



StreamNet 2015

Annual Report

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Table of Contents.....	2
1) Executive Summary	3
2) Introduction.....	6
3) Results.....	14
4) Synthesis of Findings: Discussion/Conclusions.....	24
References.....	29
Appendix A: Use of Data & Products.....	30
Appendix B: Detailed Results.....	32

1. Executive Summary

The Pacific States Marine Fisheries Commission (PSMFC) hosts StreamNet, which provides access to regional fish data by maintaining a coordinated, standardized, web-based distributed information network. The need for regionally coordinated and readily accessible data has been identified by the Northwest Power and Conservation Council (NPCC), the Bonneville Power Administration (BPA), and the National Oceanic and Atmospheric Administration Fisheries Program (NOAA). StreamNet works cooperatively with the agencies that create the data through StreamNet supported technical staff inside these agencies and by leading or coordinating a number of initiatives to aid in assuring a regional approach to data management.

During 2015 StreamNet continued to help lead implementation of the Coordinated Assessments (CA) project. Accomplishments included adoption of a 5 year Plan for the project by the StreamNet Executive Committee (<http://www.streamnet.org/streamnet-executive-committee-adopts-5-year-plan-for-coordinated-assessments-project/>), collection of data from partners on the first indicators, and continuing development of Data Exchange Standards (DES). In 2015 a decision was also made to resume updates of certain prioritized standard data trends, such as those related to the CA project or feeding the NPCC dashboards. CA focuses on the key indicators and metrics that have been identified as priorities for reporting progress on implementation of the Federal Columbia River Power System (FCRPS) Biological Opinion (BiOp). At the end of 2015 BPA identified a need to gather as much data as possible for populations they determined were priorities, and efforts were begun to assist in this effort. During the year new funding was sought for the CA project; unfortunately, however, a second application for a new round of EPA funding was not approved.

Staff at PSMFC and subcontracting agencies also continued implementation of the BPA secure data repository initiative, and StreamNet maintained the Data Store as a Repository for any BPA projects without identified repositories. Staff provided leadership and support for a second workshop on hand held technology for fish data projects, in collaboration with the Western Forestry Association, PNAMP and Sitka Technologies. StreamNet partner staff participated in or presented findings at this workshop.

The StreamNet subprojects in the state agencies all contributed to development or improvement of agency data storage systems in 2015. Additional resources were allocated to partners at Oregon Department of Fish and Wildlife (ODFW), Idaho Fish and Game (IDFG), and Washington Department of Fish and Wildlife (WDFW) through cost savings made at PSMFC. This was made possible in part through PSMFC assumption of additional BPA contract management. However, in 2016 many of these projects will downsize or terminate, so some adjustments are anticipated.

In addition to CA, focus continues to be on increasing the speed and efficiency of data conversion to the regional standard StreamNet DES, and then submission to the StreamNet database. The long term goal continues to be development of agency capacity to host data in the regional standard and share it via web services and/or to transfer data to StreamNet via web services.

A wide variety of data types were disseminated through the StreamNet website in 2015 (www.streamnet.org). Improvements to the appearance and accessibility of data on the website were made in 2015. Overall use of the site declined from 75,112 pageviews in 2014 to 63,880 pageviews in 2015. This should be expected, as work on the CA project and a decision to not update traditional trend data has made the site somewhat “stale” in recent years. Average time on site, average number of page views per visitor, and use by key data providers/users such as state and federal agencies all increased from 2014 to 2015. We provided several data query approaches used to locate, display and download data from the StreamNet main database, including the Integrated Query System (IQS) which integrates both tabular and map based query approaches into a single system. The Data Store online data archive provides access to non-standardized data from any source, and is a data repository identified as a secure location for data storage for projects throughout the region. Work on a query system for the CA project data, as well as certain associated trends, is ongoing. The goal of the project is to facilitate the flow of data “from the stream to the screen”.

In implementing the CA project, substantial progress was made in 2015. However, the various state and tribal agencies are at significantly different stages in developing the capabilities of their data management infrastructure, so developing a region-wide approach to sharing these indicators will continue to require more time and/or more resources. For purposes of data sharing at the regional level, the significant institutional knowledge of an experienced cadre of biologists that have been assessing fish populations and sharing data for many years will need to be replaced with a more automated and documented system in order to assure continuity of population assessments as these highly experienced biologists begin to retire in the coming years. Projects such as StreamNet will serve a key role, both within agencies and in regional coordination, in assuring that this documentation and the data needed to inform the assessment process is accessible and stable in the future.

2015 was the second year of the project’s Executive Committee. Management and policy level specialists at tribes, states, and federal agencies were recruited to serve on this group. Their primary function is to provide guidance and leadership to the StreamNet project to ensure that data management resources and work efforts are aligned with agency and regional priorities. The group helped to finalize plans for CA, reviewed data flow, and provided direction on the development of new indicators for CA. The Columbia Intertribal Fish Commission (CRITFC) is represented on the Executive Committee, but most individual tribes are not. The Coordinated Assessments Planning Group (CAPG) serves a useful function in communicating with tribal biologists and data managers, but the absence of representation of some tribes (especially those that compile and maintain significant amounts of fisheries data) means that neither the Executive Committee nor CAPG are completely aligned to provide overall policy direction to the CA project.

Summary of Recommendations

1. The StreamNet Executive Committee should continue to be used to focus and prioritize the CA Project. This should specifically include prioritizing selection of new high level indicators, taking into account regional data needs, such as NOAA status assessments and NPCC high level indicators and dashboards. Priorities should incorporate realistic assessments of available staff and other agency priorities.

2. Discussions should be held with the StreamNet Executive Committee and BPA to consider expanded membership on the Executive Committee for any entity that is a significant data provider.
3. The StreamNet Executive Committee should also continue to evaluate and prioritize updating traditional StreamNet data sets to reflect an emphasis on those that add value to ongoing regional O&M efforts. These include updating geo-referenced surveys that are supportive of a more granular understanding of high level indicator trends, and maintenance of regional databases such as fish distribution and facilities.
4. StreamNet should provide accessible and useful displays of information at the regional scale, with special focus on the CA project. Improvements to the StreamNet website should include GIS-based, population level graphical presentation of the high level indicators as they are developed. StreamNet should also assist in supporting the efforts of others (NOAA, NPCC, etc.) who are engaged in similar efforts by focusing on automating and streamlining the flow of data for these efforts.
5. While focusing the CA project on high level indicators that support regionally significant monitoring efforts, clear direction and consensus should be used to guide agencies and tribes to submit data that support population level assessments. Where such data are lacking, the Executive Committee should provide overall project direction to address any concerns. If warranted, they may wish to use lower level or even higher level information and incorporate that into the CA database.
6. The StreamNet Executive Committee should periodically evaluate whether regional data collection and management efforts are aligned with the high level data needs identified by the users of CA data, and make recommendations for funding and support provided to BPA, NPCC, NOAA, and others from a regional perspective.
7. Where data are needed in support of regional prioritization (i.e. resident fish data for NPCC indicators and dashboards), StreamNet should prioritize infrastructure and data management assistance needed to support such indicators. This will require advance planning in order to potentially shift resources or request additional support, as agencies are currently fully committed to ongoing efforts. BPA and the StreamNet Executive Committee should clearly convey to agencies the importance of contributing to regional efforts. This will assist in gaining acceptance and buy-in from agency managers and biologists.
8. CA methodologies for calculation of high level indicators should be fully documented.
9. The StreamNet Data Store should continue to serve a role as a secure environmental data repository. If BPA has a desire to confirm that the Data Store is in receipt of datasets for projects that have designated the Data Store as their repository, an automated routine linking Pisces/cbfish and the Data Store should be developed and implemented.
10. StreamNet should continue to play a role in the development and deployment of emerging technologies in fisheries data collection through sponsorship of workshops, though these may take place less frequently in future. If available, funding the engagement of agency-embedded staff in purchasing, development and testing of these technologies, with the objective of making data collection and transfer more efficient and secure across the region, can also be a StreamNet function.

11. StreamNet should continue to seek out efficiencies and new sources of revenue in order to fund agency operations that support regional data management priorities (i.e. field data stewards that compile and provide CA data). Where appropriate, the StreamNet Executive committee should recommend increases in traditional funding and support as needed, to complete the priorities they have established.
12. StreamNet partners should focus first on updating time series data for established trends (i.e., those already defined and mapped in the regional GIS) prior to making any effort to identify and map new stream survey reaches. The mapping of new trend locations or the refined mapping of existing trends should only be attempted after determining that the necessary GIS support exists at both the local and regional level.
13. Fish Distribution as a StreamNet data category should be redefined as a GIS dataset that is exchanged (or regionally harvested from data contributors) using GIS file formats instead of regionally coordinated linear event tables. This is a significant shift from the traditional StreamNet data exchange model. While less elegant than the historic approach (using stream routes and measures), this is a practical compromise that respects budget realities. This approach should provide the desired functionality of allowing end users and regional partners to simply visualize species distribution and habitat use type in map form.

