



FISH PASSAGE CENTER

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MEMORANDUM

TO: Dr. Dan Goodman

Michele DeHart

FROM: Michele DeHart

DATE: March 4, 2008

RE: Response to Data Request – FPC Database

In response to your data request at the January 14, 2008 Fish Passage Center Oversight Board meeting, the Fish Passage Center has compiled the following descriptions of the data bases residing at the FPC. For each of the data bases we have responded to the questions in your January 23, email:

1. Where the "official" version is housed (and who updates and corrects it);
2. what the FPC role is in the design and implementation of the actual sampling and measurement;
3. how FPC obtains and verifies the data version which it uses, what the FPC use of the data is (what reports or displays); and
4. how FPC archives the data that are used in any reported analysis.

The following points summarize the detailed discussion.

- The vast majority of these data bases are comprised of data that are gathered from other primary sources, for example the US Army Corps of Engineers and the Pacific States Marine Fisheries Commission. These agencies are the primary database managers, and they maintain responsibility for managing and verifying their data. In the process of using these data from other primary sources the FPC communicates with the primary database managers regarding updates, verification and corrections.
- The FPC has a unique requirement to make all data that we utilize in carrying out assigned tasks readily available to the region and the public. This defines the Fish Passage Center data base structure and is actually a purpose of the data base structure.

- The FPC is the primary source for Smolt Monitoring Program data which is updated daily and includes many fields. The FPC is responsible for verification of the data and implements an established quality assurance process with each of the remote site staff.
- The FPC is the primary source for public access to analytical results, generated from the SMP data and other primary sources. These include passage characteristics such as fish travel time, and survival and results of analyses, such as smolt to adult return rates.

Cc Fish Passage Center Oversight Board

FPC currently maintains 4 SQL servers for its various databases (Figure 1). Of these, two are housing the official version of the data used for daily reports, web queries, and fulfilling data requests/analyses. These two SQL servers are named “SQL Main 3” and “SQL Main 4 New”. The other two SQL servers (“SQL Main 1” and “SQL Main 2”) are mirror copies of “SQL Main 3” and are used directly for the web queries. “SQL Main 1” is copied directly from “SQL Main 3”, while “SQL Main 2” is a copy of “SQL Main 1”. These mirror copies are automatically updated any time a database in the “SQL Main 3” server is updated. The FPC maintains these mirror copies for its web queries for security reasons. If data in “SQL Main 1” become corrupted, “SQL Main 2” is brought on-line without any negative impacts to the “official” copy on “SQL Main 3”. In addition to mirroring, all of FPC’s SQL servers are backed up daily to external hard-drives.

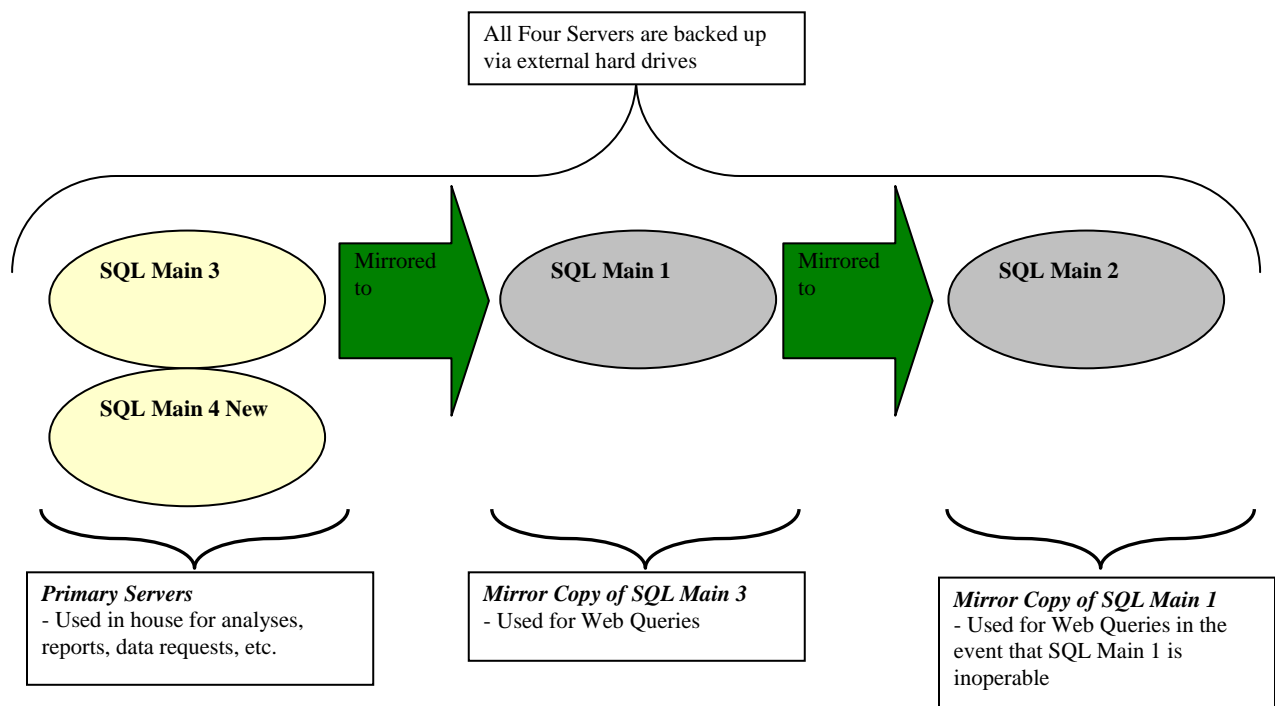


Figure 1. Schematic diagram of four servers maintained by FPC staff, their function, and back-up procedures.

Many of our databases contain hundreds of different tables, many of which are temporary tables that were developed for a single data request or analysis. Herein, we will attempt to answer your questions for each of the tables in our SQL Main 3 and SQL Main 4 New databases that are used on a regular basis by FPC Staff for generating daily reports, web queries, and fulfilling data requests/analyses. Tables whose uses include web-queries are those tables that are copied to the mirror databases (SQL Main 1 and SQL Main 2).

The FPC maintains a Procedures Manual that documents the various databases that are being used for different daily tasks and routine reports. Furthermore, FPC has documentation of which tables are being used in web queries and FPC Applications. Currently, FPC staff do not archive exactly which tables are used for particular data request and/or analysis, as this is variable among staff members. When data from the FPC databases are used for data requests and analyses, these data are copied into spreadsheets and are never removed from the databases. Furthermore, when staff fulfill data requests and analyses, they provide a brief explanation to the requestor as to what data were used and how. The FPC has archived copies of all memos generated in response to data requests and individual FPC staff members maintain an archive of all spreadsheets that were used for analyses and requests.

SQL Main 3

The SQL Main 3 server contains much of the data that the FPC uses to provide technical support to the fishery managers and information to the region. The types of data in this SQL server are variable, from project operations, to water quality, to data from the Smolt Monitoring Program. Within this SQL server, the FPC maintains 5 databases to house these data. Below is an explanation of each of these databases, the types of data stored in them, and their various uses.

Database Name: Flows

*Tables **dbo.bonmast**, **dbo.chjmast**, **dbo.coulmast**, **dbo.dwrmast**, **dbo.ihrmast**, **dbo.jdamast**, **dbo.lgrmast**, **dbo.lgsmast**, **dbo.lmnmast**, **dbo.mcnmast**, **dbo.prdmast**, **dbo.rismast**, **dbo.rrhmast**, **dbo.tdamast**, **dbo.wanmast**, **dbo.welmast*** – these tables contain unverified hourly project operations data (e.g., flow, spill, forebay elevation, tailwater elevation, etc.) from each of the above listed FCRPS Projects. These tables all contain the same types of data, only each project has a separate table. Most of these tables contain data from 2004 to present.

