The Fish Passage Center
Annual Report of Accomplishments
2014

Rock Island Left Bank Fishway entrances, at reduced pool elevation. Temporary denil passage structures were later installed in June.

Submitted to
The Fish Passage Center Oversight Board
January 31, 2015
Profile

The Fish Passage Center (FPC) was first established in 1984 by agreement of the Columbia River Inter-Tribal Fish Commission and the National Marine Fisheries Service on behalf of the basin’s tribes and the Columbia Basin Fish and Wildlife Council. The FPC originally housed two Water Budget managers and provided them with administrative support. The two Water Budget managers were a component of the Water Budget measures included in the Northwest Power Planning Council’s first Fish and Wildlife Program adopted in 1982. One Water Budget Manager represented the basin’s tribes and the other represented the state and federal fish and wildlife managers.

Since 1982, the Fish and Wildlife Program has directed that BPA provide funding for the functions carried out by the FPC. The FPC serves a large number of significant data gathering and analytical functions including the design and oversight of the implementation of the Smolt Monitoring Program (SMP), the Gas Bubble Trauma (GBT) Monitoring Program, and the Comparative Survival Study (CSS). The FPC provides a non-federal pool of expertise in assessing the effects of dam operations on Columbia Basin salmon, including analysis of juvenile salmon survival related to flow, spill, gas supersaturation, and passage routes. Tribal and state fishery managers rely heavily on this expertise and have managed their own staffs accordingly. The FPC provides a wide range of data and information through its website, including daily fish passage data, historical data, and an archive of relevant documents.

Rock Island Dam tailrace: bedrock exposed as the result of Wanapum Pool drawdown

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1 At the time the four Columbia River Treaty tribes were not members of the Columbia Basin Fish and Wildlife Council. Subsequently the Columbia Basin Fish and Wildlife Council was dissolved and the Columbia Basin Fish and Wildlife Authority was established which included expanded membership including the Basin tribes.
The Northwest Power and Conservation Council (NPCC) works to protect and enhance fish and wildlife in the Columbia River basin. The NPCC Fish and Wildlife Program guides project funding by the Bonneville Power Administration. In October, 2014, the NPCC adopted a new amended Fish and Wildlife Program through a regional amendment process. The 2014 Program amendments established and reaffirmed the directives and objectives of the FPC. The amendments reaffirmed the primary purpose of the FPC as the provision of technical assistance and information to the fish and wildlife agencies and tribes in particular, and the public in general, on matters related to juvenile and adult salmon and steelhead passage through the mainstem hydro system. The 2014 program amendments describe the duties, objectives and responsibilities of the FPC and the FPC Oversight Board as follows.

The FPC Oversight Board will annually review the FPC’s performance and help assure regional accountability, data management compatibility, and program consistency. The functions of the FPC include the following:

- Assemble, organize, make publicly available, and maintain the primary archive of the SMP data.
- Participate in the development of the annual SMP implementation plan and assist in the implementation of the program.
- Assemble, organize, and make publicly accessible data from other primary sources, and conduct analyses as requested to meet the information needs of the fish and wildlife agencies, tribes, and public with respect to water management, spill, and fish passage.
- Provide technical information necessary to assist the agencies and tribes in formulating in-season flow and spill requests that implement the measures in the Council’s program, while also assisting the agencies and tribes in making sure that operating criteria for storage reservoirs are satisfied.
- Provide the technical assistance necessary to coordinate recommendations for storage reservoir and river operations that, to the extent possible, avoid potential conflicts between anadromous and resident fish.
- Archive and make publicly accessible the data used in developing all analytical results, associating the specific data with the respective analyses.

The FPC provides technical assistance and information to the region’s fish and wildlife agencies and tribes, and the public, on matters relating to the program’s flow and passage measures.

The Council will work with the states, federal agencies, and tribes to identify specific indicators for Bonneville-funded hatchery programs that could be tracked and reported to inform progress on meeting mitigation objectives (i.e., harvest, supplementation, reintroduction, and conservation). Potential indicators that should be tracked include: contribution to hatchery broodstock, natural spawning, and harvest by hatchery. Potential indicators that could be tracked include: in-hatchery survival (egg-to-smolt); juvenile production/releases; hatchery smolt-to-
adult returns, and hatchery recruits per spawner. The Council, agencies, and tribes will work with the Coordinated Assessment partners, the FPC, and others as appropriate.

In 2010 the Fish Passage Center Oversight Board established a process and guidelines for implementation of the 2009 Fish and Wildlife Program measures regarding Independent Scientific Advisory Board (ISAB) review of FPC products. The Oversight Board agreed that the first priority is the review of the FPC Annual Report and the Comparative Survival Study Annual Report. The Oversight Board agreed to implement a process and guidelines for review of the Center’s products in 2011. Subsequently in 2013, the ISAB recommended that review of the FPC Annual Report by the ISAB should be discontinued. The ISAB continues the annual review of the Draft Comparative Survival Study Annual Report. The FPC staff works with the states, tribal and federal representatives on the CSS Oversight Committee to respond to the ISAB comments and recommendations.

On May 2, 2008, the Fish Accords Memorandum of Agreements was completed between the tribes (i.e., Confederated Tribes and Bands of the Yakama Indian Nation, the Confederated Tribes and Bands of the Umatilla Reservation, and the Confederated Tribes of the Warm Springs Reservation of Oregon) and the Bonneville Power Administration. The Memorandum of Agreement included the FPC project, the SMP project and the CSS project, specifying the same services, products, and tasks that have been carried out by the FPC historically. Since 2009 the FPC has operated under the terms and auspices of the Fish Accords Memorandum of Agreement in addition to the NPCC Fish and Wildlife Program. The Fish Accords establish annual out-year budget levels as part of the agreement. The 2014 FPC budget was developed according to Tribal Accord Agreement guidelines.