2. Introduction

The majority of fish-related data originate with the region's state, tribal and federal fisheries agency sampling programs. These data are generally used internally, and may be difficult to access across organizational boundaries. The need for regionally coordinated, securely stored, and readily accessible data has been identified by the Northwest Power and Conservation Council (NPCC), the Bonneville Power Administration (BPA), and the National Oceanic and Atmospheric Administration Fisheries Program (NOAA). StreamNet supports a regional approach to data management, coordination, and standardization. We work cooperatively with the agencies that create the data (Figure 1) by supporting technical staff inside these agencies to help manage, standardize, and geo-reference the data to the regional stream network (hydrography).



Figure 1. Formal partners and agencies participating in the StreamNet project.

These data are used internally by each agency and also submitted to a central database at Pacific States Marine Fisheries Commission (PSMFC). StreamNet provides access to these data by maintaining a coordinated, standardized, web-based distributed information network. Data collected by partners are stored and made publicly available through the StreamNet website www.streamnet.org (Figure 2).

Project Summary: <https://www.cbfish.org/Project.mvc/Display/1988-108-04>

Contract Summary(s): <https://www.cbfish.org/Contract.mvc/Summary/66435>



Figure 2. StreamNet Website Infographic

Primary Focal Species: Chinook - Deschutes River Summer/Fall ESU, Chinook - Lower Columbia River ESU (threatened), Chinook - Mid-Columbia River Spring ESU, Chinook - Snake River Fall ESU (threatened), Chinook - Snake River Spring/Summer, Chinook - Snake River Spring/Summer ESU (threatened), Chinook - Upper Columbia River Spring ESU (endangered), Chinook - Upper Columbia River Summer/Fall ESU, Chinook - Upper Willamette River ESU (threatened), Chum - Columbia River ESU (threatened), Coho - Lower Columbia River ESU (threatened), Cutthroat Trout, Coastal - Southwest Washington/Columbia River ESU, Cutthroat Trout, Coastal - Upper Willamette River ESU, Cutthroat Trout, Westslope, Cutthroat Trout, Yellowstone, Kokanee, Sockeye - Deschutes Subbasin, Sockeye - Lake Wenatchee ESU, Sockeye - Okanogan River ESU, Sockeye - Other, Sockeye - Snake River ESU (endangered), Steelhead - Lower Columbia River DPS (threatened), Steelhead - Middle Columbia River DPS (threatened), Steelhead - Snake River DPS (threatened), Steelhead - Upper Columbia River DPS (threatened), Steelhead - Upper Willamette River DPS (threatened), Trout, Bull (threatened), Trout, Interior Redband, Trout, Rainbow, Whitefish, Mountain

This project supports the 2015 Northwest Power and Conservation Council Fish and Wildlife Program. Specifically: Reporting on the program’s approved high-level indicator categories and fish and wildlife indicators (NPCC Program, page 101).

Data management Principles (page 104);

- Public accessibility, search-ability, and usability of data are important. All monitoring and research data collected under the program must be readily accessible in regionally consistent formats to all interested parties in a timely manner, and these should be preserved beyond the longevity of a project.
- Program reporting relies on coordinated data sharing that is facilitated using regional data systems that provide access to data from federal and state agencies and tribes, and other data gathering entities in the Columbia Basin.
- Refinement of coordinated data management systems should be guided by program evaluation and reporting needs.
- Collaboration among agencies, tribes, and other monitoring entities in the Basin is essential to prioritize regional data coordination efforts to support Program indicators and objectives, and this prioritization should be informed by the goals and objectives identification and refinement process and program guidance.
- The region should work collaboratively through established forums to continue to refine metrics, methods, and indicators which can be used consistently to evaluate and report on program progress, focal species, and their habitats.

General measures (page 105);

- Bonneville should ensure that data associated with broad categories of information (fish abundance, productivity, genetic diversity, geographic distribution, habitat conditions) are identified and accessible from a single, centralized website. Data users should be able to find references, data descriptions, and links to all the data collected in the program on fish abundance in such a website.
- Bonneville should ensure that all information about anadromous fish is summarized by specific life-cycle stages and made accessible from a single gateway location.
- Bonneville should contract for complete data products (e.g., annual population estimates for adult and juvenile spring Chinook in the Entiat) and not only collaborative processes and preliminary data collection (e.g., redd counts or weir counts of fish). When Bonneville pays for the development of standards or protocols the contracts should include a viable strategy for adoption.

StreamNet serves as a regional coordination body to support data management and facilitate cooperation across organizational boundaries. StreamNet staff are involved in standardization and coordination efforts on a wide variety of data management issues. We work closely with states, tribes, agencies, and with organizations such as the NPCC, Columbia River Intertribal Fish Commission (CRITFC), and the Pacific Northwest Aquatic Monitoring Partnership (PNAMP) to ensure that data managers can communicate, share, and interpret data effectively across boundaries. The StreamNet project supports coordination through establishing and implementing basin-wide data reporting standards for a specific suite of fish related measures, including abundance, distribution, and productivity, with a long term goal of extending coverage to additional metrics of regional importance.

In recent years there has been a regional initiative to streamline and coordinate RM&E work due to the complexity, scale, and cost of these efforts. Direction from the NPCC, the BPA Data Management Strategy, and the PNAMP RM&E Strategy Implementation Road Map led StreamNet to concentrate on coordination and efficiencies as our priority in 2015. The goal is to make information collected in the Columbia Basin standardized and accessible, in order to inform management questions and strategies. StreamNet can serve an important function in this effort both by building and maintaining data management infrastructure and by coordinating data management to foster effective data transfer across structural lines. The primary focus of StreamNet staff in 2015 has continued to be implementation of the CA project, a regional cooperative effort to standardize and automate data reporting on key indicators for salmon and steelhead populations. Due to this focus, regular updates of more traditional trend data in StreamNet has been largely deferred for the last several years.

Data standardization and sharing are accomplished by StreamNet data specialists within the agencies. These data specialists locate and acquire data, convert them to standard (DES) format, perform QA/QC, add geo-referencing to tie the data to the stream network (hydrography), assist with development and utilization of database systems within agencies, and then transmit the data to the central StreamNet database at PSMFC for inter-agency and public dissemination. It should be stressed that StreamNet and BPA funding provided to agencies and tribes through StreamNet supports data management infrastructure and public accessibility of data through many portals in addition to the StreamNet database. Following is a list of some of the data resources supported (at least in part) via StreamNet;

The [Okanogan Basin Monitoring and Evaluation Program \(OBMEP\)](#) is a monitoring program created in 2004 that collects long-term data on summer steelhead and spring Chinook salmon in the Okanogan River Basin. The OBMEP is a program within the Confederated Colville Tribes' Fish and Wildlife Department and is funded primarily by BPA through the Columbia Basin Fish Accords.

[Follow Idaho Salmon Home \(FISH\)](#) provides access through IDFG to information on Idaho's wild and hatchery steelhead and Chinook salmon populations. If you've ever wondered how many steelhead came back last year, how old those fish were or simply how the wild salmon run from 2012 compared to previous years, this is the place for you. There are also distribution maps, juvenile abundance, and age data.

The [Idaho Fish and Wildlife Information System \(IFWIS\)](#) is IDFG's comprehensive information system for standardizing data on fish, wildlife, and plants in Idaho. Discover what they offer by browsing their Fisheries, Wildlife, Species Diversity, Lands and GIS resources. View the IFWIS applications, stay updated on latest releases by following the IFWIS Blog, or learn more about IFWIS.

The [Montana Fisheries Information System \(MFISH\)](#) is a database containing information on fish species distribution, supporting data for distribution, and information related to the management of aquatic resources in Montana. The database is managed and maintained by the Data Services Bureau (DS) of Montana Fish, Wildlife, and Parks (FWP). Data is continually updated and sources include FWP, US Forest Service (USFS), US Fish and Wildlife Service (USFWS), Bureau of Land Management (BLM) and

tribal fisheries biologists and supplemented with information provided in technical documents and reports.

The MFISH system is slowly being replaced by a new survey and inventory system (FIS). FIS is available through the agency internal website and holds survey data, individual fish information, tagging data and analysis tools with enhanced data types, which puts the data entry and analysis in the hands of biologists. Development may soon begin on a new public fish “portal” to replace the existing Fishing Guide and MFISH web application which will allow public access to the wide variety of fisheries data MFWP’s collects. Replacing the existing Fishing Guide and MFISH is mandatory as the technology of the current systems is obsolete.