- 1) Official Location: SQL MAIN3
- 2) Maintained By: FPC staff
- 3) FPC Role in Design and Implementation of Sampling: FPC has no role in the design and implementation of sampling of these data.
- 4) Data Acquisition: Each day, FPC staff download these data from U.S. Army Corps of Engineers (COE) via the internet. An FPC program (newDoIt5.exe) parses these data and populates each table.
- 5) Data Verification: FPC does not verify or correct data in this database. Verified and corrected data are provided by the COE each month and are posted in a separate table in the Flows Database (see discussion of tables: *dbo.tbl_coe_hourly_flow* and *dbo.tbl.coe_mean_flow* below).
- 6) FPC Uses:
 - a. Data Requests and Analyses - FPC staff rely on these databases when compiling data requests and analyses that require project specific hourly flow, spill, or elevation data, particularly if extremely recent data are needed.
 - b. Daily Flow-Spill Report and Weekly Report – Each day, FPC publishes a report of daily average flow and spill for all projects throughout the Columbia River

Basin. Mean daily flow and spill levels are based on the unverified hourly data from various tables in this database. The daily report is available on the FPC website as a text file at <http://www.fpc.org/currentdaily/flowspil.txt>. Each Friday, this daily report is attached to the FPC Weekly Report.

- c. Tri-City Report – FPC compiles a daily report for the Tri-City Herald which contains project specific daily average flow and elevation data from these tables.

Table *dbo.tbl_coe_catch_flows_all* – this table contains average daily project operations data, based on the sampling times for each of the Smolt Monitoring Project (SMP) sites.

- 1) Official Location: SQL MAIN3
- 2) Maintained By: FPC staff
- 3) FPC Role in Design and Implementation of Sampling: FPC has no role in the design and implementation of collecting these data.
- 4) Data Acquisition: FPC data staff download corrected hourly project operations data from the COE (see discussion of table *dbo.tbl_coe_hourly_flow* below). Each year, the corrected hourly data are used to calculate daily average operations data for each SMP batch day (based on the start and end time of SMP sampling, usually 7:00am – 7:00pm).
- 5) Data Verification: The hourly data that go into creating this table are corrected by the COE. Therefore, FPC does not verify or correct the data further.
- 6) FPC Uses:
 - a. Data Requests and Analyses - FPC staff rely on these tables when compiling data requests and analyses that require historic passage index data.
 - b. Query of Historic Daily Passage Data for the Smolt Monitoring Project – This is a web query that allows users to download historic passage index data for all species at all SMP sites. Since the passage index relies on flow and spill data, these historic passage indices rely on the corrected flow and spill data in this table. This query can be found at:
<http://www.fpc.org/smolt/historicsmpsubmitdata.html>
There is also a query that allows users to generate a graph of historic passage index data. This query can be found at:
<http://www.fpc.org/smolt/historicsmpsubmitgraph.html>

Database Name: FPC

Table: *dbo.gbtdata* – this table contains Gas Bubble Trauma (GBT) data for the present year. At the end of each year, these data are moved into a separate table for that year (e.g., *dbo.gbtdata2005*).

- 1) Official Location: SQL MAIN3
- 2) Maintained By: FPC staff
- 3) FPC Role in Design and Implementation of Sampling: As the SMP coordinator, Jerry McCann is responsible for the design and implementation of sampling. Sampling at the GBT monitoring sites typically begins in April and continues throughout the spill season. Most sites conduct GBT sampling once per week (unless otherwise instructed). For each sample, sites attempt to examine 100 juveniles (of the most prevalent species) and record

GBT instances for each fish examined. FPC is the primary source of GBT data for the region.

- 4) Data Acquisition: GBT data are sent to Jerry McCann from GBT monitoring sites via e-mail, in the form of a table (*.dbf) and configuration file (*.cdx). A hard copy of the hand logs is also faxed to FPC for verification. Once receiving these files, Jerry runs an FPC application that updates the *dbo.gbtdata* on the FPC Database with new data from each site.
- 5) Data Verification: Prior to updating the table on the database, Jerry compares the data in the table to those in the faxed hand log. If significant problems arise, the site is contacted and instructed to correct and re-send their files.
- 6) FPC Uses:
 - a. Data Requests and Analyses - FPC staff rely on this database when compiling data requests and analyses inquiring about GBT.
 - b. In-Season Spill Management – Data from this table (and those for archived years) are used by FPC staff when providing technical support for the Fish Passage Advisory Committee (FPAC) regarding in-season spill management decisions.
 - c. Daily GBT Report and Weekly Report– Each time the *dbo.gbtdata* table is updated the FPC publishes a report of GBT sampling and results for all GBT monitoring sites. This report contains GBT data for each site over the most recent 2-week period and is posted on the FPC website as a text file at <http://www.fpc.org/currentdaily/gbtsum.txt>. Each Friday, a copy of this report is attached to the FPC weekly report.
 - d. GBT Annual Report and FPC Annual Report- In addition to the GBT section of its Annual Report, the FPC provides a separate annual report of GBT data to the US Army Corps of Engineers and to NOAA Fisheries to fulfill the requirements of the states' issued dissolved gas waiver permits. Data from this table are compiled and analyzed for these reports. These reports are both archived on the FPC website.
 - e. Web-Queries – The FPC website has web queries that allow users to download GBT data both from the current year and from historic years at <http://www.fpc.org/smolt/gasbubbletrauma.html>. Data generated by these queries come from this table.

Table: *dbo.leftgraph*, *dbo.tdggraph*, *dbo.tdgsum*– these tables contain temperature, barometric pressure, total gas pressure, and total dissolved gas (TDG) data for TDG monitoring sites throughout the Columbia River Basin.

dbo.leftgraph contains hourly data over the most recent two week period. This table is a mirror of *dbo.tdggraph* but includes dates for days where data may be missing. This is necessary for one of the web-queries to run properly.

dbo.tdggraph contains several years worth of hourly data from the TDG monitoring stations

dbo.tdgsum contains daily summary data for each of the TDG monitoring stations. These summary data include 24 hour average TDG, 12 hour average TDG, High TDG, and Number of hours per daily sample.

- 1) Official Location: SQL MAIN3
- 2) Maintained By: FPC staff

- 3) FPC Role in Design and Implementation of Sampling: FPC has no role in the design and implementation of sampling for these data.
- 4) Data Acquisition: These data are downloaded directly from the COE and Grant County PUD daily.
- 5) Data Verification: FPC does not verify or correct data in this database. However, the program used to populate these tables removes any TDG measurements that are suspiciously low (<95%) or high (>145%).
- 6) FPC Uses:
 - a. Web Queries-
 - i. Real Time Versus Historic Water Temperature – this query allows users to track hourly the water temperature at the forebay and tailwater of each project, compared to the daily scrollcase and 10 year average temperatures. This query can be found at: <http://www.fpc.org/river/tempgraphs/NETtempgraph.aspx> but is only active during the spill season.
 - ii. Fixed Monitoring Site Data and Fixed Monitoring QA Data TDG Data Quality Control – these queries allows users to view graphs of temperature, barometric pressure, total gas pressure, and total dissolved gas over the most recent two week period at each project. These graphs are used by FPC staff as a means of quality control. By visually inspecting data, FPC staff are able to see where there might be faulty TDG measurements and adjust the database accordingly. These queries rely on the *dbo.leftgraph* table for constructing these graphs and can be found at: http://www.fpc.org/river/tdgsqueries/site_tdgsubmit.html and http://www.fpc.org/river/tdgsqueries/river_tdgsubmit.html.
 - b. Daily TDG Report and FPC Weekly Report– data from the *dbo.tdgsum* table are used to compile a daily TDG summary report. This report provides the 24-hr Avg TDG, 12-Hr Avg TDG, High TDG, and Number of Hours for each TDG monitoring site over the most recent two week period. This report is compiled daily and is available on the FPC website at: <http://www.fpc.org/currentdaily/dgassum.txt>. A version of this report is also included in the FPC weekly report.

Tables: *dbo.pihistoric* and *dbo.avgpihistoric* – these tables contain current and historic passage index data for CH1, ST, and CH0 at BON, MCN, RIS, and LGR.

dbo.pihistoric- contains historic daily passage index and cumulative passage index data for the current year, as well as a 10-yr average passage index (+/- 95% CI).

dbo.avgpihistoric – contains the average daily proportion of the historic passage index (+/- 95% CI).