The Year in Review

Funding level for the FPC was established by the terms of the Fish Accords Memorandum parties. The terms of the agreement also establish future funding levels which included 2014. The implementation of the agreements among the Accord parties simplified and streamlined the budgeting and contracting process for the FPC. This allowed the FPC staff to (1) concentrate efforts on improvements to the mainstem passage monitoring programs (the SMP and the CSS), (2) improve public data access through the FPC website, and (3) improve and increase data display.
Several improvements were implemented in the CSS in 2014, based on recommendations from the ISAB of the NPCC, and the state, federal and tribal fishery agencies. The CSS Annual Review meeting was held on April 23, 2014. The CSS Annual Review meeting is a public presentation of analyses of CSS data. The meeting is open and the FPC strives to invite attendance from all regional agencies and the public including the action agencies and state, federal and tribal agencies. In response to ISAB recommendations the FPC has encouraged scientists working in tributary, estuary, and ocean areas to attend the CSS Annual Review. All CSS Annual Review presentations are posted on the FPC website.

In 2014, the FPC staff worked closely with the Fish Passage Advisory Committee (FPAC), state, federal and tribal fishery managers in reviewing and considering modifications to the SMP to reduce handling and sampling of ESA stocks. This review will continue through 2015. The 2015 SMP will reflect some of the modifications to smolt trap operations that were agreed to in 2014, to reduce handling and sampling. These changes will be implemented as “pilot” modifications in 2015. Permanent changes to the SMP will depend upon results from 2015. Juvenile fish passage characteristics, such as survival and travel time, will be documented in the FPC Annual Reports of the SMP for 2014. SMP data is first distributed to the region via the FPC website. Passage indices, flow, spill fish condition and gas bubble trauma monitoring data is available immediately on the FPC website as monitoring takes place. Calculated data such as travel time and survival is available on the website after analyses are complete. The contract completion date for that Annual Report is August 31, 2015. Smolt-to-adult return, effect of environmental and river conditions, and effects of route of passage are documented annually in the CSS Annual Report (completed November 30, 2014, and posted on the FPC website).

The FPC staff invested a significant amount of time in the Adult Fish Facility Inspection Program as the result of major fish passage problems which occurred at the Upper Columbia Projects. This started with structural problems at Wanapum Dam which led to modifications of pool elevation which affected adult fish passage.
Runoff Volume and Flows in 2014

The January–July runoff volume forecast for the Columbia River above The Dalles was 106% of average, while the April–July runoff volume forecast for the Snake River above Lower Granite was 99% of average. The Biological Opinion flow target for the spring migration period at McNary based on these forecasts was 260 kcfs and 100 kcfs at Lower Granite Dam. The summer migration period Biological Opinion flow targets were 200 kcfs at McNary and 52 kcfs at Lower Granite. The actual seasonal average flow for the spring migration period at McNary was 286.4 kcfs and 91.8 kcfs at Lower Granite. The summer migration period actual flow was 189.8 kcfs at McNary and 40.4 kcfs at Lower Granite.

The Smolt Monitoring Program

The Smolt Monitoring Program (SMP) was successfully implemented according to the plan agreed upon by the state, federal, and tribal fishery agencies. The objective of the SMP is to provide a consistent, long-term database for short-term in-season fish passage management, and for long-term mitigation decisions. In consultation with the U.S. Fish and Wildlife Service (USFWS) and FPAC, the SMP was modified to accommodate collection of data on juvenile and larval lamprey in 2011. These modifications included: (1) adopting a standardized approach to juvenile (and potentially adult) lamprey identification based on methods that the USFWS developed, (2) assigning a sample rate to juvenile lamprey that were sampled at SMP sites (as opposed to handling lamprey as “incidental species” whose counts were not associated with sample rates), and (3) implementing a pilot study of condition monitoring. In 2014, again as the result of requests from USFWS and FPAC, lamprey condition monitoring was added to the SMP at McNary and Bonneville Dams, in addition to lamprey condition monitoring which was established at the John Day smolt monitoring site in 2011. The FPC32.net data entry program was modified in winter 2011 to accommodate these changes in 2014 monitoring.
In November 2013, FPC staff provided a report of the 2013 lamprey data to the Lamprey Technical Work Group (LTWG) with questions for guidance for the 2014 SMP season. The LTWG did not recommend modifications for the 2014 SMP lamprey monitoring. As a result monitoring for 2014 was conducted consistent with 2013 monitoring without any changes to the sampling program or protocol.

Major modifications were completed to the FPC32.net remote data entry program to accommodate lamprey monitoring. Additional major modifications to the remote data entry program were not required in 2014.

Grande Ronde River Smolt Monitoring Trap (ODFW)

The FPC staff provides daily oversight and technical support for the eleven remote sites implementing the SMP. Final data and analyses of the SMP data are reported in the FPC Annual Report. Data validation/verification and data analysis occur throughout the fall and winter and are presented in the FPC Annual Report the following year. SMP data collection continues from March through October 31 at most in-river trap and mainstem sites. The quality control data verification report was completed and distributed to the remote sites on December 10, 2014, completing the data review process. Annual Report for the 2013 passage season was completed after providing a draft for a 45-day regional review. It was distributed and posted on the FPC website, on July 31, 2014, according to contract deliverable dates, along with previous year’s reports. The ISAB, following their recommendation to the NPCC, did not provide comments on the FPC Annual Report.
Annual GBT Monitoring and Reporting

The Oregon Department of Environmental Quality waiver, issued for implementation of the NOAA Biological Opinion spill for fish passage measures, requires a gas bubble trauma monitoring program. The FPC maintains responsibility for the technical design and implementation of that program including data collection, distribution, and analyses. The FPC includes these data on the FPC website and includes these data in the FPC Annual Report. In addition the FPC staff provides a separate report; an annual summary of GBT data to the U.S. Army Corps of Engineers (USACE) and to NOAA Fisheries to fulfill states’ issued dissolved gas waiver permits. This annual report summary was completed and provided to the agencies in November for incorporation into their 2014 passage season report requirements. Dissolved gas bubble trauma monitoring data is updated daily on the FPC website and is reported in the FPC Annual Report.

GBT sampling at Little Goose Dam
Planning for 2015

In 2014, the FPC developed responses to questions and comments by the ISAB on CSS reports. These reviews, comments, and recommendations are taken into consideration in planning SMP and CSS activities and analyses in future years. The FPC staff participated with the fishery managers in a regional review of the CSS and SMP projects in regard to reduction of sampling and handling of ESA listed stocks. Several modifications were planned for implementation in 2015 to meet those objectives. The review is continuing in 2015. “Pilot” modifications to smolt trap operations are planned for implementation in 2015, after which their effectiveness will be evaluated for future years planning. The FPC staff participated with PTAGIS staff in pilot testing the “PIT-Tag Forecaster” program for future years planning of PIT-tag utilization. In 2014 the FPC staff worked with Idaho Department of Fish and Game (IDFG) to plan for future sockeye CSS mark groups to adjust to future hatchery program modifications. In 2014 the FPC staff worked with the Nez Perce Tribe (NPT) to collaborate on CSS/NPT future CSS mark groups. The FPC staff worked extensively with the IDFG and Oregon Department of Fish and Wildlife (ODFW) to maximize efficiency of future mark groups coordinating with existing marking plans and programs for the CSS study.