The [Crucial Areas Assessment](#) evaluated the fish, wildlife, and recreational resources of Montana in order to identify crucial areas and fish and wildlife corridors. The Assessment is part of a larger conservation effort that recognizes the importance of landscape scale management of species and habitats by fish and wildlife agencies. The Web-based Crucial Areas Planning System (CAPS) mapping service is aimed at future planning for a variety of development and conservation purposes so fish, wildlife, and recreational resources can be considered earlier.

The [Natural Resources Information Management Program \(NRIMP\)](#) supports the efforts of ODFW by:

- Identifying and prioritizing natural resource information needs for fish and wildlife management.
- Developing and promoting the use of modern data collection and analysis techniques.
- Promoting the use of technology that will benefit the department’s natural resource data collection and management needs.
- Developing and providing consistent, accessible, high-quality information.
- Encouraging the synthesis and transfer of scientific information into management recommendations.
- Developing and promoting a multidisciplinary approach to fish, wildlife, and habitat management.
- NRIMP provides GIS data, maps and reports, data standards and protocols, information on angling opportunities within Oregon, and links to other state agencies.

The ODFW [Salmon Recovery Tracker](#) website provides information on the health of Oregon’s anadromous salmon and steelhead populations. Website users can explore and download information related to salmon conservation and recovery in Oregon. The Salmon Recovery Tracker was built to make it easier for the public to explore the health of salmon populations and access critical underlying data. It’s a first step in helping the state open its information to the public in an easy-to-use medium.

The ODFW [Data Clearinghouse](#) stores natural resource information, including reports, data files, databases, GIS files, maps and pictures from natural resource projects. This includes agency projects that provide CA data for recovery populations, and [Oregon Watershed Council](#) projects funded by the Oregon Watershed Enhancement Board, and other [Oregon Plan](#) partners. The goal of the Data Clearinghouse is to make Oregon’s natural resource information more accessible and to provide a

centralized accumulation and distribution service for Oregon’s natural resource data. The increased availability of data provided by the Data Clearinghouse will support the Oregon Plan Assessment process, as well as other resource management efforts.

[Compass](#), the first-of-its-kind online fish and wildlife habitat map provides coarse-scale, non-regulatory fish and wildlife information, and crucial habitat layers emphasizing areas documented as containing important natural resources. Compass is intended to support early planning for large-scale land-use, development, or conservation projects, helping users make informed decisions related to fish and wildlife habitats as energy, transportation, conservation and other large projects are planned.

WDFW manages multiple data resources, including [SCoRE](#), which provides up-to-date information on populations and provides context for the efforts WDFW and its partners are taking in the arenas of habitat, hatcheries, and harvest to protect and conserve salmon and steelhead in Washington.

[SalmonScape](#) delivers the science that helps recovery planners identify and prioritize the restoration and protection activities that offer the greatest benefit to fish. This WDFW site also offers a significant environmental education tool for middle school and high school students. SalmonScape merges fish and habitat data collected by state, federal, tribal and local biologists and presents them in an integrated system that can be readily accessed by other agencies and citizens. SalmonScape is an interactive mapping application designed to display and report a wide range of data related to salmon distribution, status, and habitats. The data sources used by SalmonScape include stream specific fish and habitat data, and information about stock status and recovery evaluations.

Washington’s eleven species and subspecies of native salmonid fish constitute a biological resource of spectacular commercial and cultural importance. Unfortunately, this resource is under heavy pressure from human population growth and development. Urban and industrial land conversion, forestry and agricultural practices, water diversion, municipal water demands, overfishing, and hydropower development have contributed to the decline of several salmonid stocks. A large recovery effort at the local, state, and federal level is currently underway to prevent further declines and improve the condition of already imperiled stocks.

The overall objective of WDFW’s [SGS](#) is to help monitor status and trends of Coastal, Puget Sound, and Columbia Basin salmonid stocks. The Spawning Ground Survey database (SGS) was designed as a repository for raw, unexpanded data collected during spawning ground surveys and from adult traps. It is intended to provide a common framework for the collection, storage, retrieval, and dissemination of data collected by public and private entities. WDFW maintains a centralized copy of the database, which contains historic and current spawning ground survey data from throughout Washington.

The USF&WS [Pacific Region Fishery Resources Program](#) has 26 offices and staff located in Idaho, Oregon, Washington, and Hawaii. They work with partners to protect the health of aquatic habitats, recover and restore fish and other aquatic resources, and provide people with opportunities to enjoy the many benefits of healthy aquatic resources in the Pacific Northwest and Pacific Islands. The foundation of the site – and their work – is based on the [Pacific Region Fisheries Strategic Plan](#).

In addition to these StreamNet supported programs, Bonneville separately contracts operation of [Cbfish.org](#), an interactive website that provides the public an unprecedented view into [Bonneville Power Administration's](#) implementation of the [Columbia Basin Fish and Wildlife Program](#), which stretches across a four-state region and is the largest program of its kind in the world. Developed by the [Northwest Power and Conservation Council](#) pursuant to the Northwest Electric Power Planning and Conservation Act of 1980, the Program consists of measures for the purpose of protecting, mitigating, and enhancing fish and wildlife, including related spawning grounds and habitat, on the Columbia River and its tributaries. Cbfish.org is also a web application that enables BPA and its regional partners to manage the program's activities and accomplishments, and to define, evaluate, fund, and review portfolios of projects.

The Council adopted [high level indicators](#) to track the progress of fish and wildlife efforts in the Columbia Basin. The collective efforts of many entities, including the Council, contribute to improving habitat and migration while protecting and enhancing fish and wildlife. These measures cannot be interpreted as a performance measure for any single entity but instead provide a high level overview of outcomes that reflect regional headway.

Subbasin plans are complex documents. To show key elements of these plans simply and efficiently, NPCC has made these "[dashboards](#)" for those subbasins with plans. They show extracts of the plans and links to related management plans, local maps, and contact information. StreamNet data are widely used in support of Cbfish, high level indicators, and NPCC dashboards.

Data disseminated through the project are primarily focused on the Columbia Basin (Figure 3), but other data are included when they are obtained through other contracts or are consolidated in agency databases. Much of the tribal data flow is through the respective state StreamNet projects or through the Columbia River Inter-Tribal Fish Commission (CRITFC), which is a full partner in the StreamNet project but which is supported through a separate contract.

During 2015 project data collection and coordination focused on leadership of the CA project with PNAMP. CA is an effort to locate and obtain derived data on high level viable salmonid population (VSP) indicators, and to develop (DES) for these indicators and supporting information.

In addition to this work, StreamNet also serves as a searchable archive and approved environmental data repository for data sets that fall outside the scope of the StreamNet DES, ensuring that they are protected for the long term and remain accessible for use. These data sets include the NPCC Protected Areas list, Habitat Evaluation and Procedures (HEP) records, data sets from subbasin planning, the Hatchery Scientific Review Group (HSRG), and all other data sets submitted to the Data Store, the StreamNet online data archive.

Fish & Wildlife Program Map

Explore the many features (map layers and work site information) of this map. To select features, click the << button at the top right corner of the map, and check the features to display.

<< Back to Contract "1988-108-04 EXP STREAMNET (CIS-NED) FY12 "

