FMP Areas (BSAI, GULF, INSD).
FMP_SUBAREA	FMP Sub-areas (AI,BS,WG,CG,WY,SE,SEI,PWDI).
SPECIAL_AREA_CODES	Code representing the special regulatory area in which the fishing activity occurred, e.g., 'COBLZ', 'CVOA', etc. (if any)
LATDD_START	Latitude decimal degrees computed from the deployment latitude
LONDD_START	Longitude decimal degrees computed from the deployment longitude.
LATDD_END	Latitude decimal degrees computed from the retrieval latitude.
LONDD_END	Longitude decimal degrees computed from the retrieval longitude.
GEAR	Numeric value for type of fishing gear deployed.
TRIP_TARGET_CODE	Code representing the target fishery calculated for the trip.
BOTTOM_DEPTH_FATHOMS	Average bottom depth (fathoms) where fishing effort occurred.
FISHING_DEPTH_FATHOMS	Average fishing depth (fathoms) of fishing activity.
PERFORMANCE	A numeric code that indicates how well the fishing device operated.
TYPE_2_SCALE	Whether scales were collected (Y=yes).
TYPE_3_SEX_LENGTH_WEIGHT	Whether sex, length, and weight of specimen was recorded.
TYPE_4_FIN_CLIPS	Whether a fin clip was collected for genetic analysis.
TYPE_12_SNOOT	Whether snout was collected.
TYPE_13_ADIPOSE_PRESENT	Whether adipose is present.
BARCODE	Barcode
SALMON_SNOOT_BARCODE	Salmon snout barcode.
LENGTH_SEQ	Sequence generated unique identifier of an atl_length.
SAMPLE_SYSTEM	Code for sampling system employed by the observer.
SAMPLE_COMMENTS	Sample comments.

Appendix 2. Fields and field description in AKFIN report “Genetic BSAI Salmon Bycatch Report”.

Field	Description
FIRST_NAME	NORPAC Observer's First Name
LAST_NAME	NORPAC Observer's Last Name
CRUISE	Unique identifier for an observer cruise record.
PERMIT	Unique code identifying a Vessel or Processor.
HAUL_OFFLOAD_NUM	Unique number for an offload within a cruise/permit combination and for a haul within a trip.
YEAR	Year extracted from haul retrieval date or offload delivery end date.
HAUL_OR_DELIVERY_DATE	Date of haul retrieval or date offload delivery was complete.
WEEK_ENDING_DATE	Conversion of the HAUL_OR_DELIVERY_DATE to week end date. Week ending date is always a Saturday.
PROCESSING_SECTOR	Code representing processing operations in the Bering Sea and Aleutian Islands: CP = Catcher/Processor, M = Mothership, S = Shoreside.
VESSEL_ADFG	ADFG number of the mothership or catcher processor.
CATCHER_VESSEL_ADFG	ADFG license number of the vessel that landed the catch.
SAMPLE_FROM	Offload delivery at plant or At-Sea haul.
REPORT_ID	Unique identifier of the landing report.
NMFS_AREA	Code used to identify a federal reporting area.
PRIMARY_ADFG_STAT_AREA_CODE	Code for the ADFG state statistical area with either the ADFG area translated from the latitude and longitude reported by an at-sea observer or it is the ADFG area the highest landed weight of the target species fished when more than one area is associated with an offload.
ADFG_STAT_AREA_CODES	Codes for the ADFG state statistical areas where the harvest took place.
SPECIAL_AREA_CODES	Code representing the special regulatory area in which the fishing activity occurred, e.g., 'COBLZ', 'CVOA', etc. (if any)
LATDD_START	Latitude decimal degrees computed from the deployment latitude.
LONDD_START	Longitude decimal degrees computed from the deployment longitude.
LATDD_END	Latitude decimal degrees computed from the retrieval latitude.
LONDD_END	Longitude decimal degrees computed from the retrieval longitude.
GEAR	Numeric value for type of fishing gear deployed.
TRIP_TARGET_CODE	Code representing the target fishery calculated for the trip.
BOTTOM_DEPTH_FATHOMS	Average bottom depth (fathoms) where fishing effort occurred.
FISHING_DEPTH_FATHOMS	Average fishing depth (fathoms) of fishing activity.
PERFORMANCE	A numeric code that indicates how well the fishing device operated.
SPECIMEN_TYPE	Specimen type code.
SPECIMEN_TYPE_DESCRIPTION	Speciment type code description.
MALE_CHUM_FINCLIP	Count of male chum salmon that had a finclip genetic sample taken.
FEMALE_CHUM_FINCLIP	Count of female chum salmon that had a finclip genetic sample taken.
TOTAL_CHUM_FINCLIP	Total number of chum salmon that had a finclip genetic sample taken.
MALE_CHINOOK_FINCLIP	Count of male Chinook salmon that had a finclip genetic sample taken.
FEMALE_CHINOOK_FINCLIP	Count of female Chinook salmon that had a finclip genetic sample taken.
TOTAL_CHINOOK_FINCLIP	Total number of Chinook salmon that had a finclip genetic sample taken.
NUMBER_CHINOOK	The number of Chinook from the BS census.
NUMBER_CHUM	The number of chum from the BS census.
NUMBER_COHO	The number of coho from the BS census.
NUMBER_PINK	The number of pink from the BS census.
NUMBER_SOCKEYE	The number of sockeye from the BS census.
CHUM_PROPORTION	Proportion of census chum sampled for a genetic finclip.
CHINOOK_PROPORTION	Proportion of census Chinook sampled for a genetic finclip.