Endangered Species Act Section 10 Permit and State Endangered Species Act Permit Requirements

The FPC is responsible for application, accounting and reporting for federal and state ESA sampling and monitoring permits for the SMP and the CSS. Estimated numbers of endangered and/or threatened species to be handled are submitted to the permitting authority. Permit applications and reporting were completed. Application, accounting, and reporting for state ESA permits were also accomplished. All ESA permit requirements were met in 2013. State permits from both Washington and Oregon were obtained for sampling under state-mandated requirements.

Comparative Survival Study

The Comparative Survival Study (CSS) is a jointly developed and sponsored program of the state, tribal and federal fishery management agencies. A CSS Oversight Committee comprised of state, federal, and tribal fishery management agencies has been established to provide technical direction for data collection, analysis and preparation of annual status reports. The ISAB reviews of the CSS Annual Reports for previous years have contributed to the determination of specific analyses and activities conducted for the CSS in 2014.

The CSS has had a history of collaboration and is currently cooperating with several other agencies including: the Lower Snake River Compensation Plan, IDFG, ODFW, Washington Department of Fish and Wildlife (WDFW), Idaho Power Company, and the SMP. This project incorporates the long-term PIT-tag marking and recovery of groups of wild and hatchery Chinook juveniles and steelhead. We continued our coordination toward the marking of hatchery Chinook groups from Imnaha, Catherine Creek, McCall, Rapid River, Dworshak,
Clearwater, Pahsimeroi and Sawtooth facilities; hatchery steelhead groups from Dworshak, Clearwater, Magic Valley, Hagerman, Niagara Springs, and Irrigon hatcheries; and wild Chinook and steelhead from tributary tagging programs in the Clearwater and Snake River basin. These PIT-tag groups will also be an important component of the regional smolt monitoring program.

In addition to the historic data time series analyses included in the CSS, additional analyses were added in 2014. Enhancements, improvements and new considerations were included in the CSS 2014 Annual Report. Some new mark groups were added in the 2014 report. In addition to overall smolt-to-adult return rates (SARs) for aggregate Snake River wild steelhead and Chinook salmon, the report now includes overall SAR estimates for wild steelhead and Chinook salmon at the Major Population Group (MPG) level when sample size was adequate. These MPG-level SARs are provided for both Lower Granite to Lower Granite and from Lower Granite to Bonneville with and without jacks (1-salt) for Chinook salmon. In addition, the report now includes estimates of overall SARs (McNary to McNary) for Yakima River wild Chinook salmon, Yakima River hatchery Chinook salmon (i.e., Cle Elum Hatchery), and Yakima River wild steelhead. New fall Chinook groups were added to Chapter 5, including the Little White Salmon, Spring Creek hatchery fall Chinook salmon releases, along with Deschutes River wild fall Chinook salmon. Also new in the 2014 report is Chapter 6 which presents the design and preliminary results of a study of PIT-tag effects on Carson Hatchery spring Chinook salmon. The long-term CSS objective of linking stages of the salmon life cycle, the factors influencing survival at each life stage, and understanding how each factor affects survival at later life stages, is a work in progress. Utilizing PIT-tag groups, survival was separated into mainstem and early ocean components, and variability in fresh water productivity was included in the analysis. In these analyses mixed-effect model structures were included in analyses of the factors that influence fish travel time, instantaneous mortality, and survival probability. The application of mixed-effects models in the 2014 report increased the proportion of the variation that was explained in models of juvenile migration and survival probability. Incorporating the 2014 adult
returns in this Annual Report shows that the trends seen in all but two past years of CSS monitoring continues. The overall SARs for Upper Columbia and Snake river populations of salmon and steelhead are not meeting the 2%–6% regional goal, while middle Columbia populations are meeting the regional SAR goals in most years. In response to ISAB comments and recommendations, the 2014 report includes analyses of SARs relative to estimates of population productivity. This is the beginning of a longer-term effort, which will need to incorporate effects of density dependence on observed productivity to evaluate population responses relative to SAR rates.

In 2014 the FPC staff continued modifications to the Bootstrap program utilized in CSS analyses. We use our own software that is developed in-house to generate many of the base metrics provided by the CSS. The development of our update to this software began in 2011 and continued through 2014. The FPC continues to utilize C# programming language to continue to streamline the user interface to increase efficiency and provide more flexibility. The 2014 programming has successfully improved the speed and streamlined the data analyses with the Bootstrap program for the CSS mark groups, allowing more mark groups to be processed more quickly for analyses by the CSS Oversight Committee. The considerable effort expended by FPC staff to adjust FPC data acquisition and validation processes to the new SQL data structure
adopted at PTAGIS reached a successful conclusion in 2014, as all modifications to FPC data acquisition processes successfully worked with the new PTAGIS structures. FPC staff continues to work closely with PSMFC PTAGIS staff to assure accurate and efficient data access. This continues to be a high priority for FPC staff.

On April 23, 2014, the CSS Oversight Committee and the FPC organized and conducted the fourth Comparative Survival Study Annual Review. The objective of the public review meeting is the presentation of the annual CSS analyses by the agencies and tribes representatives on the CSS Oversight Committee and the FPC. The Annual Review meeting was held at the Water Resources Education Center in Vancouver, Washington, and was well attended by the fishery management agencies, tribal representatives, the ISAB, and the public. The presentations and attendance from the Annual Review meeting are available on the FPC website. CSS life-cycle analyses incorporating freshwater and ocean conditions were presented at the Annual Review.