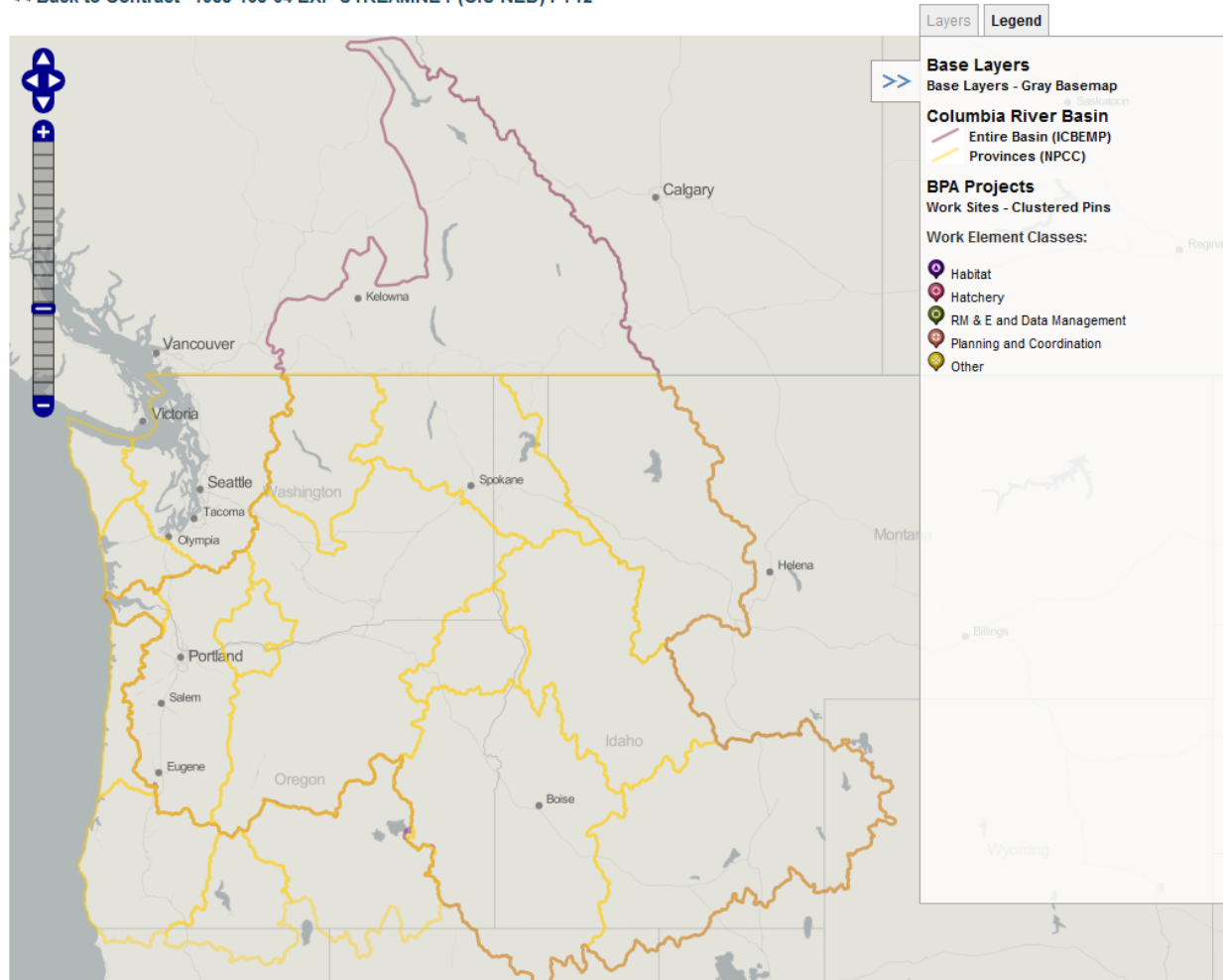


Figure 3. StreamNet Project Area: Columbia Basin

3. Results

Regional Coordination

StreamNet contributed to the coordination and standardization of monitoring data throughout the basin in 2015. We actively supported improving data sharing capabilities in the region through the CA project. This project uses an exchange network approach and dynamic web services to share data. With the leadership of StreamNet cooperators in WDFW, a grant was obtained from the EPA in January, 2014, specifically to work towards automated data sharing of key high level indicators for the region. A second EPA grant application (also led by WDFW) was completed and submitted to EPA, outlining a plan to expand CA to additional indicators and areas. Unfortunately, this grant was not funded. EPA related that the decision was made because the grant program did not fund such expansion.

We continued to work with our partners in IDFG, Confederated Tribes of the Colville Reservation (CCT), Montana Fish, Wildlife, and Parks (MFWP), ODFW, CRITFC, and WDFW to promote data standardization within agencies by assisting them with development of database systems designed to ultimately have the capability to share data directly in a regional format. As part of the effort to improve coordination, in 2014 StreamNet instituted an Executive Committee structure (Table 1). In 2015 the project continued to implement the intent; using policy-level staff from partner agencies and primary data consuming organizations directly involved in setting priorities for the technical data management staff. The Executive Committee provided direction on program priorities in 2015. The StreamNet Steering Committee remains an essential part of the organizational structure of the program as the implementation team for these priorities.

Current Members: StreamNet Executive Committee

Randy Fisher, PSMFC
 Stan Allen, PSMFC
 Zachary Penney, CRITFC
 Tony Grover, NPCC
 Bryan Mercier, BPA
 Russell Scranton, BPA
 Tom Cooney, NOAA- Fisheries
 Tom Rien & Tom Stahl, ODFW
 Dan Rawding, WDFW
 Pete Hassemer, IDFG
 Don Skaar, MFWP
 John Arterburn, CCT
 Roy Elicker, USFWS

Current Members, StreamNet Steering Committee

Tom Pansky, BPA
 Henry Franzoni, CRITFC
 Nancy Leonard, NPCC
 Bart Butterfield, IDFG
 Dawn Anderson, MFWP
 Cedric Cooney, ODFW
 Steve Pastor, USFWS
 Paul Clayton, CCT
 Brodie Cox, WDFW
 Tom Iverson, Coordinated Assessments Project Contractor
 Jen Bayer, PNAMP

Table 1. Current members, StreamNet Executive and Steering Committees

StreamNet coordinated closely with PNAMP in providing technical guidance to the CA project, including development of the DES. Staff at PSMFC and subcontracting agencies coordinated with state, federal and tribal agencies in support of increasing data flow in the region and to encourage increased use of information technology to improve the efficiency of data sharing.

Data sharing is associated with concerns over interpretation, analysis, and attribution in many cases. Data Sharing Agreements are now ready for use as data are uploaded and shared. It is expected that increased usage of the Data Store and actual flow of indicator and metric data via the Coordinated Assessments project may lead to additional discussion and new versions of the Data Sharing Agreements over time.

The StreamNet project performed its planned data management and coordination activities during the period. Details on use of the StreamNet data delivery systems and responses to direct requests for data and information are presented in Appendix A.

Coordination is still needed in the GIS arena, particularly surrounding hydrography management and maintenance. At the end of 2015, ODFW was still in the process of finalizing a long-term hydrography data management strategy as it relates to the National Hydrography Dataset (NHD) and the StreamNet regional hydrography data set. In coordination with regional staff, ODFW conceptualized new linear referencing requirements related to fish distribution data, thus reducing the burden of maintaining whole stream routes (WSR's). If this approach is adopted, WSR maintenance would be limited to streams where trend data occur. While maintaining aquatic resource data on the NHD is the preferred approach, the StreamNet project and other funding constraints will dictate the final alternative hydrography data management strategy.

Within PSMFC, as a direct result of the PSMFC database integration workshop held in 2015, an integrated Columbia Basin fish facilities GIS dataset was developed. This effort eliminates multiple datasets with varying degrees of accuracy for location information, and establishes a common layer which is now shared between programs. The dataset is under testing now, and shows promise for broader application, such as use in the NPCC/BPA O&M review.

The IDFG StreamNet subproject continued assistance with development of the Idaho Fish and Wildlife Information System (IFWIS), and was able to download data directly from the system in a single step in order to simplify standardization of the data and speed submission to the StreamNet database, saving significant time from the previous approach. The MFWP StreamNet subproject continued working with the Fish Division to scope and develop a new data management system. The ODFW StreamNet subproject continued work to construct a more efficient data management system for posting recovery population data to the ODFW Data Clearinghouse for distribution to StreamNet, the [Salmon & Steelhead Recovery Tracker](#), NOAA and other management partners. Oregon StreamNet staff also coordinated internally and externally to ensure priority Coordinated Assessments (CA) and recovery related efforts were addressed. ODFW regional coordination focused on NOAA TRT recovery population changes, regional information gathering requests, traditional data category definitions, overlapping population estimates, and the StreamNet query system. Some ODFW coordination occurred with other agencies, tribes, regional groups, non-profits, efforts outside the FWP, etc. beyond the CA process in CY-2015. The WDFW StreamNet subproject coordinated with the Biological Data Systems Program in WDFW on ongoing development of the Juvenile Migrant Exchange and the SCoRE data delivery system, which will be able to serve data to StreamNet in the future.

StreamNet continued to coordinate with partner agencies to build systems with regional data sharing capability. The goal is to make it possible to harvest data directly for loading into StreamNet through automated means. When implemented, this will significantly speed the process of obtaining annual data updates, and allow our data stewards to expand to the acquisition of additional priority data types. The IDFG StreamNet subproject can currently accomplish this through their IFWIS database, which the Idaho StreamNet project helped to initiate and partially supports. The CA project is designed to build this capability in all the data source agencies for a few key indicators. StreamNet worked with the agencies to develop procedures for internal conversion of the data to

regional standards through a DES, and developed an automated data dissemination approach modeled after the EPA Exchange Network approach. The ODFW StreamNet subproject enhanced their CA automated data exchange system to stay in sync with StreamNet CAX changes, increase robustness, implement new pre-submission validation rules, and only upload data which has been modified since the previous upload. WDFW is in the process of modifying their Salmonid Stock inventory (SaSI) to carry CA indicator data and deliver it to CA StreamNet aggregate databases using the StreamNet API.