- 1) Official Location: SQL MAIN3
- 2) Maintained By: FPC staff
- 3) FPC Role in Design and Implementation of Sampling: The FPC , is responsible for the design and implementation of sampling as directed by the state, federal and tribal salmon managers. Upon initiation, SMP sampling typically occurs daily (except at MCN). FPC is the primary source of SMP data for the region.

- 4) Data Acquisition: Each year, the 10-yr Average Passage Index (+/- 95% CI) is updated and loaded into this table. The daily passage index and cumulative passage index data are loaded into the table daily, as part of the SMP program. The daily proportion of the passage index (table *dbo.avgpihistoric*) is updated yearly by incorporating the last year's SMP data into the historic average daily proportion passing. Daily SMP data originally come from the individual SMP sites and are contained in a separate table in the FPC Database (see discussion on Table: *dbo.tbl_catch_dtl* for more detail).
- 5) Data Verification: These tables contain estimated data that rely on verified daily SMP data. The current SMP data are verified throughout the season (see discussion on Table: *dbo.tbl_catch_dtl* for more detail).
- 6) FPC Uses:
 - a. Web-Queries –
 - i. Daily Passage Index Graph – this query generates a figure comparing the present year's daily passage index to the historic daily proportion passage for CH1, ST, or CH0 at BON, MCN, RIS, and LGR. This query relies on both of the above listed tables and can be found at http://www.fpc.org/smolt/passgraphs/dayPassgraphSubmit_07.html
 - ii. Cumulative Passage Index Graph – this query generates a figure that shows the present year's cumulative passage index compared to the historic cumulative passage index for CH1, ST, or CH0 at BON, MCN, RIS, and LGR. This query relies on both of the above listed tables and can be found at http://www.fpc.org/smolt/passgraphs/PassgraphSubmit_07.html

Tables: *dbo.tbl_catch*, *dbo.tbl_catch_dtl*, *dbo.tbl_catch_dtl_inc*, *dbo.tbl_transport*, *dbo.tbl_mark_recap* (*dbo.tlkp_gear_code*, *dbo.tlkp_rear_disp*, *dbo.tlkp_incidental_catch*, *dbo.tlkp_SMP_sites*, *dbo.tlkp_transport*) – These tables contain the daily operational and collection data from the Smolt Monitoring Program (SMP).

dbo.tbl_catch contains operational data from the SMP sites, including: 1) daily average flow, 2) daily average spill, 3) powerhouse flow, 4) sample rate, 5) gear code, 6) sample start and end time, etc.

dbo.tbl_catch_dtl contains biological data, such as: 1) daily sample rate, 2) daily sample count, 3) daily collection count, 4) daily descaling, 5) daily sample and project mortality, 6) fish length, etc. These data are project, species and race specific.

dbo.tbl_catch_dtl_inc contains incidental catch and mortality data from each daily sample at each SMP site.

dbo.tbl_transport contains daily transportation data from transportation sites (LGR, LGS, LMN, and MCN), including: 1) number bypassed, 2) number barged, 3) number trucked, etc. These data are species and race specific.

dbo.tbl_mark_recap contains mark/recapture data for fish that are collected by the SMP sites that are tagged with Elastomer, freeze brand, or Floy tags.

dbo.tlkp_gear_code*, *dbo.tlkp_rear_disp*, *dbo.tlkp_incidental_catch*, *dbo.tlkp_SMP_sites*, *dbo.tlkp_transport are supporting lookup tables that contain miscellaneous data necessary for maintaining the SMP Database. These tables contain

such information as: 1) gear codes and their definitions, 2) incidental catch species and their codes, 3) SMP site names and their codes, 4) transport categories, etc.

- 1) Official Location: SQL MAIN3
- 2) Maintained By: FPC staff
- 3) FPC Role in Design and Implementation of Sampling: As the SMP coordinator, Jerry McCann is responsible for the design and implementation of sampling.
- 4) Data Acquisition: Upon completion of the daily sampling, each SMP project sends these data to the FPC in the form of a batch file (*.bch), via e-mail or the internet. These batch files are generated by an FPC program (FPC32) that is used at each site for data entry. FPC also receives a printed copy of the hand logs for each batch file via fax. Every 10 minutes, an FPC application automatically runs which imports data from the batch file to these tables on the FPC Database. FPC is the primary source of SMP data for the region.
- 5) Data Verification: Each week, two random batch files are chosen for each SMP site for data validation. Data from these two batch files are compared to what is reported in the hand log. If errors are detected, more batch files for that site are chosen for validation. Also, upon detecting errors, the site is notified and a request is made for errors to be corrected. Upon correcting an error, each site "reposts" the corrected batch file, which is then imported into the database.
- 6) FPC Uses:
 - a. Data Requests and Analyses - FPC staff may rely on these tables when compiling data requests and analyses that require SMP data.
 - b. Daily SMP Reports:
 - i. Two Week Summary of Passage Index –This daily report provides passage index data for each species sampled over the past two weeks, along with a cumulative passage index for each SMP project. The data used to generate the passage index come from several of these tables. This report is available as a text file on the FPC website at <http://www.fpc.org/currentdaily/passindx.txt>. A copy of this report is attached to the each of FPC's Weekly Reports.
 - ii. Daily Collection Report - This daily report provides collection data (e.g., river flow, index flow, passage index, sample count, and collection count) for each species sampled over the most current two week period for each SMP project. Data from several of these tables are used to generate this report. This report is available as a text file on the FPC website at <http://www.fpc.org/currentdaily/passindx.txt>
 - iii. SMP Sampling Comments - This daily report provides sampling data (e.g., sample start date, sample start time, sample end date, sample end time, gear code, sample code, and sampling comments) for each batch over the past two weeks for each SMP project. Data from table *dbo.tbl_catch* are used in generating this report. This report is available in html format on the FPC website at <http://www.fpc.org/currentdaily/smpcomments.htm>
 - iv. Last Two Weeks and Cumulative Transportation Summary Reports – These daily reports provide transportation data from each of the transportation sites. The two week report provides transportation data from the most recent two week period, where as the cumulative report is a tally of the entire transportation season. Data from tables

dbo.tbl_transport and *dbo.tbl_catch_dtl* are used in generating these reports. These reports are available in both html and text format on the FPC webpage at: <http://www.fpc.org/currentdaily/transport.htm> or [.txt](http://www.fpc.org/currentdaily/transport.txt) and <http://www.fpc.org/currentdaily/cumtrans.htm> or [.txt](http://www.fpc.org/currentdaily/cumtrans.txt).

c. Web-Queries –

- i. Smolt Migration Timing for the Runs at Large – The FPC website has web queries that use these tables in illustrating run timing at the various SMP projects for each run-at-large. These queries allow users to download both current and historic SMP data in both tabular and graphic form and generate the daily passage index for each project/species combination. These web queries can be found at: http://www.fpc.org/smolt/SMP_queries.html
 - ii. Smolt Mortality Data - The FPC website has several web queries that use these tables to provide mortality data from the SMP. There are separate queries for each of the various sources of mortality, including: 1) sample mortality, 2) facility mortality, 3) transportation mortality, and 4) total mortality. Each of these web queries can be found at: http://www.fpc.org/smolt/SMP_mortality.html.
 - iii. Transportation Query – The FPC website has a web query that provides historic and current transportation data from the SMP for download. This query can be found at: http://www.fpc.org/smolt/transportation/smolt_transportation_query.html.
 - iv. Incidental Catch Query – the FPC website has a web query that provides historic and current data on the incidental catch at each of the SMP projects, as far back as 1997 (when sites first began collecting these data). This query can be found at: http://www.fpc.org/smolt/incidentalcatchqueries/incidental_catch_query.html. Bulltrout and Lamprey are two of the most queried incidental species. Because of this, the FPC has separate web-queries available for these species. These queries can be found at: http://www.fpc.org/bulltrout/bulltrout_queries/smp_bulltrout_query.html (Bulltrout) and http://www.fpc.org/lamprey/smp_lamprey_query.html (Lamprey)
 - v. Fork Length Query for Mark/Recapture Fish – The FPC website has a query that allows users to download lengths of marked fish that are recaptured at SMP sites. There are separate queries that allow for the estimation of an average fork length for each species/site combination or fork lengths of individual marked and recaptured fish. These queries are on the FPC website at: http://www.fpc.org/smolt/forklengthqueries/forklength_query.html
 - vi. Descaling Query – The FPC website has a web query that allows users to download daily smolt descaling data from the SMP sites. This query is available at: http://www.fpc.org/smolt/descalingqueries/descaling_query.html
- d. FPC Annual Report – Data from these tables are used in many of the analyses presented in the FPC annual report, particularly the chapter pertaining to the SMP.