**Adult Facilities Inspection Program**

The state and federal fishery management agencies provide funding for the FPC Adult Fish Passage Facilities Inspection Program. FPC staff manages the agencies’ adult facilities inspection program and writes the annual report of the inspection program. The FPC staff trains inspectors and coordinates fish facilities inspections at federal and Public Utility mainstem Columbia and Snake River dams. Inspections are conducted monthly and are often accompanied by FPC staff. Monthly reports are provided to the FPC and then posted on the FPC website for regional access. Facility issues that arise as the result of inspections are raised to the project operators by the FPC for discussion and resolution, and are reported to the FPAC. In 2014 inspections were conducted at all 13 dams. A total of 97 adult facility inspections were conducted in 2014.

In addition emergency passage facility events are coordinated by the hydro project operators and regulators through the FPC facilities inspection program staff who assures communication with FPAC. In 2014 FPC Fish Facilities Inspection Program staff invested significant effort into adult passage problems that occurred throughout the spring and summer adult migration period as the result of structural problems that arose at Wanapum Dam. The structural problems at Wanapum required significant reduction of the pool elevation at Wanapum Dam which affected the operation of adult fish passage facilities. In addition serious injuries to adult migrating salmon and steelhead were observed at the Wells Dam adult trapping facility. FPC Adult Fish Facilities Inspection Program staff conducted field investigations, research and field site visits to analyze and provide detailed information to FPAC. These investigations were summarized in memorandums to FPAC and posted on the FPC website.

FPC produces an Annual Adult Facilities Inspection report. All inspections and reports were successfully implemented in 2014. The Annual Adult Facilities Inspection Report for 2013 was completed in 2014 and is posted on the FPC website with reports from previous years. The draft 2014 report will be completed by April 15 and posted on the FPC website for a 45-day public review period. The final report will be completed by June 1, 2015, and posted on the FPC website.
Data Acquisition, Storage, Management and Distribution

The NPCC Program Amendment specifically requires the FPC to “Gather, organize, analyze, house, and make widely available monitoring and research information related to juvenile and adult passage and to the implementation of water management and passage measures that are a part of the Council’s program.” The FPC Data System is comprised of several databases that are maintained and updated hourly, daily, weekly, monthly and annually. These databases are utilized by the state, tribal, and federal fisheries agencies for in-season management deliberations and decisions, so they must be accurate with the most recent information available. The databases are the foundation of FPC analysis and technical support for the fishery managers. Smolt passage data, flow, spill, and adult counts are updated daily. The hatchery release database is continually updated through daily discussions between FPC staff and hatchery managers and staff to assure that hatchery release data are up to date and reflect any last minute changes in release data. All of the FPC databases were successfully maintained and updated without lapse in 2014. In 2014, several upgrades, improvements, and modifications were made to the FPC data system. Analytical tools were developed to deliver data for our users, improve database stability, and improve data presentation to facilitate meeting the needs of the agencies, tribes, and the public at large. Website improvements were made to enhance user navigation, ease of use, and data access. A major improvement for the operation of the FPC website which occurred was the installation of fiber optic line in 2013 to improve speed and capacity for the website, and data access from the website by the region.

Software Development and Hardware Updates

- New storage procedure created to automate flow/spill report for posting to web.
- Technical support provided for Nez Perce data collection system in support of the SMP.
- New features added to FPC32.Net data entry program for the SMP.
  - Warning pop-up when cancel button is selected.
  - New lamprey section in Daily Summary Report and new Sockeye Fry column.
- Summary data validation system developed to control PTAGIS Extract file. The system includes:
  - Four report tables (ReportMortDetail, ReportRecaptureDetail, ReportTaggingDetail, and ReportInterrogationSummary)
  - SSIS jobs to post data from PTAGIS reports csv files to SQL server report tables
  - C# application to copy reports from SMPSITES folder as csv files into DataSource (part of FTPSpider)
  - PTAGIS reports running on PTAGIS database system to provide aggregate data for FPC as e-mail attachments
- New computer program (CSS Bootstrap BT4.3 Light) developed.
  - Export output data into SQL Server tables in formats easy to import into Excel applications
  - Run application from settings screen
  - Run application from list for multiple settings
Separate results in three tables (CRT, T and R) with individual structure.

- Daily validation system to control and fix PTAGIS Extract file Data Collection developed and used to validate 1988 to 2014 mortality and recapture data. System upgrades include:
  - tblReceivePITAGReportbyDay table as main Daily reports log table
  - Report tables ReportMortDetailbyMortDate and ReportRecaptureDetailbyRecDay
  - PTAGIS reports running on PTAGIS database system to provide data for FPC as e-mail attachments
  - SSIS application to post data from PTAGIS report csv files to SQL server daily report tables
  - spUpdateReportRecaptureDetailTablebyRecapDaybyYear storage procedure to recalculate Extract data collected in FPC database as PTAGIS report format (Day-Site-Species-Count) and show the difference.

- Built a new database server (SQL2)
- Built a new database server to replicate BOOSTRAP6 - (PITTAG_SQL6)
- Built a new antivirus server which continuously runs software to scan network
- Switched data collection to new database server
  - Reinstated replication services for database tables, storage procedures, and views
  - Reinstated ODBC services
  - Reinstated back-ups and scheduled jobs
- Replaced failing hard drive in BOOTSTRAP-6 database server
- Reinstalled databases and data collection services on BOOTSTRAP-6 after hard drive replacement.

**Website, Daily Reports, Database, and Data Updates**

- Performed regular website maintenance and updates including updating some SMP queries and graphs for the new season (e.g., fish condition graph and query, population index data and graphs, spill to the fish operations plan, passage index graphs and data queries, etc.).

- Updated CSS queries and graphs to incorporate data from CSS 2013 Annual Report including: SR, TIR, and D Data; Overall Annual SARs for the Snake and Columbia rivers; Returning Adult Age Composition; SARs by Study Category; Number of Smolts and Returning Adults by Study Category; annual in-river survival estimates query; and number of PIT-tagged fish released by site query.

- Developed a new prototype Adult sub-site using the updated software stack on a development server. The new adult sub-site includes the following queries:
  - Adult Daily Data Query
  - Adult Annual Totals Query
  - Adult Dam Counts Passage Graph
  - Adult Salmon Return Comparison Report
• Created new Adult sub-site using enhanced dojo.js tables on the development server.

• Created new reporting sites map using leaflet.js and various plug-ins. Added new data to each project pop-up dialog, including photos.