Data Management

StreamNet continued to acquire fish data from our four partner state fish and wildlife agencies (ODFW, WDFW, IDFG and MFWP), one federal fisheries agency (USFWS for data from the national fish hatcheries), and one tribe (CCT). These data have been created through a variety of funding processes and sources, only some of which are through BPA or other federal programs. As a regional data coordinator StreamNet strives to provide all data of a given type from all sources. The project uses subcontracts to support data stewards inside these agencies to acquire, quality check, develop metadata, convert when necessary, and update data of types routinely disseminated through StreamNet, and to convert these data to the regional data standard. The data are then submitted to the StreamNet database at PSMFC, where they are quality checked and managed so they become available to the StreamNet online data query systems. The data are then made publicly available for viewing and download in standardized format through the project website, www.streamnet.org.

Oregon StreamNet staff modified their previously adopted file naming standard related to recovery data to improve overall data flow and make it easier to expand to the agency. Significant time was spent participating in the development, update and maintenance of the CA and StreamNet DES's throughout the year, and developing/modifying a database for exchanging the four CA DES indicators. Enhancements were made to the ODFW Data Clearinghouse and conversion of a MS Access spawning ground survey database into SQL was initiated to increase data flow efficiency. NHD hydrography migration was completed and a new version of the NHD-derived statewide whole stream route dataset was created. The hydrography was maintained throughout the year. ODFW continues to encourage the implementation of data management best practices related to standards in field and file names, metadata, folder organization, data sharing agreements and data management plans, etc. as time and resources allow, particularly as they relate to priority CA and Recovery Planning efforts.

WDFW is moving forward with our work to standardize regional and central fish data systems with particular emphasis on data informing or contributing directly to the CA high level indicator data flows. In addition to CA systems development, WDFW StreamNet worked with agency HQ staff to implement mobile data collection platforms, staging databases and automated transfer mechanisms for sport and commercial, adult survey, and juvenile data systems, again, ultimately informing the CA exchange as well as other consumers. WDFW continued hydrography mapping to NHD framework. Final adoption of WDFW's draft new stream layer has repeatedly been delayed. When it is adopted, the StreamNet Location Manager will fully scope the layer and draft a proposal to integrate mixed scale hydro (MSH) with the new line work.

In 2015 a large number of records from the HEP project were acquired and archived on StreamNet, at the request of BPA and the NPCC. These records and associated materials on this historic program will remain accessible for regional use here: <http://www.streamnet.org/hep>.

Database Backup Assessment and Inventory

At BPA's request, during 2013, StreamNet staff at PSMFC and all of the partner agencies spent considerable time conducting a data inventory to determine the location of project data. The StreamNet Data Store is a repository for any BPA projects that do not have an approved environmental data repository available. Improvements to the Data Store were made in 2015. Programming now pre-populates attributes from CbFish when project sponsors use the Data Store as a repository to secure their data. Outreach to project managers was completed with the assistance of StreamNet staff within the agencies. A number of datasets were uploaded into the Data Store. However, it appears that some projects designated the Data Store as their designated repository, but then did not upload any data.

Identification of Management Questions and Strategies

A regional data management and coordination approach is necessary if the many data collectors in the basin wish to cooperate and share information. StreamNet serves this regional coordination function. The StreamNet Executive Committee brings together policy level fish and wildlife managers from across the region to review data management issues, set priorities, and direct the StreamNet partners at a policy level. The StreamNet Steering Committee, made up of data management professionals from within partner agencies, as well as technical experts representing many primary data consumers, then works to ensure implementation of the established regional data management objectives. Data managers from a diverse set of agencies and tribes are called together in regional forums to discuss topics of interest. These forums serve to identify data management questions that otherwise would be handled on an individual basis. Strategies can then be identified to address these questions and concerns, and data management considerations can be incorporated early in the development of monitoring plans and approaches.

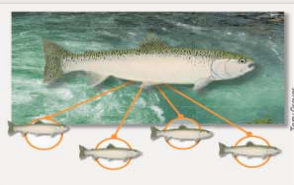
The CA project is a result of identifying a key deficiency in regional data management, namely the potential inability to share and compare information on fish populations across structural boundaries due to differences in data collection and management practices. This has generally required decision makers to establish individual networks of biologists and staff to ensure the flow of data needed to assess fish populations. The CA project is designed to structure this flow so that it becomes standardized, automated, and sharable throughout the region; first on key VSP indicators, then expanding to other data as time proceeds. The BPA Data Management Strategy supports the CA project to support sharing and proper management of data.

During 2015 the StreamNet Executive Committee established the priority of focusing on collection, review, and reporting of the Natural Origin Spawner Abundance (NOSA) indicator for populations (Figure 4). Working with the Steering Committee, biologists were polled and best estimates of data flow were listed for the collection of NOSA, Recruits per Spawner (RperS), and Smolt to Adult (SAR) indicators for 216 Technical Recovery team (TRT) populations in the next (FY 2016) contract. The estimated data flow for these indicators is shown in Figure 4. It should be noted that this reporting is comprehensive only for StreamNet partners. Other organizations and tribes may have additional data that may be reported as well.

COORDINATED ASSESSMENTS



NATURAL ORIGIN SPAWNER ABUNDANCE



RECRUITS PER SPAWNER



SMOLT TO ADULT RATIO



HATCHERY INDICATORS

Coordinated Assessments Data Flow in 2016

Coordinated Assessments Data Flow Predictions for FY 2016 216 TRT populations listed in the Interior Columbia & Lower Columbia/Willamette Recovery Domains

Estimated reporting for TRT populations in FY 2016

Indicator	Estimated/ Total TRT	Est./Total %	Pops/New - Yrs/New ODFW	Pops/New - Yrs/New IDFG*	Pops/New - Yrs/New WDFW	Tribes*
Natural Origin Spawner Abundance	113/216	52.3	44/38 - 356/327	20/2 - 29/11	49/0 - 50/0	
Recruits per Spawner	54/216	25.0	18/5 - 369/256	20/2 - 24/6	16/0 - 64/64	
Smolt to Adult Ratio	7/216	3.2	5/4 - 74/731	1/1 - 5/5	1/1 - 6/6	
Juvenile Outmigrants	5/216	2.3	5/4 - 90/90			
Presmolt Abundance	4/216	1.9	4/4 - 73/73			

Figure 4. Coordinated Assessments Project FY 2016 Priorities

Documentation of Protocols and Methods

Protocols and methods used in the creation of data generally are documented through formal reports, at varying levels of detail, and for that reason StreamNet has always gathered the source documents for all data in the database and asked that they be made available in the StreamNet Library, with direct links to the documents from the actual data. With the regional recognition that protocols and methods described in reports are not always sufficient for fully understanding the origin and uses of the data, a tool to support full description of methods and protocols was developed through PNAMP with support from BPA. Use of this tool (www.monitoringmethods.org) to describe sampling methodology is increasing, and StreamNet built a link to the website for the CA project to specify the protocols used to calculate the indicators and metrics in the data. We are working to add similar capability to the Data Store and potentially the main StreamNet database in the future. Providing a link to protocols and methods could easily be added to the current links to data source documents in the main StreamNet database. This will require new work on the part of the StreamNet data stewards, however, so this will have to be prioritized

in the future. In 2015, development of Viable Salmonid Populations (VSP) Methods Compendium reports, including GIS maps to show population, MPG, and DPS/ESU level boundaries for submitted population data continued in Oregon, with two being completed and one in progress. When all DPS/ESU compendiums are finalized, they will be made available on ODFW's Recovery Tracker and the Data Clearinghouse. Oregon StreamNet worked with PNAMP staff to assess if VSP Methods Compendium reports and protocols could be incorporated into MonitoringMethods.org, and continues to promote the adherence to the agency's simple metadata standard along with the development of full FGDC compliant metadata when warranted. Additionally, WDFW StreamNet staff continued to work with contributing biologists to document methodologies and update them within our corporate reporting systems. The development of formal metadata for CA data and beyond will greatly aid efforts to document data origin, protocols used to collect the data, and uses of the data.

Data Entry

Database development and management, including data loading and QA, was performed by PSMFC central staff and the project staff in the participating agencies in order to manage the data that are obtained, standardized and disseminated through the project. Data were obtained, loaded and quality checked, geo-referenced, and converted to the DES for transmittal to the project database at PSMFC. In 2015, PSMFC instituted additional cost savings to StreamNet through assumption of additional projects, and BPA provided some funding for increased activities. The StreamNet Executive Committee used these resources to increase direct funding to WDFW and to the USFWS to increase data management activities for CA. Funding was also used to assist IDGF with increases in overhead expense. Unfortunately, the failure to obtain a second EPA grant, as well as the ending of several of the other projects that had been managed by StreamNet staff, will require adjustments to budgets, or additional funding, in the future.