Tables: *dbo.tbl_coe_hourly_flow*, *dbo.tbl_coe_mean_flow* – These tables contain corrected hourly and daily operational data from each of the projects of the FCRPS.

dbo.tbl_coe_hourly_flow contains hourly operational data including: 1) total flow, 2) turbine discharge, 3) spill, 4) forebay elevation, 5) tailwater elevation, 6) number of units available, 7) number units on line, etc.

dbo.tbl_coe_mean_flow contains daily average operational data including: 1) total flow, 2) turbine discharge, 3) spill, 4) forebay elevation, 5) tailwater elevation, 6) number of units available, 7) number units on line, etc.

- 1) Official Location: SQL MAIN3
- 2) Maintained By: FPC staff
- 3) FPC Role in Design and Implementation of Sampling: FPC has no role in the design and implementation of sampling for these data.
- 4) Data Acquisition: Each month, FPC data staff acquire these corrected data from the Army Corps of Engineers (COE) via the internet. An FPC application is then used to populate these tables.
- 5) Data Verification: These data are already verified and corrected by the COE and, therefore, FPC does not verify or correct data in these tables. Because these data are verified and corrected by the COE, these tables run approximately 1 month behind.
- 6) FPC Uses:
 - a. Data Requests and Analyses - FPC staff rely on these databases when compiling data requests and analyses that require project specific hourly or daily flow, spill, or elevation data, particularly if historical data are needed.
 - b. Final Passage Index Estimates – In season, SMP passage indices are calculated based on unverified daily flow data reported by the SMP site (typically 7:00am-7:00am) and stored in table *dbo.tbl_catch*. At the end of the year, FPC staff re-estimate average daily flow for each site by using the corrected hourly flow data in table *dbo.tbl_coe_hourly_flow* from the COE. These corrected flows are stored in table *dbo.tbl_coe_catch_flows_all* (as mentioned earlier in the discussion of the Flows database) and are used to re-calculate the historic Passage Index for each project.
 - c. FPC Annual Report – Data from these tables are used in many of the analyses presented in the FPC annual report, particularly the chapter pertaining to Spill Management and several of the appendices.
 - d. Web Queries - The FPC website has a web query that uses these tables, allowing users to download current (within 1 month) and historic hourly or daily operational data for the various projects of the FCRPS. This web query can be found at: http://www.fpc.org/river/flowspill/FlowSpill_Query.html.

Tables: *dbo.tbl_hatch_rel* and *dbo.tbl_hatch_rel_dtl* (*dbo.tlkp_agency*, *dbo.tlkp_hatchery*, *dbo.tlkp_apre_hatchery*, *dbo.tlkp_river*, *dbo.tlkp_apre_rel_site*, *dbo.tlkp_species*)–

These tables contain data on hatchery releases of anadromous salmonids to the Columbia River Basin and its tributaries. These tables contain numbers of hatchery fish released above Bonneville Dam since 1979 and released below Bonneville Dam since 1987.

dbo.tbl_hatch_rel contains detailed information about each hatchery release to the Columbia River Basin, including: 1) release agency, 2) hatchery, 3) species, 4) age, 5)

listing status, 6) release date(s), 7) number released, 8) release site, 9) brood year, 10) migration year, 11) tagging information, 12) fish per pound, etc.

dbo.tbl_hatch_rel_dtl contains tagging details for those releases that were tagged with freeze brands, Elastomer, or photonic tags. For each of these release, this table identifies, the type of tag used along with the location and color of the tag.

dbo.tlkp_agency, *dbo.tlkp_hatchery*, *dbo.tlkp_apre_hatchery*, *dbo.tlkp_river*, *dbo.tlkp_apre_rel_site*, *dbo.tlkp_species* are supporting lookup tables that contain miscellaneous data necessary for maintaining the Hatchery Database. These tables contain such information as: 1) hatcheries and hatchery codes, 2) release sites and release sites codes, and 3) release rivers and river codes, etc.

- 1) Official Location: SQL MAIN3
- 2) Maintained By: FPC staff
- 3) FPC Role in Design and Implementation of Sampling: The FPC has identified several important pieces of information that are needed about each hatchery release. These pieces of information are gathered from State, Federal and Tribal agencies (normally the agencies' coordinator for their hatchery programs) for entry into these tables.
- 4) Data Acquisition: The FPC receives preliminary hatchery release schedules from State, Federal and Tribal agencies (normally the agencies' coordinator for their hatchery programs) prior to the juvenile fish migration. These release schedules are initially entered in the FPC database and then updated on a weekly or monthly basis throughout the year until the release numbers are "finalized" by the State, Federal, and Tribal fish agencies. Data entered into the Hatchery Database are initially entered using a data entry program developed by FPC staff.
- 5) Data Verification: At the end of each year, Brandon contacts each of the State, Federal, and Tribal fish agencies and gets "finalized" data from them regarding each hatchery release. Releases are updated with these finalized numbers as they are received.
- 6) FPC Uses:
 - a. Data Requests and Analyses - FPC staff rely on these tables when compiling data requests and analyses that require information regarding hatchery releases to the Columbia River Basin.
 - b. FPC Annual Report – Data from these tables are used in writing the Hatchery Releases Chapter and Appendix of the FPC annual report.
 - c. FPC Weekly Report – Data from table *dbo.tbl_hatch_rel* are used to prepare the hatchery section of the weekly report and generate tables of past and upcoming hatchery releases.
 - d. Web Queries –
 - i. The FPC has a web query that allows users to obtain detailed information about hatchery releases throughout the region. Users are able to query releases by many different criteria, including: 1) release dates, 2) hatchery, 3) release sites, 4) release region, 5) species, 6) release agency, 7) migration year, etc. This query uses table *dbo.tbl_hatch_rel* and can be found at: http://www.fpc.org/hatchery/Hatchery_Queries.html.
 - ii. The FPC has a web query that allows users to obtain detailed information about hatchery releases that have been tagged with Elastomer, freeze brand, and/or phototoxic tags. This query uses table *dbo.tbl_hatch_rel_dtl* and can be found at: <http://www.fpc.org/hatchery/markreleasequery.html>.

Tables: *dbo.tdg_coe12highavg* and *dbo.tdg_spill* (*dbo.tdg_coe12highavg_site*, *dbo.tdg_spill_combsite*, *dbo.tdg_12hrsites*, *dbo.tdgcolorhrs*) – These tables contain hourly TDG and flow/spill data that are used to generate Spill Season Update graphs, which track actual spill versus what is mandated through the BiOP/Court Order. These graphs also track TDG in order to determine whether reduced spill is the result of excess TDG.

dbo.tdg_coe12highavg contains daily average TDG data for each TDG monitoring station on the Snake and Lower Columbia Rivers. These daily averages are the average of the 12 highest hours in the day.

dbo.tdg_spill contains hourly temperature, barometric pressure, total gas pressure, TDG, spill, flow, gauge depth, and compensation depth data from each TDG monitoring station on the Snake and Lower Columbia Rivers.

dbo.tdg_coe12highavg_site*, *dbo.tdg_spill_combsite*, *dbo.tdg_12hrsites*, and *dbo.tdgcolorhrs are supporting tables that contain miscellaneous data necessary for preparing Spill Season Update graphs

- 1) Official Location: SQL MAIN3
- 2) Maintained By: FPC staff
- 3) FPC Role in Design and Implementation of Sampling: FPC has no role in the design and implementation of sampling for these data.
- 4) Data Acquisition: FPC data staff acquire data from Army Corps of Engineers (COE) daily via the internet. Many of the tables in this database contain unverified uncorrected hourly data. These tables are updated daily with data from the previous day.
- 5) Data Verification: FPC does not verify or correct data in this database.
- 6) FPC Use:
 - a. Spill Season Update Web Query – Data in these tables are used to generate figures for tracking actual spill volumes versus those that are mandated by the BiOP/Court Order. These figures also track average TDG (12-hour) at each TDG monitoring station in order to provide an explanation for reduced spill levels. During spill season, this report is run and published to the FPC website daily. Graphs of spill are presented in weekly blocks for each project. This web-query allows users to view any time period/project combination and can be found at: <http://www.fpc.org/WebForm2.0/MAINCHART.ASPX>

Table: *dbo.tempscrl*– this table contains daily scrollcase temperature data for Bonneville, The Dalles, McNary, Ice Harbor, Lower Monumental, Little Goose, Lower Granite, Wanapum, and Priest Rapid dams.