• Updated logic on SMP Passage Index queries by year and species to identify rearing disposition (i.e., Combined, Hatchery, Unmarked, or Wild). Added the SMP passage index graphs to the data query. Updated the SMP passage index metadata to include information about partial sampling at the beginning of the season prior to transportation season.

• Updated website metadata for current year. Updates include: SMP metadata; GBT metadata; adults metadata; 2014–2014 adult salmon dam count monitoring dates; 2013-2014 Columbia and Snake River fishway outages; summary of 2013 actual and 2014 preseason forecasts of spring Chinook, summer Chinook, sockeye and steelhead returns to the Columbia River; summary of salmon and steelhead estimated returns to the Columbia River mouth by year, etc.

• Updated annual report adult maps and hatchery maps.

• Updated CSS annual report tag and release site maps.

• Updated programming of SMP Passage Index (PI) species rearing type logic in PI Query/Graph and added metadata to SMP queries
  o Completed updating programming of SMP PI species rearing type logic in PI Query/Graph.
  o Began gathering historic SMP PI data for all species queries (completed 1984 through 2010).

• Developed programs to update spatial monitoring sites and overlay with watersheds, ESUs and MPGs.
  o Completed a procedure to download hatchery, release sites, and release data from SQL into a csv format.
  o Completed finding and testing scripts to remove, store, and restore dependencies on spatial tables and views.
  o Using the current year hatchery.csv, releasesite.csv and other monitoring sites .csv files, completed scripting a spatial SQL script to:
    ▪ Input the data into the spatial database on PostgreSQL
    ▪ Create spatial points from latitude/longitude data and register those points with spatial reference system (spherical Mercator, units meters)
  o Overlay monitoring sites with various geographies used in spatial queries (HUCS, river zones, ESAs for chinook, MPGs for spring/summer Chinook, and POPs for MPGs for spring/summer Chinook).
  o Update existing tables with the new data.

• Web-site Documentation
  o Completed documentation on the current website’s adults sub-site and started updating the river section website documentation.
Continued working on documenting the prototype fpc.org website’s adult sub-site.

Created a procedure and automated script to:

- Input release sites into the spatial database on PostgreSQL
- Create spatial points from latitude/longitude data and register those points with spatial reference system (spherical Mercator, units meters)
- Overlay relsites with various geographies used in spatial queries (HUCS, river zones, ESAs for chinook, MPGs for spring/summer Chinook, and POPs for MPGs for spring/summer Chinook).

- Created SPSU CHINOOK Hatchery and Monitoring Sites mapping prototype application.
  - Designed user interface for monitoring app prototype.
  - Added data to table of contents and colored datasets for the mapping application.
    - General groups include:
      - Hatcheries and Release Sites
        - Hatchery Sites
        - Hatchery Code Labels
        - Release Sites
        - Release Site Code Labels
        - Watershed Boundaries
      - WATERSHED – Monitoring Sites (CSS Sites, Redd sites, PIT-tag sites, smaller private hatcheries, smaller private dams, weirs and traps)
      - WATERSHED - ESU, MPG, Populations
      - WATERSHED - Streams, Towns, and Highways
      - RIVER BASIN - Rivers, Counties, and Interstates
      - COLUMBIA RIVER BASIN - ESU, MPG, Populations
      - ALL SCALES - Land cover and water
  - Began development of a prototype program and procedure for linking selected monitoring sites to additional data. Tested the prototype program to query a database table and produce a dynamic table with basic location information and urls to other FPC website queries that pertain to that location.
  - Developed spatial search queries (a query that zooms to highlight and opens up data tables for selected locations). The spatial searches include:
    - Select one SPSU Chinook hatchery and its associated release sites
    - Hatcheries and release sites by ESU, MPG, population or watershed
    - Release sites by release river
    - Select one SPSU Chinook release site
    - Select one SPSU Chinook CSS site
    - SPSU Chinook CSS site by ESU, MPG, population or watershed
    - Select other monitoring sites (PIT tag, weirs, traps, etc.) by ESU, MPG, population or watershed
    - Select one redd site
    - Select redd sites by population
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New storage procedure to populate flow/spill report table

New features for FPC32.Net data entry program
Warning: You have not exported newly saved data to XML file.
Press Exit to exit program without saving data to XML file.
Press Return to return to touch screen so data can be exported to XML file.

New features for FPC32.Net data entry program
— Warning pop-up when cancel button is selected
FPC New Web Design – Adult Sub-site – Adult Salmon Dam Count – Data Query

FPC New Web Design – Adult Sub-site – Adult Salmon Dam Count – Annual Totals Data Query

FPC New Web Design – Adult Sub-site – Adult Salmon Dam Count Graphs
FPC New Web Design – Adult Sub-site – Adult Salmon YTD Comparison Table
Daily SMP Passage Data Query and Graph includes new logic identifying species rearing disposition for each year (i.e., combined, hatchery, unmarked, or wild)

Updated CSS Queries and Graphs incorporating data from 2013 CSS Report
Updated SMP 2014 Season Queries and Graphs

Updated 2014 Metadata, Forecasts, Spawning, Kelts, etc.
Summary data validation system to control PTAGIS Extract file
Scripting a spatial SQL script to automate updating new hatchery, release and other monitoring points, and overlay with watersheds and spring Chinook major populations groups and population groups.
SMP Enhanced Metadata Table
SMP Historical Passage Index Data (1985–2010)

Updating Web-site Documentation (current asp website)
SPSU Chinook Hatchery and Monitoring Sites mapping prototype application: GUI and layers

SPSU Chinook Hatchery and Monitoring Sites mapping prototype application: Spatial Searches
SPSU Chinook Hatchery and Monitoring Sites mapping prototype application: Dynamic Link to additional data

Replication Services for Database Tables, Storage Procedures, and Views Used on Website
Updated Annual Report Hatchery and CSS Release Maps

BT 4.2 Updates
CSS Bootstrap BT4.3 Light
### Daily data validation system to control PTAGIS Extract file