In 2015 StreamNet continued to test field data devices and technology. Devices were purchased for partners with end of contract savings. Oregon StreamNet reacquired three mobile devices that were returned to PSMFC after device trials ended. These will be used to test, develop and promote mobile data collection within ODFW. A second field technology workshop in November was hosted by StreamNet, PNAMP, the Western Forestry Association, and Sitka Technologies. More than 100 attendees made or heard presentations, demonstrations, and panel discussions on technology. Because there was some overlap in presentations between the two sessions (2014 and 2015), it is recommended that this workshop be continued on an every other year basis.

StreamNet currently utilizes centralized databases due to the current capabilities of agency infrastructure. A longer term goal is to support the agencies in development of internal data infrastructure that will allow automated data dissemination from the agencies via web services in regionally standardized format. Data were managed and stored at the subcontracting agency level to support this data entry/development process, and in the consolidated regional scale database at PSMFC, where the data are stored, managed and backed up for use through the StreamNet data query systems.

ODFW StreamNet acquired new and maintained existing datasets for population estimates from various contributors in the Columbia basin. This resulted in indicator estimates for 69 NOSA, 1 SAR, and 36 adult and 1 juvenile RperS populations in the Coordinated Assessments (CA) DES. With the reengagement of traditional data compilation, Oregon exchanged these data with Regional StreamNet, along with CA indicators for 4 non-listed NOAA populations and 11 new and 1,141 existing (1,600 EscData) traditional data trends originating from the BPA Inventory effort, NPCC dashboards, opportunistic connection to CA data, priority populations within the Columbia basin, QC information from StreamNet staff and linear referencing conducted on existing and new data. Because of

the hydro strategy review, Oregon did not submit updated hydrography records or updated distribution and barrier information. Data will be submitted in 2016 for submission testing. If the approach is deemed acceptable, it is possible Oregon will submit additional distribution and barriers in 2016.

WDFW StreamNet staff loaded the WDFW CA database with NOSA (2010-2012) and SAR (2003-2010) data to test exchanging data with PSMFC through the API. Although the test was successful, this data was not published as at that time PopFit and TRTmethod needed to be documented further to accurately reflect the data. The Upper Columbia Data Steward conducted a regional WDFW review to identify CA metric data and associated time series for CA data in the upper Columbia Basin. These data were identified and compiled for future integration into the CA database. All StreamNet staff contributed to the new design of the TWS (Traps, Weirs, Surveys restructure and to ensure all measurements were being collected to support metrics needed to create focal indicators. The Location Data Manager converted cutthroat SGS (Spawner Survey Database) historic routes to more current routes. Further work continues to equate the route measures with current route measures. This data was targeted to scope how difficult it would be to use automation for all the historic routes in SGS.

Agency Data Storage

StreamNet maintains a central database containing summarized fish data for the Columbia Basin. BPA relies on the StreamNet database and StreamNet Data Store as core data repositories to secure public access to data where not provided in an alternative, publically accessible system. The StreamNet Data Store serves as the default database for numerous fish population metrics, as indicated in the BPA Data Management Strategy. In addition, StreamNet can function as the interim data storage location during the development of databases for new data sets, such as fish species genetics, blood work, and enzyme analysis. PSMFC also physically hosts other data storage repositories as a cooperator with state and tribal agencies. StreamNet staff now also work to ensure that data not located in the StreamNet database are secure and regionally accessible in other approved environmental data repositories.

The StreamNet subprojects in the state agencies all contributed to development or improvement of agency data storage systems in 2015. Focus continues to be on increasing the speed and efficiency of data conversion to the regional standard StreamNet DES, and then submission to the StreamNet database. The long term goal is to develop the capacity for the agencies to host data in the regional standard and share them via web services and/or to transfer data to StreamNet via web services. Because each state uses different approaches to their data management, actions taken by the state subprojects differ accordingly.

IDFG StreamNet staff assisted BPA project biologists to identify and prioritize data available for entry into the Idaho Fish and Wildlife Information System (IFWIS), or an alternative accessible, backed up information system. IDFG StreamNet staff participated in meetings of the CA planning and development groups. They provided input prioritizing indicators, metrics, and metadata. They coordinated with development between the proposed DES, the prototype database and application, and the web service data exchange. Multiple sources of CA data were consolidated into complete, standardized, workbooks on a secure and backed up network drive. SQL queries were written to select, extract, and transform those data into the draft DES for NOSA and RperS. IDFG staff wrote web service routines to enable the transfer of CA data to PSMFC and NOAF databases. Those services were successfully tested and results shared with the CA Exchange Team. After appending into the IFWIS CA database, those data were then transferred to the PSMFC CA database. IDFG StreamNet staff compiled and submitted hatchery return data for 2012-2015 chinook, and 2015 steelhead and the 2015 chinook index redd counts.

MFWP StreamNet staff, in addition to maintenance and update of existing databases, assisted the Fisheries Division in continued scoping and development of an internal centralized fisheries data system being built by MFWP Application Development staff. StreamNet staff is involved to ensure that data being collected and stored conform to existing StreamNet DES guidelines and that the exchange of data with the StreamNet central database is efficient. The system has been designed to replace individual databases residing on biologists' computers, thus making truly centralized data a reality. In addition, the system includes analysis tools giving the user the ability to calculate various population estimates and other metrics needed by staff for reporting purposes, which will benefit BPA projects. StreamNet staff also continued to assist in converting historic data files residing with individual biologists to a file type that can be uploaded into the new system. This has resulted in thousands of individual fish records being uploaded to the database, resulting in historic data available in the new system much sooner and with far less effort than anticipated. Additional StreamNet staff efforts related to the system design and development have resulted in eight of the nine data categories MFWP submits to StreamNet housed in the centralized database with the ninth slated to be complete next year. The database currently houses over 2 million raw fish records statewide. In 2015, 588 redd counts were added in the Columbia Basin including both current and historic data, approximately 550 fish survey location were added in the Columbia resulting in over 36,400 individual fish records. Statewide 1,427 survey locations were added resulting in 112,436 individual raw fish records. An additional task moving forward will be to investigate the potential to deliver data as web services. These efforts are leading to a significantly enhanced ability for MFWP to share fisheries data in standardized format with regional entities. MFWP staff also developed a web-based tool for editing fish distribution locations and attributes using a map interface. The tool has been incorporated into centralized applications and is available for staff use. It was also presented at the Field Technology Conference for Data Collection in Forestry, Fisheries, and Natural Resources in Portland in November, 2015.

ODFW StreamNet performed routine maintenance and updates on existing core databases. In addition, efforts to improve overall agency data storage and flow from the field continued by ongoing development and maintenance of the ODFW Data Clearinghouse (DC), making Oregon's natural resource information more secure and accessible by providing a centralized storage and distribution service. During the year, 10 new DC records were created and 43 existing records were updated. StreamNet staff worked with ODFW Recovery Plan staff throughout the year to coordinate efficient exchange of CA and Recovery data to StreamNet and the ODFW [Salmon & Steelhead](#) Recovery Tracker, standardization, DES needs and changes, flow configuration and data sharing documents, metadata, and data system development. Enhancements to the data structure and user interface for Oregon's Trend database were primarily to more efficiently address Coordinated Assessment data needs, and to accommodate DES requirements. An integrated mapper data capture system was completed and incorporated into an existing web application. In time, this mapper could be expanded to enhance the flow of data from the field to NRIMP and StreamNet. Oregon StreamNet continued refining and testing a pilot web map for supporting mobile data access, update and creation of fish passage barrier data, and explored the potential to test this out more broadly across the basin.

Oregon StreamNet's server infrastructure and application migration to .NET 4.6, Visual Studio 2013, Windows Server 2012 and SQL Server 2012 continued. Processes to mitigate against catastrophic failures were updated. Migration to ArcGIS Server 10.3 was completed.

WDFW focused some SN resources on the building, testing and refinement of several systems to store data captured from field biologists and analyzed by regional biologists. Database systems under development and

implementation include those for: adult age and scales; traps, weirs and surveys; spawning ground surveys; and juvenile migration. These systems are being developed with the intent of holding BPA project data in a secure and transferable location and informing the CA indicator data sets as well as the standard StreamNet data sets. These data sets are being prototyped at WDFW headquarters and in Washington's Lower Columbia Region, but will eventually be rolled out to other regions statewide. Additionally, WDFW has been concentrating resources, when available, to the development of our Salmon Conservation Reporting Engine (SCoRE) which will enable on-demand data access via services from the data.wa.gov open data platform. Contingent on funding, we anticipate further development of these and other systems in 2015.