- 1) Official Location: SQL MAIN3
- 2) Maintained By: FPC Staff
- 3) FPC Role in Design and Implementation of Sampling: FPC has no role in the design and implementation of sampling for these data.
- 4) Data Acquisition: These data are downloaded directly from the COE daily.
- 5) Data Verification: FPC does not verify or correct data in this database.
- 6) FPC Uses:
 - a. Real Time Versus Historic Water Temperature Web Query- daily scrollcase temperatures from this table are used for this query, which allows users to track

the water temperature at the forebay and tailwater of each project, compared to the daily scrollcase and 10 year average temperatures. This query can be found at: <http://www.fpc.org/river/tempgraphs/NETtempgraph.aspx> but is only active during the spill season.

Database Name: FPC Live

Tables: *dbo.commenttable2*, *dbo.Images* – These tables contain data that are posted on the Spill Season Update portion of the website

dbo.commenttable2 contains daily comments for each project for the Spill Season Update webpage (<http://www.fpc.org/WebForm2.0/MAINCHART.ASPX>). These comments contain information for the user, including expected spill, actual spill, a brief explanation as to whether state TDG waivers were exceeded, and measures of the 12-hr average TDG at the tailrace and forebay monitors.

dbo.Images contains pictures of the graphs that are posted on the Spill Season Update website. Once the figures are generated in Excel, they are saved as GIF files and stored in this table.

- 1) Official Location: SQL MAIN3
- 2) Maintained By: FPC staff
- 3) FPC Role in Design and Implementation of Sampling: FPC designed these two tables to store finalized information for the Spill Season Update website. However, FPC has no role in the design and implementation of sampling for the data that go into these final products.
- 4) Data Acquisition: FPC data staff acquire data from Army Corps of Engineers (COE) daily via the internet. The final products from analyses of these data are stored in these tables. The comments table is updated daily, with a new comment for each project each day. The images table is also updated daily, with a new day's worth of data added each day.
- 5) Data Verification: If erroneous data are detected from the source, past comments and images are updated.
- 6) FPC Use:
 - a. Spill Season Update Web Query – the images and corresponding daily comments that are posted in the Spill Season Update query (<http://www.fpc.org/WebForm2.0/MAINCHART.ASPX>) are stored in these tables. This query allows users to track actual spill volumes versus those that are mandated by the BiOP/Court Order and determine if reduced spill is due to excessive TDG levels or not. During spill season, this report is run and published to the FPC website daily.

Tables: *dbo.FishHits* and *dbo.stock*– These tables contain PIT-tag detection counts for adult and juvenile salmonids throughout the FCRPS. These data are daily and cumulative counts for each project from 1998 to present.

- 1) Official Location: SQL MAIN3
- 2) Maintained By: FPC Staff

- 3) FPC Role in Design and Implementation of Sampling: FPC has no role in the design and implementation of sampling for these data.
- 4) Data Acquisition: FPC data receives these data from PTAGIS via e-mail. An FPC program (GetMailData.exe) is run each morning to update this table with data from the previous day.
- 5) Data Verification: FPC does not verify or correct data in this database
- 6) FPC Use:
 - a. Adult Daily and Cumulative Web Queries – these queries generate graphs (*dbo.FishHits*) of daily or cumulative PIT-Tag detections of adults and various projects for 2002 to present. Projects with adult count data include: 1) Bonneville Dam, 2) McNary Dam, 3) Priest Rapids Dam, 4) Rock Island Dam, 5) Wells Dam, 6) Ice Harbor Dam, and 7) Lower Granite Dam. The user also has the option of downloading a report (*dbo.stock*) of daily or cumulative detections. These queries can be found at <http://www.fpc.org/adultsalmon/adultPITtag.html>
 - b. Smolt Daily and Cumulative Web Queries – these queries generate graphs (*dbo.FishHits*) of daily or cumulative PIT-Tag detections of smolts and various projects for 2002 to present. Projects with smolt count data include: 1) Lower Granite, 2) Little Goose, 3) Lower Monumental, 4) McNary, 5) John Day, and 6) Bonneville Dam, along with detections at Rapid River Hatchery. As with the adult query, the user has the option of downloading a report (*dbo.stock*) of daily or cumulative detections. These queries can be found at <http://www.fpc.org/smolt/smoltPITtag.html>

Tables: *dbo.fpcPageHits*, *dbo.Hits*, *dbo.HostDNS*, and *dbo.PageHits* – These tables contains data on visits to the FPC websites and uses of FPC queries

dbo.fpcPageHits contains data on visits to ASP web queries on the FPC web site. The information being collected includes: 1) Web site URL, 2) Hit date and time, 3) user IP address, 4) host DNS address, and 5) what data were requested by the query.

dbo.Hits contains quarterly tallies of the number of hits each query on the FPC website receives in each year.

dbo.HostDNS contains a list of each user unique IP address that has visited an FPC web site and its corresponding host DNS ID.

dbo.PageHits contains data on visits to ASPX web queries on the FPC web site. The information being collected includes: 1) Web site URL, 2) Hit date and time, 3) user IP address, 4) host DNS address, and 5) what data were requested by the query.

- 1) Official Location: SQL MAIN3
- 2) Maintained By: FPC staff
- 3) FPC Role in Design and Implementation of Sampling: FPC determined what data were needed for these tables and how these data were going to be recorded.
- 4) Data Acquisition: An FPC program (prjCollector.exe) records these data when users access our web site and populates the above mentioned tables.
- 5) Data Verification: FPC does not verify or correct data in this database
- 6) FPC Use:
 - a. FPC Annual Accomplishments Report – Many of the data stored in these tables are reported in the Web Site Usage portion of the in the FPC Annual Accomplishments Report for the FPC Oversight Board.

Database Name: PitTag

Tables: *dbo.histfishtwo*, *dbo.adultsYYYYTwo* (where YYYY is the year of adult return from 1993-Present), ***dbo.histfish*, *dbo.tenyrhistfishYYYYtoYYYY*** (where YYYY is the appropriate 10 year window for each adult return year), ***dbo.adults_ytd*, and *dbo.adult_ladder_bulltrout*** – These tables contain adult count data from the counting windows at various dams throughout the Columbia River Basin for different time periods.

dbo.histfishtwo contains daily adult count data for the entire season from 2002 to present. The dates of counting for each project can change on an annual basis. An example of these date ranges for 2007 is in Table 1.

Table 1. Annual reporting dates for adult counts in Table: *dbo.histfishtwo*

Project	Counting Dates for 2007
Bonneville Dam (BON)	Jan. 1 – Dec. 31
The Dalles Dam (TDA)	Feb. 20 – Dec. 7
John Day Dam (JDA)	Feb. 20 – Dec. 7
McNary Dam (MCN)	Mar. 1 – Dec. 31
Ice Harbor Dam (IHR)	Mar. 1 – Oct. 31
Lower Monumental Dam (LMN)	Apr. 1 – Oct. 31
Little Goose Dam (LGS)	Apr. 1 – Oct. 31
Lower Granite Dam (LGR)	Mar. 1 – Dec. 15
Priest Rapids Dam (PRD)	Apr. 15 – Nov. 15
Wanapum Dam (WAN)	Apr. 15 – Nov. 15
Rock Island Dam (RIS)	Apr. 14 – Nov. 15
Rocky Reach Dam (RRH)	Apr. 14 – Nov. 15
Wells Dam (WEL)	May 1 – Nov. 15
Willamette Falls (WFA)	Jan. 1 – Dec. 31

dbo.adultsYYYYTwo (where YYYY is the year of adult return from 1993 to present) contains year specific daily adult count data for the historical reporting date ranges (Table 2) for various projects throughout the Columbia River Basin.