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</table>

### 2014 Annual Web Statistics

The FPC website is the primary vehicle for data distribution. During 2014, FPC.org had 23,530,364 hits. During 2013, there were a total of 23,639,612 hits. In 2014, there were a total of 4,495,992 pages viewed and 2,541,840 visits to the website. The numbers of unique page views were 3,289,261. The average number of hits per day was 64,466. The average visits per day to the website were 6,963 staying an average of 8½ minutes. About 93.2% of the visits were from the United States. Of the U.S. visits, 33.7% were from Washington, 21.5% were from Oregon, 12.6% were from California, 4.6% were from Idaho, and 27.6% were from other states. Of the top 50 domains, 46.6% were from commercial, 37.4% were from organizations, 15% were from individuals, and 1% were from government and education sites. We log all data requests made via the web. The number of requests between 1/1/2014 and 12/31/2014 was 2,207,374.
The most active day of the week was Tuesday, while the least active day of the week was Saturday. The busiest hour of the day was around 3:00 PM. September was the busiest month, with 15.4% of the hits, followed by May (13.5%), April (11.5%), August (11.3%), June (9.3%) and July (9.2%). The top platform (operating system) used to hit the site during 2014 was Windows 7 with about 53.6% of the hits, followed by Android (14.6%), Windows XP (8.5%), Windows NT (8.1%), Mac OS (7.8%), Windows Vista (6.2%), Unix/Linux (0.8%), iOS (0.1%) and other platforms (0.3%). The top browser used to hit the site was Internet Explorer (40.9%) followed by Safari (29.8%), Chrome (19.4%), Firefox (8.7%), and other various other browsers (1.2%). A total of 20% of the visits during 2014 were from mobile devices. Of the 20% mobile visits, 76% were from iPhones, 22.6% were from iPads, 0.8% were from various Android devices, and 0.6% were from iPods.

The top requested page was the Daily Adult Salmon Dam Count Report. Of the top 150 groups of requested pages and queries, 81.7% were about adult salmon, 8.8% were about FPC documents and other FPC administrative pages (includes FPC homepage, contact, site map, FAQ, FPAC links, etc.), 3.7% were about river queries (flow/spill report, temperature graphs, spill update, etc.), 3.7% were about smolt data, and 2.1% were about CSS, PIT-tag, hatchery and other data queries.
Visits by Hour of Day

Hits by Domain, 2014

- Commercial, 47%
- Network/Individual, 15%
- Organization, 37%
- Government/Education, 1%
Hits by Browser, FPC.ORG, 2014

- Internet Explorer: 41%
- Safari: 30%
- Chrome: 19%
- Firefox: 9%
- Other: 1%
Of the 20% of Hits from Mobile Devices:
Percentage of Hits by Device Type

- iPhones 76%
- iPads 22.6%
- Android 0.08%
- iPods 0.06%
2014 Percentage of National FPC.ORG Visits by State

Note: The geographic locations included in these maps are based on where the domain name of the visitor is registered. In some cases, the domain name is not registered in the same location as the visitor. For example, the domain name for the USFWS is in Colorado. Therefore, if a USFWS employee in Montana, Washington, Oregon or Idaho accesses the FPC website, that visit will be logged as coming from Colorado.
2014 Percentage of International FPC.ORG Visits by Country

Note: The geographic locations included in these maps are based on where the domain name of the visitor is registered. In some cases, the domain name is not registered in the same location as the visitor. For example, the domain name for the USFWS is in Colorado. Therefore, if a USFWS employee in Montana, Washington, Oregon or Idaho accesses the FPC website, that visit will be logged as coming from Colorado.
Technical Assistance for Fishery Managers and the Public at Large

The primary purpose of the FPC is to provide technical assistance and information to fish and wildlife agencies, the tribes in particular, and the public in general. The FPC participated in all FPAC meetings and provided technical information as requested. In-season analyses and recommendations relative to the implementation of the 2014 Operations Agreement were assessed weekly and SORs were developed and submitted as needed. The FPC also participated in weekly Technical Management Team meetings. The FPC participated in PIT-tag steering Committee meetings and in some meetings of the Coordinated Assessment Group. In 2014 the FPC staff began working with the U.S. v Oregon Policy Committee and a TAC small work group committee to respond to their requests for assessment of adult salmon and steelhead passage success in the mainstem Columbia River. The FPC staff continued to provide technical support to IDFG to maintain and update an IDFG website entitled Follow Idaho Salmon Home (FISH). The website displays life cycle data for Idaho stocks of salmon and steelhead and is designed to provide easily accessible data for the salmon life cycle for juveniles leaving Idaho, migrating to the ocean, and returning to Idaho. The FPC staff works with IDFG to coordinate mainstem passage and SAR adult return data with the IDFG state data. The FPC staff responded to requests from Oregon Department of Environmental Quality (ODEQ) for Dissolved gas bubble trauma monitoring data to support the ODEQ consideration of the extension of the water quality dissolved gas waiver to facilitate the implementation of the Biological Opinion spill for fish passage measures. FPC staff conducted statistical power analyses to determine fall Chinook mark group size for future CSS evaluations of fall Chinook in coordination with Nez Perce Tribe evaluations of fall chinook survival and adult return. In response to requests, the FPC staff reviewed NOAA analyses of smolt transportation benefits and transportation operations. FPC staff provided extensive analyses to FPAC of the comparison of survival and smolt-to-adult return rate of fish passing the McNary project on sampled versus nonsampled days.

The FPC staff invested a significant amount of effort providing technical support to the fishery management agencies and tribes in the following topics in 2014. Some of these topics are expected to continue through 2015.

SMP Review

In 2014, FPAC began a thorough review of the SMP. The purpose of the review was to address questions about whether the data collected by the SMP fulfilled the needs of the fisheries managers. In support of this review, FPC staff provided an overview of the current SMP program. This overview outlined what data are being collected under the SMP, what these data are used for, and what potential impacts may occur if modifications are made to SMP sampling protocols. FPAC decided that the SMP would not change in 2015, but discussions of potential changes would continue throughout 2015 for possible implementation in 2016. During this time, we anticipate that FPC staff will continue to provide technical assistance to FPAC in addressing questions that arise during these discussions.
Modifications to the CSS Trapping/Tagging Program

In an effort to reduce handling of listed hatchery CSS and SMP traps, FPC staff provided technical advice to state, federal, and tribal fishery managers to modify the trapping and tagging plans for several CSS/SMP traps in 2015. Specifically, FPC staff worked with staff from ODFW to develop a pilot program for 2015 where additional ODFW tags will be incorporated into the CSS sort-by-code in order to accommodate modified trapping operations at the Grande Ronde River trap that are intended to reduce handling of listed hatchery Chinook. In addition, FPC staff worked with staff from IDFG on a modified trapping plan for the Salmon River trap that is intended to reduce handling of listed hatchery Chinook. In order to accommodate potential reduction in marking at this trap, FPC and IDFG staff worked with staff from the USFWS and the Shoshone-Bannock Tribe to provide additional tags to existing tributary traps and incorporate new tributary traps in the Salmon River Basin. Finally, it was decided that the mainstem trap on the Clearwater River will be discontinued in 2015. FPC and IDFG staff worked with the USFWS and Nez Perce Tribe to provide additional tags to existing tributary traps and incorporate new tributary traps in the Clearwater River Basin.