The USFWS StreamNet project continued to benefit from the fact that most data from the national fish hatcheries in the Basin are already managed in the centralized CRiS database, making conversion to the StreamNet DES format straightforward. No additional work was done to support FWS data storage by this StreamNet subproject.

Regional Sharing

Regional sharing of fish management data is StreamNet's primary purpose (Figure 5). In 2015, significant effort was expended to improve sharing of the CA indicators and metrics. StreamNet led the team that developed the DES for the project. The DES specifically identifies the data elements that are to be shared for each indicator, along with definitions, formats, and business rules for each element. The DES is used to guide the organization of data to be shared via any specific medium, whether by spreadsheet, CSV file, database file, or web service. The project envisioned the data elements being hosted by the originating agency in DES format and shared via web services that could be accessed by an exchange network hosted by the Environmental Protection Agency (EPA). However, in 2015 it became apparent that the use of the EPA data exchange network might be problematic. Consequently, an alternative approach, using StreamNet as the data location, will be explored in 2016.

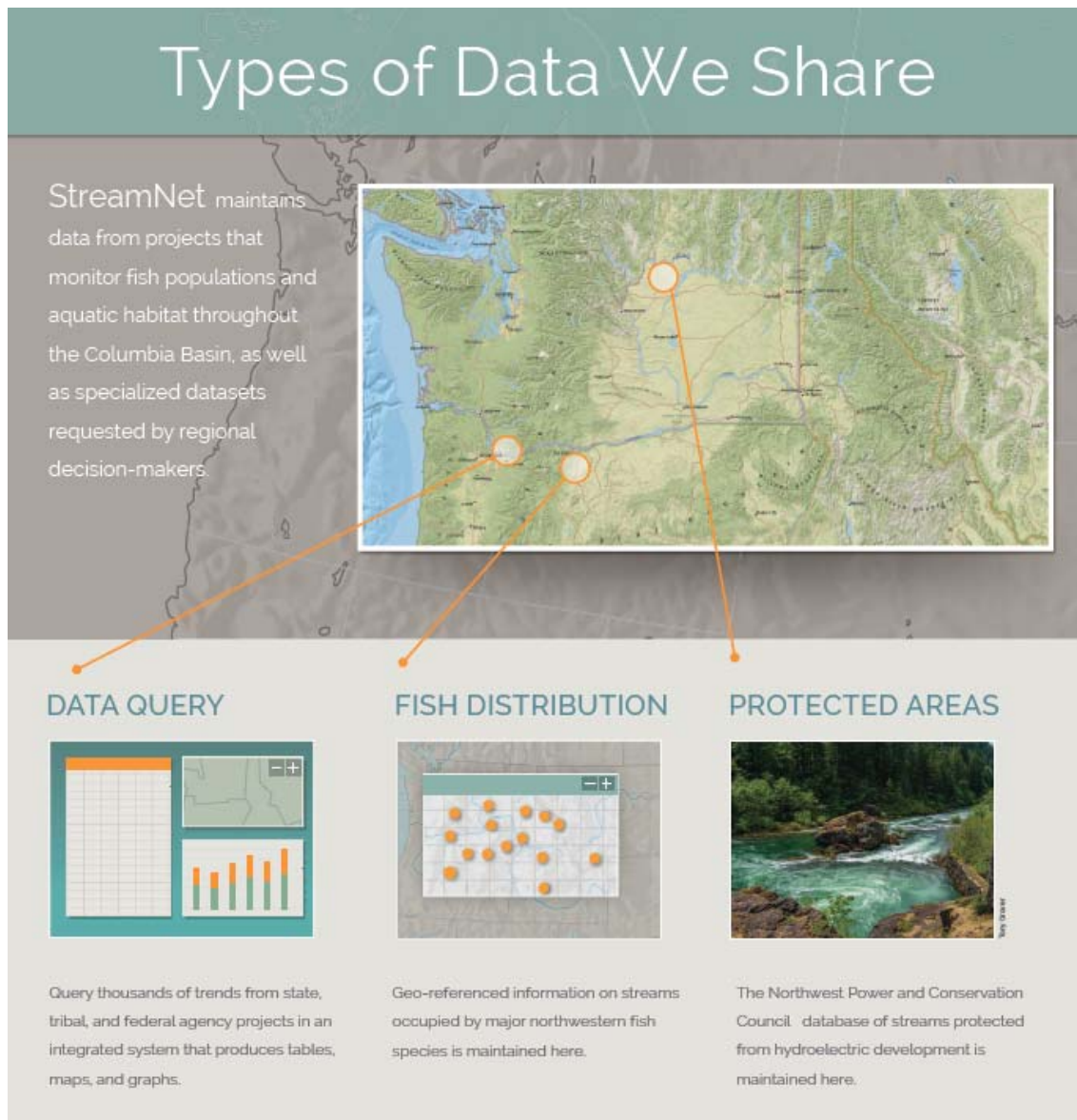


Figure 5. Data sharing Infographic from new website

StreamNet also continued its role as a primary data sharing project in the Columbia Basin, providing ready access to fisheries data. These data have traditionally been created and managed internally by the region’s state, tribal and federal fish management agencies or programs, and have not been shared widely in a consistent format, except through StreamNet. We maintained and updated a central database containing these data and then shared the data through the StreamNet website. Each StreamNet sub-project compiled state or agency specific data for the data categories and submitted them to the central database at PSMFC to add the most recent data. During 2015, the Executive Committee directed the project to resume updating selected, high priority traditional data sets, such as long term sets that support CA indicators and those that are used to maintain the NPCC dashboards.

During 2015 a wide variety of data types primarily related to fish were disseminated through the StreamNet website at www.streamnet.org and by the agency subcontractors. We provided several data query approaches used to locate, display and download data from the StreamNet main database for standardized data and from the Data Store for data that fall outside the scope of the StreamNet DES (Figure 2).

The standard data query utilizes a tabular approach for requesting and viewing or downloading data from the main database. An interactive map application allows location of data from the main database by navigating to an area of interest, then using a 'get data' tool to view and download all data that are associated with features at that location, such as for a stream, county, HUC or hatchery. Maps and GIS layers are also available.

The Integrated Query System (IQS) integrates both tabular and map based query approaches into a single system. This allows viewing and obtaining data within multiple data types by filtering or sorting on column headings in a table and also selecting on a location basis by using a map query. During 2015, work began on a query system which will be used for accessing CA data and related trends. As older trend data sets are not updated over several years, the CA database, along with the trend data associated with these populations, should become the predominate search location for users of StreamNet. The older systems will be maintained only as necessary to maintain access to data.

The Data Store online data archive provides access to non-standardized data from any source, within or outside the StreamNet project, in native format. As previously mentioned, the Data Store serves as an approved environmental data repository for a wide variety of data collected in the basin, maintaining security and accessibility long term. The Data Store interface allows data producers to upload their data sets for secure storage and dissemination along with descriptive metadata. The BPA Data Management Strategy directs StreamNet to store links to associated protocols and designs to ensure data downloaded and used by third parties can be understood and properly used. The Data Store upload procedure obtains project information directly from the BPA Taurus database through www.cbfish.org, and additional links with Taurus and www.monitoringmethods.org are planned. StreamNet data and metadata were provided online as web services, allowing users to locate and obtain data through automated means such as national or regional clearinghouses, and in fact, the new IQS harvests our own web services as part of the new, more efficient approach to querying our data.

Analysis and Reporting

The StreamNet project displays and provides online access to all legacy data and data updates as soon as they are received from the source agencies, quality checked and validated, and disseminated through the various data query systems. Annual time series data are presented as 'trends', while other data sets are updated on a less regular basis as the agencies generate new information, such as for distribution and facilities. The updating of this trend data was discontinued in 2013, in order to focus efforts on CA. Therefore, the dissemination of this type of data through the StreamNet website has declined. In 2015 the StreamNet data technicians working within the data source agencies identified trend data sets associated with CA populations, and selected those that they considered integral to a better understanding of these populations at a more localized level. The Executive Committee endorsed re-initiating updates to these selected trends, as well as those that populate the dashboards and indicator websites of the NPCC.

Data from the StreamNet database are made available through the online data query systems (Figure 2). During 2012 we initiated planning with NOAA Fisheries to develop automated means of feeding indicators and metrics from the CA project to the Salmon Population Summary (SPS) database. During 2015 we continued discussions with NOAA and state and tribal management agencies, with the intent of assisting them in automating data flow for their decision making needs.