Table 2. Historical reporting dates for adult counts in Tables: *dbo.adultsYYYYTwo* (where YYYY is the year of adult return) **and *dbo.histfish***

Project	Historical Counting Dates
Bonneville Dam (BON)	Mar. 15 – Nov. 15
The Dalles Dam (TDA)	Apr. 1 – Oct. 31
John Day Dam (JDA)	Apr. 1 – Oct. 31
McNary Dam (MCN)	Apr. 1 – Oct. 31
Ice Harbor Dam (IHR)	Apr. 1 – Oct. 31
Lower Monumental Dam (LMN)	Apr. 1 – Oct. 31
Little Goose Dam (LGS)	Apr. 1 – Oct. 31
Lower Granite Dam (LGR)	Mar. 1 – Dec. 15
Priest Rapids Dam (PRD)	Apr. 15 – Nov. 15
Wanapum Dam (WAN)	Apr. 15 – Nov. 15
Rock Island Dam (RIS)	Apr. 15 – Nov. 15

Rocky Reach Dam (RRH)	Apr. 15 – Nov. 15
Wells Dam (WEL)	May 1 – Nov. 15
Willamette Falls (WFA)	Jan. 1 – Dec. 31

dbo.histfish contains finalized daily adult count data (1977-Present) for the historical reporting date ranges from (Table 2) for various projects throughout the Columbia River Basin.

dbo.tenyrhistfishYYYYtoYYYY (where YYYY is the appropriate 10 year window for each adult return year) contains an estimate of the 10-year average adult counts at each project, based on the historical counting dates. Each adult return year, the 10 years for this average change, thus a new table with the corresponding ten years date range is created at the beginning of each adult return year.

dbo.adults_ytd contains a total adult count for each species at each project based on the historical counting dates (Table 2). These annual totals date as far back as 1938 for some projects.

dbo.adult_ladder_bulltrout contains adult bulltrout counts from counting stations.

- 1) Official Location: SQL MAIN3
- 2) Maintained By: FPC staff
- 3) FPC Role in Design and Implementation of Sampling: FPC has no role in the design and implementation of actual sampling for these data.
- 4) Data Acquisition: An FPC program (prjFileCollector.exe) downloads daily adult count data from various sources (COE, Chelan County PUD, Grant County PUD, Douglas County PUD, ODFW Willamette Falls) and parses these data into *dbo.histfishtwo*. Once this historical count period arrives, data from *dbo.histfishtwo* are copied to *dbo.adultsYYYYTwo* for the current year. Only at the end of the season are finalized adult count data copied to *dbo.histfish*.
- 5) Data Verification: FPC staff constantly check adult count data from the various data sources to make sure they match up with what is in our database. Unbalanced data are corrected as they are discovered.
- 6) FPC Uses:
 - a. Data Requests and Analyses - FPC staff may rely on these tables when compiling data requests and analyses that require adult passage data
 - b. Daily Reports
 - i. YYYY Adult Salmon Counts (Based on Reporting Dates Since 2000) – This daily report provides daily adult count data for all species at each of the projects over the most recent week. Also included in this report is the YTD count. These counts are based on the date range over the entire season (Table 1). Data from *dbo.histfishtwo* are used for this report. This report is available on the FPC website at: http://www.fpc.org/currentdaily/HistFishTwo_7day-ytd_Adults.htm
This report can also be downloaded in a printer friendly version for the BON-MCN, IHR-LGR, and PRD-WEL reaches.
 - ii. YYYY Adult Salmon Counts (Based on Historical Reporting Dates) – This daily report provides daily adult count data for all species at each of the projects over the most recent week. Also included in this report is the YTD count. These counts are based on the historical date range (Table 2). Data from *dbo.adultsYYYYTwo* are used for this report. This report is

available on the FPC website at: http://www.fpc.org/currentdaily/7day-ytd_Adults.htm

This report can also be downloaded in a printer friendly version of the BON-MCN, IHR-LGR, and PRD-WEL reaches.

- iii. Adult Salmon Comparison Report - This daily report provides current adult count totals (to date) for all species at each of the projects, compared to those from the previous year and the 10-yr average. These total counts are based on the historical date range (Table 2). Data from *dbo.adultsYYYYTwo*, *dbo.histfish*, and *dbo.tenyrhistfishYYYYtoYYYY* are used to generate this report. A copy of this report is attached to each of FPC's weekly reports. This report is available on the FPC website <http://www.fpc.org/adultsalmon/AdultCumulativeTable.asp>
- c. Web-Queries –
 - i. Adult Returns for Columbia and Snake River Dams – Graph Adult Salmon Database – This is a web query that allows users to generate a graph of species specific daily adult counts for the current year, compared to those from the previous year, and the 10-year average. This query only allows for comparison of counts after March 15. Any counts prior to March 15 are not included in the graphs. Data from *dbo.histfishtwo*, *dbo.adultsYYYYTwo*, *dbo.histfish*, and *dbo.tenyrhistfishYYYYtoYYYY* are used for this query. This web query can be found at: http://www.fpc.org/adultsalmon/adultqueries/Adult_Table_Species_Graph.html
 - ii. Adult Returns for Columbia and Snake River Dams – Query Current Year All Counts Adult Salmon Database – This is a web query that allows users to download daily adult count data for all species and projects for the current year. These counts are based on counts from the entire season for each project (Table 1). This query uses data from *dbo.histfishtwo* and can be found at http://www.fpc.org/adultsalmon/adultqueries/Adult_Table_Species_allCurrent.html
 - iii. Adult Returns for Columbia and Snake River Dams – Query Historic All Counts Adult Salmon Database– This is a web query that allows users to download daily adult count data for all species and projects from 2002 to present. These counts are based on historic counting periods (Table 2). This query uses data from *dbo.histfishtwo* and can be found at http://www.fpc.org/adultsalmon/adultqueries/Adult_Table_Species_AllHistoric.html
 - iv. Adult Returns for Columbia and Snake River Dams – Query Current Traditional Counts Adult Salmon Database – This is a web query that allows users to download daily adult count data for all species and projects for the current year. These counts are based on historic counting periods (Table 2). This query uses data from *dbo.adultsYYYYTwo* and can be found at: http://www.fpc.org/adultsalmon/adultqueries/Adult_Table_Species_Current.html

- v. Adult Returns for Columbia and Snake River Dams – Query Historic Traditional Counts Adult Salmon Database – This is a web query that allows users to download daily adult count data for all species and projects for several years. These counts are based on historic counting periods (Table 2). This query uses data from *dbo.histfish* and can be found at: http://www.fpc.org/adultsalmon/adultqueries/Adult_Table_Species_historic.html
 - vi. Annual Adult Salmon Totals by Project – There are two queries that allows users to see the annual total counts for each species at each site (in csv or html format). The annual totals are based on historic count dates (Table 2). Both queries use *dbo.adults-ytd*. The csv format query allows for easier import into Excel and can found at: http://www.fpc.org/adultsalmon/adultqueries/Adult_Annual_Totals_Query_form.html. The html query can be found at: <http://www.fpc.org/adultsalmon/adulthistory/adultsites.html>
 - vii. Adult Returns for Columbia and Snake River Dams - Query Ten Year Average Traditional Counts Adult Salmon Database - This is a web query that allows users to download the 10-yr average adult count for each species at each project, for the most recent 10 year period. This can be either a total count or a daily count up to a user specified end date. These counts are based on historic counting periods (Table 2). This query uses data from *dbo.tenyrhistfishYYYYtoYYYY* and can be found at: http://www.fpc.org/adultsalmon/adultqueries/Adult_Table_Species_TenYr.html
 - viii. Bulltrout Adult Counts – This is a web-query that allows users to download site-specific adult count data for Bulltrout for a user-specified date range (1998 to Present). This query reports either a grand total or daily counts and can be found at: http://www.fpc.org/bulltrout/bulltrout_queries/adultladder_bulltrout_query.html
- d. FPC Annual Report – Many of the data stored in these tables are reported in the Adult Chapter and Appendix of the FPC Annual Report.