Analyses of Alternative Spill Programs at Lower Monumental Dam

In 2014, FPAC requested that FPC conduct extensive reviews of proposed operations for implementation at Lower Monumental Dam in 2014. This information was discussed and used as the foundation for consideration in the U.S. Army Corps of Engineers’ (USACE) FPOM Committee where these proposed operations had been submitted.

USACE Total Dissolved Gas variance from Oregon Department of Environmental Quality

In April 2014, the USACE submitted a request to Oregon’s Environmental Quality Commission (EQC) for a renewal of the modification to Oregon’s total dissolved gas standard for voluntary spill operations at the four Lower Columbia River dams. During the renewal process, FPC staff provided technical assistance to the USACE and ODEQ staff to address questions raised by the EQC regarding the Gas Bubble Trauma Monitoring Program.

In response to a request from the Lamprey Technical Workgroup (LTWG), FPC staff prepared a report summarizing the lamprey monitoring data that were gathered as part of the SMP in 2014 (the report is posted on the web: www.fpc.org/documents/memos/144-14.pdf). Migration year 2014 was the fourth year of including lamprey as target species in the SMP. Results from 2011, 2012, and 2013 were also included in this report. FPC staff also prepared reports to each of our cooperative hatcheries from the SMP and CSS that describe passage timing, survivals, and/or SARs for these cooperative groups. These reports are prepared annually. In addition, upon the request from USFWS, FPC staff prepared a similar report for the Columbia Gorge Hatchery Complex. All of these reports are available on the FPC website: www.fpc.org/documents/FPC_memos.html.

In implementing the NPCC Program language, the FPC responds to requests for data, analysis, and technical support. The vast majority of data provided to the region by the FPC is accessed through the FPC website where data can be downloaded into documents and
spreadsheet formats. Analysis and reports can also be accessed through the website. The data and analysis provided to the region through the website is usually accomplished without direct involvement of FPC staff. However, FPC staff is available to assist individuals when they are having difficulty locating or downloading the data they need.

Specific requests for data summaries or analysis are also submitted to the FPC through telephone conversations or e-mail. If possible, these people are directed to the website and assistance is provided to the requester in navigating the site to retrieve the data requested. For more complex inquiries, these requests are logged onto a data request form, reviewed by the FPC manager, and assigned to one or more FPC staff members according to staff expertise and workload. All data requests are logged and filed upon completion. Those that include analysis are posted on the website. The schematic below shows the process for response to data requests followed by a data request form.
DATA REQUEST FORM

FISH PASSAGE CENTER
847 N.E. 19th Ave., Suite 250, Portland, OR 97232
Phone: (503) 833-3900  Fax: (503) 232-1259
http://www.fpc.org
e-mail us at fpcstaff@fpc.org

Request Taken By: ________________________________ Date: _____________________

Data Requested By:
   Name: _____________________________________ Phone: ______________________
   Address: ___________________________________ Fax: _________________________
   ___________________________________ E-mail: ____________________________

Data Requested:
____________________________________________________________________
____________________________________________________________________
____________________________________________________________________
____________________________________________________________________
____________________________________________________________________
____________________________________________________________________

Data Format:    Hardcopy    Text    Excel
Delivery:    E-mail    Mail    Fax    Phone

Comments:
____________________________________________________________________
____________________________________________________________________
____________________________________________________________________

Data Compiled By: ________________________________ Date: _____________________

Request # ______________
The FPC website is the primary source for public data access. In addition to data access through the website, several data requests are received through telephone or written contacts. Responses to these requests are developed by FPC staff and distributed according to the request. In 2014 the FPC staff received and responded to 67 data requests from agencies, tribes, and the public. Of the 67 requests received, 40 responses required analyses and the response was developed in memorandum form. These memorandums are posted on the FPC website at the same time as they are submitted to the requestor. These requests were completed and presented to the agencies and tribes to facilitate their activities in a wide range of forums related to fish passage and hydro system management. These 40 requests related to data summaries and analysis relative to historic passage data, hydro system operations, and fish passage characteristics. The requests that included analysis were posted on the FPC website in accordance with established FPC operating procedures.

Weekly summary reports of storage reservoir elevations and operations were provided to FPAC and reflected in weekly reports which are posted on the FPC website. FPC staff participated in the Adaptive Management Team and provided analysis and technical support to the agencies and tribes regarding dissolved gas waiver limits and monitoring.

In response to requests from the fishery agencies and tribes, the FPC staff provided historic data summaries, research results, and analytical results to the agencies and tribes as well as review comments on various proposed hydro system operations that potentially affect fish passage and survival. The FPC staff continued participation and technical support in the regional Adaptive Management Team, FPAC, and the Lamprey Technical Workgroup. FPC staff provided technical support for the USACE’s Fish Passage Operations and Management Committee. Regular updates were provided in-season on the migration characteristics of juvenile and adult salmonids during the spring season and particularly during the implementation of the court ordered spill. These were developed into web reports. The FPC staff provided review comments on research proposals and research reports as requested by the agencies and tribes. These were proposed or conducted through the BPA Fish and Wildlife Program process and the USACE’s Anadromous Fish Passage Evaluation Program. Specifically, the FPC staff provided technical assistance to the agencies and tribes in the development and review of research proposals, as well as provided assistance in reviewing results of research used to make management decisions regarding modifications to dam’s operations or structure.