References

- AFSC (Alaska Fisheries Science Center). 2014. 2015 Observer sampling manual. Fisheries and Monitoring and Analysis Division, North Pacific Groundfish Observer Program. AFSC, 7600 Sand Point Way N.E., Seattle, Washington, 98115.
[http://www.afsc.noaa.gov/FMA/Manual_pdfs/MANUAL_pdfs/manual2015.pdf](http://www.afsc.noaa.gov/FMA/Manual_pages/MANUAL_pdfs/manual2015.pdf), accessed 1/31/2017.
- Faunce, C. H. 2015. Evolution of observer methods to obtain genetic material from Chinook salmon bycatch in the Alaska pollock fishery. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-AFSC-288, 28 p. <https://www.afsc.noaa.gov/Publications/AFSC-TM/NOAA-TM-AFSC-288.pdf>
- Guthrie, C. M. III, Hv. T. Nguyen, A. E. Thomson, and J. R. Guyon. 2017a. Genetic stock composition analysis of the Chinook salmon bycatch from the 2015 Bering Sea walleye pollock (*Gadus chalcogrammus*) trawl fishery. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-AFSC-342, 33 p. <http://www.afsc.noaa.gov/Publications/AFSC-TM/NOAA-TM-AFSC-342.pdf>
- Guthrie, C. M. III, Hv. T. Nguyen, A. E. Thomson, and J. R. Guyon. 2017b. Genetic stock composition analysis of Chinook salmon bycatch samples from the 2015 Gulf of Alaska trawl fisheries. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-AFSC-343, 33 p. <http://www.afsc.noaa.gov/Publications/AFSC-TM/NOAA-TM-AFSC-343.pdf>
- Kondzela, C. M., J. A. Whittle, S. C. Vulstek, Hv. T. Nguyen, and J. R. Guyon. 2017. Genetic stock composition analysis of chum salmon from the prohibited species catch of the 2015 Bering Sea walleye pollock trawl fishery and Gulf of Alaska groundfish fisheries. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-AFSC-345, 64 p. <http://www.afsc.noaa.gov/Publications/AFSC-TM/NOAA-TM-AFSC-345.pdf>
- NMFS (National Marine Fisheries Service). 2016. Catch Accounting System data. NMFS Alaska Regional Office. Data compiled by Alaska Fisheries Information Network for Alaska Fisheries Science Center, Juneau. [URL not publicly available as some information is confidential.]