Tables: *dbo.bonfmast*, *dbo.ivesmast*, *dbo.targettail*, *dbo.vanfmast*, *dbo.wallamast2*, *dbo.sensordata*, *dbo.hammast* - These tables contain project operations (e.g., outflow, spill, elevation, etc) and/or river data (i.e., flow, temperature, etc.) from various gauges throughout the Lower Columbia River.

dbo.bonfmast contains hourly project operations data from Bonneville Dam, including: 1) outflow, 2) spill, 3) forebay elevation, and 4) tailwater elevation from 1998 to present.

dbo.ivesmast contains water elevation and temperature data from Ives Island gauge below Bonneville Dam.

dbo.vanfmast contains river elevation data from a USGS gauge near Vancouver, WA

dbo.wallamast2 contains river data from the Walla Walls River Gauge. These data include: 1) river elevation, 2) temperature, 3) pH, 4) conductivity, and 5) dissolved

oxygen. Conductivity, pH, and dissolved oxygen data are not available after Sept. 2006.

dbo.sensordata contains temperature and elevation data from several different sensors at the mouth of Hamilton Creek below Bonneville Dam.

dbo.hammast contains river elevation data from Hamilton Creek gauge below Bonneville Dam.

- 1) Official Location: SQL MAIN3
- 2) Maintained By: FPC staff
- 3) FPC Role in Design and Implementation of Sampling: Data in *dbo.bonfmast* and *dbo.vanfmast* are downloaded from the COE and, thus, the FPC has no role in the design and implementation of sampling. FPC was responsible for the design and implementation of sampling from the Hamilton Creek, Ives Island, and Walla Walla gauges.
- 4) Data Acquisition: Data from the Hamilton Creek, Ives Island, and Walla Walla gauges are downloaded directly from the gauge, via a cell phone and modem, several times each day. However, due to lack of funding, the Ives Island gauge is no longer in service. No new data have been downloaded from this gauge since Spring 2007. FPC is the primary source where data from the Hamilton Creek, Ives Island, and Walla Walla gauges are stored.
- 5) Data Verification: These data are unverified, as they come in directly from the source.
- 6) FPC Uses:
 - a. Data Requests and Analyses - FPC staff may rely on these tables when compiling data requests and analyses regarding Chum populations below Bonneville Dam, particularly those from FPAC.
 - b. Web Queries –
 - i. Walla Walla River Data: The FPC has a web query that allows users to view graphs of temperature and elevation data from the Walla Walla gauge over specified ranges of time. These queries use table *dbo.wallamast2* and can be found at: http://www.fpc.org/river/columbiarivergauges/WallaWalla_Graph_Query.html.
 - ii. Ives Island Data: The FPC has a web query that allows users to view graphs of Bonneville Dam flow and tailwater elevation compared to the target tailwater elevation as set by FPAC (for Chum). These data are also available in tabular form. These queries use tables *dbo.bonfmast*, *dbo.vanfmast*, and *dbo.ivesmast* and can be found at: http://www.fpc.org/ivesisland/ivesislandgraphs/Ives_Graph_Query.html and <http://www.fpc.org/ivesisland/ivesisland.html>.
 - iii. Hamilton Creek Data: The FPC has a web query that allows users to view graphs of river depth and temperature data from several sensors at the mouth of Hamilton Creek, below Bonneville Dam, over specified ranges of time. These data are also available in tabular form. These queries use tables *dbo.hammast* and *dbo.sensordata* and can be found at: http://www.fpc.org/river/hamiltonsensor/HamiltonSensor_GraphQuery.html and http://www.fpc.org/river/hamiltonsensor/HamiltonSensor_Query.html.

Database Name: TT_SURV

Tables: *dbo.css_adult_agedist*, *dbo.css_numfishbysite*, *dbo.css_numsmolt_adults_stdycat*, *dbo.css_reachsurvivals*, *dbo.css_results_expectations*, *dbo.css_sars_stdycat*, *dbo.css_sr_tir_d* – These tables contain results data from Comparative Survival Study (CSS) Annual Reports and the 10-Yr Retrospective Summary Report of the CSS. The FPC has populated these tables with CSS results in order to make those results accessible to the general public, via the internet.

dbo.css_adult_agedist contains adult age distribution data among adults returning to Lower Granite or Bonneville Dam for each release site/migration year combination.

dbo.css_numfishbysite contains annual (migration year) totals of the number of CSS PIT-tags released for each site/species/rear-type combination

dbo.css_numsmolt_adult_stdycat contains annual (migration year) estimates of the total Lower Granite population (of CSS PIT-tagged fish), as well as estimates of the T0, C1, and C0 populations at LGR. Each population estimate has an estimate of the 95% Confidence Lower and Upper Limit.

dbo.css_reachsurvivals contains annual (migration year) estimates of the individual reach survivals for CSS PIT-tagged juveniles, along with 95% confidence bounds.

dbo.css_results_expectations contains results from the 10-Year Retrospective Summary Report (Appendix E).

dbo.css_sars_stdycat contains annual (migration year) estimates of smolt-to-adult (SARs) for each of the CSS study categories (T0, C1, and C0), along with 95% confidence bounds.

dbo.css_sr_tir_d contains annual (migration year) estimates of SR, TIR, and D, along with 95% confidence bounds.

- 1) Official Location: SQL MAIN3
- 2) Maintained By: FPC staff
- 3) FPC Role in Design and Implementation of Sampling: These data are results from the CSS study and are stored in the database for reporting purposes via the internet. FPC staff designed this database for this purpose and were responsible for the implementation of the reporting of these data on the web. Tom Berggren was responsible for the design and implementation of most of the analyses and results presented in these tables.
- 4) Data Acquisition: These data are acquired from tables published in the CSS Annual Reports and/or the 10-Year Retrospective Summary Report.
- 5) Data Verification: These data are results from CSS reports, which are peer-reviewed by outside sources. These reviews serve as a means of verifying that these data are correct. If errors are found, they are corrected as soon as possible, both in the reports and in these databases.
- 6) FPC Uses:
 - a. Data Requests and Analyses - FPC staff may rely on these tables when compiling data requests and analyses that require CSS data
 - b. Web-Queries – FPC staff are currently building a series of queries that will soon become available to the general public. These queries are intended to allow users to download CSS results data and import them into their own spreadsheets. Once these queries are completed, we will provide more detail about each query.

Tables: *dbo.fpc_daily_fish_traveltimes* and *dbo.fpc_multiyearanalysis* – These tables contain results data from SMP section of the FPC Annual Report. The FPC has populated these tables with these data to make them accessible to the general public, via the internet.

dbo.fpc_daily_fish_traveltimes contains median travel times of PIT-tagged smolts for several reaches throughout the FCRPS. These data are presented in Appendix F of the FPC Annual Report. These median travel times are daily, based on the day of release at a trap or hatchery or detection at a project.

dbo.fpc_multiyearanalysis contains reach survival estimates for PIT-tagged smolts, based on two-week windows of release dates. Along with the reach survival estimates are estimates of several covariates that were analyzed, including: 1) spill proportion, 2) water travel time, 3) temperature, 4) flow, and 5) fish travel time.