Specific 2014 Requests for Data/Analyses

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<td>Review of BPA/USACE/Skalski presentation to the Independent Scientific Advisory Board on 1/17/14</td>
<td>January 27, 2014</td>
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<tr>
<td>5.</td>
<td>Review of NOAA Analyses Supporting Modification of RPA 30 — Earlier Transport in April</td>
<td>February 18, 2014</td>
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<tr>
<td>No.</td>
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<td>9.</td>
<td>Passage Timing at Lower Monumental Dam</td>
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<td>10.</td>
<td>Modeling the Effects of Idaho Change Form for Ice Harbor Dam Spring Spill Operations on Proportion of Yearling Chinook and Steelhead Passing in Spill</td>
<td>March 5, 2014</td>
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<td>11.</td>
<td><em><strong>UPDATED</strong></em> Preliminary Results from 2013 Pilot to Explore Feasibility of Long Monitoring Group for Okanogan River Sockeye</td>
<td>March 6, 2014</td>
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<td>12.</td>
<td>Results from 2012 PIT-Tagging of Okanogan River Sockeye</td>
<td>March 7, 2014</td>
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<td>13.</td>
<td>Opportunities to Improve Data and Fish Passage through the Upper Columbia River with Emphasis on Present Structure and Passage Issues</td>
<td>March 24, 2014</td>
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<td>14.</td>
<td>Recent Data and Analyses Indicate that Current Fish Passage Operations can be Improved and Established Processes do not Facilitate Incorporation of Recent Data and Analyses into Management Decisions</td>
<td>March 25, 2014 (revised 3/31/14)</td>
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<td>15.</td>
<td>Juvenile Migration Conditions for Fall Chinook Adults Returning in 2014</td>
<td>April 16, 2014</td>
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<td>18.</td>
<td>Fish Injuries at Wells Dam Trap</td>
<td>June 17, 2014</td>
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<td>20.</td>
<td>Data Request re: In-River Juvenile Migration Conditions that Result in High Smolt-to-Adult Return Rates</td>
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<td>21.</td>
<td>AFEP Proposals Submitted to SRWG</td>
<td>August 5, 2014</td>
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<td>25.</td>
<td>Summary of Smolt-to-Adult Return Rates Distributed through the FPC Web Site</td>
<td>September 15, 2014</td>
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<td>26.</td>
<td>Changes to CSS PIT-Tagging for Migration Year 2015</td>
<td>October 1, 2014</td>
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<td>27.</td>
<td>Rock Island Fishway Update</td>
<td>October 8, 2014</td>
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<td>28.</td>
<td>Power Analysis for Fall Chinook Marking in Snake River</td>
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<td>29.</td>
<td>Trap Modifications for 2015</td>
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<td>30.</td>
<td>Summary of Surface Passage Structures Effectiveness Analyses</td>
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<td>Results of 2014 Lamprey Monitoring</td>
<td>November 12, 2014</td>
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<td>33.</td>
<td>Review of PIT-Tag Data for Juvenile Lamprey in the Columbia River Basin</td>
<td>November 14, 2014</td>
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<td>34.</td>
<td>Letter to Melinda Eden (ODEQ) re: Historic Information Associated with the GBT Monitoring Program</td>
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<td>35.</td>
<td>NPCC Fish and Wildlife Program Hatchery Production Reporting Requirement</td>
<td>December 10, 2014</td>
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<td>37.</td>
<td>Results from WDFW Sockeye PIT-Tagging on the Wenatchee River in 2014</td>
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<td>38.</td>
<td>Results from 2013 and 2014 Pilot Studies to Explore Feasibility of Long-Term Monitoring Group for Okanogan River Sockeye</td>
<td>December 18, 2014</td>
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<tr>
<td>39.</td>
<td>Review of Mortality and <em>Columnaris</em> Data from the Smolt Monitoring Program at Snake River Sites</td>
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<td>40.</td>
<td>Review of Adams et al. (2014), <em>Performance of a surface bypass structure to enhance juvenile steelhead passage and survival at Lower Granite Dam, Washington</em></td>
<td>December 18, 2014</td>
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All FPC staff participates in the development of weekly reports from March through October. These weekly reports summarize river and reservoir operations, as well as fish passage information. The reports document any unplanned or planned departures from the implementation of Biological Opinion measures. The report is distributed via e-mail, as well as being posted on the FPC website. The estimated circulation is about 750 readers.

All FPC staff participates in the development of the Annual FPC Report and the CSS Annual Report. The objective of the FPC Annual Report is to tell the story of adult and juvenile fish passage for that year. In this way the report serves as a resource of historic practical information regarding the annual operation and management of the hydro system as well as juvenile and adult fish passage. The report summarizes hydrologic conditions, reservoir operations throughout the water year, and the resulting flows during the migration period. The report also summarizes annual spill operations as provided under the Biological Opinion spill measures or court ordered spill measures. Annual fish passage metrics, passage indices, passage timing, smolt travel time and survival, and analyses are presented and discussed along with past years’ information collected under varying environmental parameters. The Annual Report also presents annual and historic adult passage information and yearly hatchery releases.

Documents completed by FPC in the 2014 contract year

The culmination of all aspects of the FPC project staff work is presented in several annual, weekly, and periodic documents prepared in response to requests. The documents completed in 2014 are listed below and are all available on the FPC website at www.fpc.org.

- Fish Passage Center Annual Report
- Comparative Survival Study Annual Report
- Annual Adult Facilities Inspection Report
- Weekly Reports
- Gas Bubble Trauma Monitoring Annual Report
- Fish Passage Center Accomplishments Annual Report
- Response to ISAB comments on the CSS project

In addition in 2014, the FPC staff completed the newly implemented RPA reporting requirements for each BPA-funded project. The FPC completed RPA reporting for the FPC, SMP and CSS projects.
Financial Summary

The FPC project funding levels were established and agreed upon through the Tribal Accords Process. The funding levels for the FPC, CSS and SMP projects were all set and agreed upon for the term of the Tribal Accords. The FPC funding level for 2014 was set at $1,532,977 through the Accord Agreements. The FPC project was successfully operated in 2014 within the budget established through the Accords process.

BPA Pisces System

The FPC project met all of the Pisces system requirements for maintaining Pisces project data for the FPC, SMP and CSS projects, including, input of data, budgets, milestone reports, annual and quarterly reports. Edits were made to the statement of work as necessary for all projects. Project inventory was also maintained and updated by the FPC for all projects. FPC continues to maintain the responsibility of updating all needed CSS Pisces requirements for USFWS including its budget information. All Pisces requirements for the CSS and the SMP were successfully completed within the required time frames.