- 1) Official Location: SQL MAIN3
- 2) Maintained By: FPC staff
- 3) FPC Role in Design and Implementation of Sampling: These data are results from the SMP study and are stored in the database for reporting purposes via the internet. FPC staff designed this database for this purpose and were responsible for the implementation of the reporting of these data on the web. Jerry McCann was responsible for the design and implementation of most of the analyses and results presented in these tables.
- 4) Data Acquisition: These data are acquired directly from tables published in the FPC Annual Report.
- 5) Data Verification: These data are results from FPC Annual Reports, which are peer-reviewed by outside sources. These reviews serve as a means of verifying that these data are correct. If errors are found, they are corrected as soon as possible, both in the reports and in these databases.
- 6) FPC Uses:
 - a. Data Requests and Analyses - FPC staff may rely on these tables when compiling data requests and analyses that require SMP survival or travel time data
 - b. Web-Queries – FPC staff are currently building a series of queries that will soon become available to the general public. These queries are intended to allow users to download results from SMP data analyses and import them into their own spreadsheets. Once these queries are completed, we will provide more detail about each query.

SQL Main 4 New

The SQL Main 4 New server mostly contains data from PIT-tagged fish that originates from PTAGIS. These data are also used to provide technical support to the fishery managers and information to the region. Within this SQL server, the FPC maintains two databases for these data. Below is an explanation of each of these databases, the types of data stored in them, and their various uses by the FPC.

Database Name: Pittagtwo

Tables: *dbo.capturehistory*, *dbo.Interrogation By Site*, *dbo.mort_data*, *dbo.mort_hdr*, *dbo.recap_data*, *dbo.recap_hdr*, *dbo.tag_data*, *dbo.tag_hdr*, and *dbo.onefishYYYY* (where YYYY refers to a particular migration year) – contain specific details about each PIT-tagged fish that FPC has downloaded from PTAGIS.

dbo.capturehistory contains Capture History, Capture Disposition, and Burnham History codes for each individual PIT-tag ID that is downloaded from PTAGIS.

- Capture History codes are 7 digit codes consisting of ones and zeros. The first digit corresponds to the release site and is always 1. The subsequent digits are assigned based on whether that fish was detected (1) at each of the FCRPS juvenile PIT-tag detection sites (LGR, LGS, LMN, MCN, JDA, BON) or not detected (0).
- Capture Disposition codes are 7 digit codes with each digit a 0, 1, 2, or 3. This code is similar to Capture History in how these digits are assigned. However, if a fish is detected at a transportation site and is identified as being transported, then that fish receives a 2 for that site's detection. If a fish is detected at a transportation site but its fate is unknown (transported or returned to river), this fish is assigned a 3 for that detection site. This enables the data staff to query fish whose transportation status may be questionable.
- Burnham History codes are 7 digit codes that consist of zeros and ones and are similar to Capture History codes. However, fish that are transported receive a negative (-) symbol in front of their "Burnham History" code. These codes are typically used for Cormack Jolly Seber survival analyses.

dbo.Interrogation By Site contains detailed tagging, release, and detection data for each individual PIT-tag ID that is downloaded from PTAGIS. These data include: 1) PIT-tag ID, 2) tagging site, 3) coordinator ID, 4) release site, 5) release date (date and time), 6) river kilometer (of release), 7) migration year, 8) species, rear type, and run type, 9) all juvenile detections (date and time) at LGR, LGS, LMN, MCN, JDA, BON, and/or TWX (NOAA Trawl in Columbia River Estuary), and 10) all adult detections (date and time) at BON, MCN, PRD, RIS, WEL, IHR, and/or LGR.

dbo.mort_data* and *dbo.mort_hdr contains data on all PIT-tagged individuals that are confirmed mortalities (e.g., research mortalities, aviation predator mortalities, etc.). Table *dbo.mort_hdr* contains details about each mortality file, including: mortality file date, mortality site, capture method, etc. Specific data on individuals are stored in table *dbo.mort_data*. These data include: PIT-tag ID, mortality date (or date of detection of mortality), fish fork length (at tagging and mort), fish weight (at tagging and mort), clipping information, etc. These two tables can be joined on the Mortality File name.

dbo.recap_data* and *dbo.recap_hdr contains data on all PIT-tagged individuals that are recaptured (e.g., collected in traps, recaptured by researchers, etc.). Table *dbo.recap_hdr* contains details about each recapture file, including: recapture file name and date, recapture site, recapture method, etc. Specific data on recaptured individuals are stored in table *dbo.recap_data*. These data include: PIT-tag ID, recapture date, recapture size (length and/or weight), clipping information, etc. These two tables can be joined on the Recapture File name.

dbo.tag_data* and *dbo.tag_hdr contains physical data on all PIT-tagged individuals that are downloaded from PTAGIS. Table *dbo.tag_hdr* contains details about each Tag

File ID, including: Tag File ID name and date, tagger, migration year, tag site, capture method, release and tagging temperature, tagging method, release date and site, etc. Specific data on tagged individuals are stored in table *dbo.tag_data*. These data include: PIT-tag ID, length and weight at tagging, tagging sequence number, etc. These two tables can be joined on the Tag File ID name.

dbo.onefishYYYY (where *YYYY* refers to a particular migration year) is list of all PIT-tagged fish in table *dbo.Interrogation By Site*, broken into separate migration years (1990-Present). Along with the Tag ID of each fish, information such as Coordinator ID, Release Site, Release Date, and Species are kept in this table. These tables are used as reference tables to generate fish travel times for the FPC Annual Reports (Appendix E).

- 1) Official Location: SQL MAIN 4 NEW
- 2) Maintained By: FPC staff
- 3) FPC Role in Design and Implementation of Sampling: These data are all downloaded from the PTAGIS database and are stored in the various tables listed above. FPC staff has no role in the design and implementation of how these data are samples and stored in PTAGIS or what data are available through PTAGIS.
- 4) Data Acquisition: FPC staff download PIT-tag data directly from PTAGIS on an “as needed” basis throughout each migration year. Typically, at the end of each migration year, FPC staff download all PIT-tags for that migration year, in order to have a complete data set for the entire migration year. PIT-tag data are downloaded from PTAGIS via queries from a program called AnizoWin. The requested data arrive via e-mail in the form of a text file. An FPC Program (Fish Pump GUI) is then used to parse the data from the text file into the various tables above. This program also assigns the Capture History, Capture Disposition, and Burnham History codes for each individual. Every time an individual Tag ID is run through this program, the record for that fish is updated (e.g., subsequent juvenile and adult detections).
- 5) Data Verification: Data in the PitTagTwo database are downloaded directly from PTAGIS and are considered “real time” data. These data are constantly being updated by FPC staff throughout the migration year. However, it is possible that the PitTagTwo database may contain some records that have subsequently been removed by the tagging coordinators from PTAGIS (i.e., dotted-out). It is impossible for FPC staff to know precisely which fish have been “dotted-out” during the migration season and, thus, in season analyses may include some “dotted-out” fish. However, for analyses such as those for the Annual Report and/or CSS Report, FPC has a system to account for these “dotted-out” tags (See discussion of PITTAG2008 Database below).
- 6) FPC Uses:
 - a. Data Requests and Analyses - FPC staff may rely on these tables when compiling data requests that require survival analyses, travel time estimates, passage timing of particular release groups, transportation proportions, etc.
 - b. FPC Annual Report – Data from these tables are used in many of the analyses and appendices presented in the FPC annual report, particularly the chapter pertaining to the SMP and the multiyear analysis of survival.
 - c. CSS Annual Report – Data from these tables are used in many of the analyses presented in the CSS Annual Reports.

Database Name: PITTAG2008

In December 2007, the FPC developed a new database (PITTAG2008) for PIT-tagged fish. This new database was primarily developed in order to address the issue of “dotted-out” tags from PTAGIS. At the end of the migration season, all PIT-tagged fish for that migration season will be downloaded from PTAGIS and loaded into this new database (PITTAG2008). By waiting to load these data until after the migration season is over, FPC staff will eliminate the possibility of loading a PIT-tagged fish that is later “dotted-out” by the tagging coordinator. This database currently has data for migration years 2005-2007. It is our intent to continue loading historic migration years prior to 2005. In addition, this database will be updated periodically for adult detections in subsequent years.

This database has all the same tables as those discussed above for the PitTagTwo database. These data are downloaded from PTAGIS in the same manner as those for the PitTagTwo database. Furthermore, the tables in PITTAG2008 will be populated using the same FishPump GUI program. This database will then be used by FPC staff for analyses for the FPC Annual Report and the CSS Report.