StreamNet periodically issues reports on topics of interest to various users, as staff time is available. These include reports on the geographic distribution of fish, fish marking and hatchery releases, and other topics for which

StreamNet holds data, or where StreamNet can serve a facilitating role with other PSMFC projects and databases. StreamNet is a data sharing and reporting repository, and further analysis is not our purview. Where derived data, such as estimates of spawning populations, are disseminated through the project, they are obtained from the source agencies for inclusion in the project's data systems.

As a BPA funded project, StreamNet regularly issues required reports through Pisces and Cbfish. In 2015 these included the 2014 and 2015 quarterly progress reports and the 2014 Annual and BiOp reports. At BPA's request, in 2013 StreamNet also undertook a project to inventory data repository locations by BPA project, contract, and work element. This project resulted in contractor data entry improvements to Pisces. A final communication to contractors who had yet to indicate an environmental data repository was completed in 2015.

4. Synthesis of Findings: Discussion/Conclusions

In 2012 StreamNet received significant input from the NPCC and BPA. Among their recommendations were:

- Data management should focus on addressing priority data needs. Specific guidance for StreamNet included;
 - Focus on a number of additional priority data types, including CA indicators and supporting metrics and juvenile abundance data, and Single Nucleotide Polymorphisms (SNPs) genetics data.
 - Assess the security and accessibility of data developed by BPA funded projects.
 - Participation with integrating data discovery through MonitoringResources.org.
- Increased coordination among database projects is needed to avoid potential redundancy.
- Expanded use of information technology is needed to improve efficiency in data management and sharing.
- StreamNet should take on production and dissemination of a number of additional priority data types. These included the CA indicators and supporting metrics, information on security and accessibility of BPA funded data, juvenile abundance data, resident fish data, SNPs genetics data, and data coordination through MonitoringResources.org.

During 2015 many of these instructions were carried out (Figure 6), and have been reported in the Results section of this report. In completing those tasks, a number of lessons have been learned.

One lesson learned has been that StreamNet should focus efforts on CA and key VSP indicator information in such a way that it helps regional decision makers, ultimately in real time, within existing resources. The flow of traditional StreamNet data should also be focused on providing more detail to populations and priorities of the CA project. Data flow for existing CA indicators, development of new DES and indicators within the CA project, and specifically identified trends associated with the CA populations and species should be prioritized. Given existing resources, StreamNet and the data management infrastructure within StreamNet partners should seek out and implement the priorities of the region's fish and wildlife managers. Where those are not clearly articulated, StreamNet should seek guidance from the Executive Committee on next steps. Where resources are not available to provide the desired data, if data management infrastructure is the bottleneck, StreamNet should seek additional support in order to meet these needs.

The Executive Committee has provided a useful and important function for StreamNet, and particularly for the CA project. This group should continue to play an important role in determining priorities for the project. In addition, it

serves as a venue where managers from the data providing organizations can discuss and outline their issues and resource needs to BPA, NPCC, NOAA, USFWS, and others who may need, direct, and fund data collection. This will be important going forward, so that funders and data providers both have clear understanding of what is being sought and what is needed to meet the demand. One lesson learned is that the structure of the Executive Committee may not be perfectly aligned with the data providing entities, in that several tribes who collect and analyze large amounts of fisheries data are not on the committee. Discussions should be held next year on ways to address this issue.

In 2015, it became evident that maintaining a standardized tabular GIS standard through StreamNet support and funding to data providers was not feasible, given the other priorities of the project. In January 2014, PSMFC created a GIS Center to provide a base level of centralized GIS support for all of its data projects. Thus far, this centralized support has been adequate to help StreamNet meet the less intensive GIS needs associated with mapping fish data at the population level. PSMFC's GIS staff works closely with StreamNet to identify and meet needs as they arise with the understanding that, should the project's GIS needs return to the pre-2014 level, additional project funding to support a GIS technician or specialist may be needed. Currently, PSMFC's GIS Center is working with StreamNet to support the population boundary mapping and visualization needs of the Coordinated Assessments project, coordinate and maintain a regional 'fish facilities' dataset to serve as a point of integration across multiple Columbia Basin projects administered by the Commission (StreamNet, PTAGIS, RMIS, and others), and to provide technical support to the NPCC's Fish and Wildlife Program.

The latest SOW includes a goal to update, where possible, some of the project's traditional, spatially explicit data categories. While the main focus is on compiling and publishing HLI data for priority populations, partners are also being directed to resume targeted updates to stream survey 'trends' associated with BPA and NPCC's priority populations, and fish distribution for priority anadromous species in the Columbia Basin.

Given limited GIS support and a need to stay within current budgets, the PSMFC GIS Center would like to make the following recommendation to streamline the data submission process and concentrate the effort where it will be most fruitful.

- StreamNet partners should focus first on updating time series data for established trends (i.e., those already defined and mapped in the regional GIS) prior to making any effort to identify and map new stream survey reaches. The mapping of new trend locations or the refined mapping of existing trends should only be attempted after determining that the necessary GIS support exists at both the local and regional level.
- Fish Distribution as a StreamNet data category should be redefined as a GIS dataset that is exchanged (or compiled regionally) using GIS file formats. This is a significant shift from the traditional StreamNet model. While less elegant than a regionally coordinated linear event table approach (using stream routes and measures), this is a practical compromise that respects budget realities. This approach should provide the desired functionality of allowing end users and regional partners simply visualize species distribution and habitat use type in map form.

A related lesson is datasets that indirectly support priority recovery and CA data such as hydrography, distribution, and barriers will also lose their utility over time if not prioritized and supported appropriately. The Executive Committee gave direction to maintain fish distribution and area facilities GIS layers as a regional reference source as their priority. Maintenance of the other data types will be secondary, and should not interfere with higher priorities.



Figure 6. Project overview infographic from the new website

Cooperating subcontractors have made use of assets provided by BPA through the StreamNet program to build infrastructure that contributes directly to their own decision-making capability, to degrees that vary from agency to agency. In general, agencies that have made the development of a centralized data management capability a priority have integrated StreamNet staff into their programs, and effectively use the staff to both feed data into the StreamNet database and to complete their own internal data management priorities. In general, agencies that have a more dispersed data management process use StreamNet staff primarily to feed data into the StreamNet database. Other staff separately and independently manage data for decision making. StreamNet has integrated discussions with agency partners on how best to deploy program assets within agencies through the Executive Committee, with the goal of simultaneously assisting agency decision-makers and assuring data security and regional sharing of data.

One of the lessons learned in this project has been that embedded data management staff paid for through the StreamNet project serve an important and often unrecognized role within the agencies. So long as the flow of traditional data, and now CA information, has continued, agencies have been free to structure their data systems and use embedded staff in any structural assemblage that works for them. While this flexibility can be an asset, it is incumbent on the program to ensure that these assets are deployed to best implement regional RM&E programs.

StreamNet staff will continue to focus on aligning the program with regional RM&E through discussions with the Executive and Steering Committees, the NPCC, and participation in other regional coordination efforts.

While BPA funds the majority of projects that collect fish metric data in the basin, it does not fund all of this work. Combining resources at the state, tribal, and federal level can lead to more effective and comprehensive RM&E management in the future. However, that also means that the setting of priorities and the flow of data will be a collaborative, and sometimes compromised, arrangement.

In implementing the CA project, substantial progress was made in 2015. However, the caveats identified in 2012 remain an impediment that will impact the region's ability to implement more efficient data flow to decision makers. The indicators are not calculated for all defined populations. Many indicators, particularly those related to productivity, are calculated for far fewer populations than others. Indicators are not always calculated to represent an entire population. This has led to discussion about the value of compiling and submitting data at a sub-population scale. The various state and tribal agencies are at significantly different stages in developing the capabilities of their data management infrastructure, so developing a region-wide approach to sharing these indicators will continue to require more time and/or more resources for some agencies.

One lesson learned through this project is that the existing system of decision making is reliant on a small, core network of biologists with a long history and significant institutional knowledge that is largely irreplaceable. As these professionals retire, a more automated and documented system will be essential to assure continuity of population assessments. Projects such as StreamNet could serve a key role in assuring that this documentation and the data needed to inform the assessment process are accessible and stable during any upcoming transition. Analytical method documentation for the CA project will be a priority for StreamNet in 2016.

Documenting the history of population assessments is key to understanding and evaluating past and present data. The goal is to provide a citable reference for co-managers and interested parties when referencing abundance and productivity data in their own reports and analysis, including detailed methods on the datasets for indicators and metrics that are in the CA DES, and document changes to methods for those indicators and metrics. This work requires a detailed examination of methods documents and datasets, which, on occasion, illuminates QA/QC issues in VSP datasets, resulting in an intensive review of analytical methods and recalculation of VSP metrics and indicators. This often requires an enormous amount of time and coordination and therefore needs to be considered when thinking about compiling and/or documenting current or VSP metrics and indicators into DES format.

Recommendations;

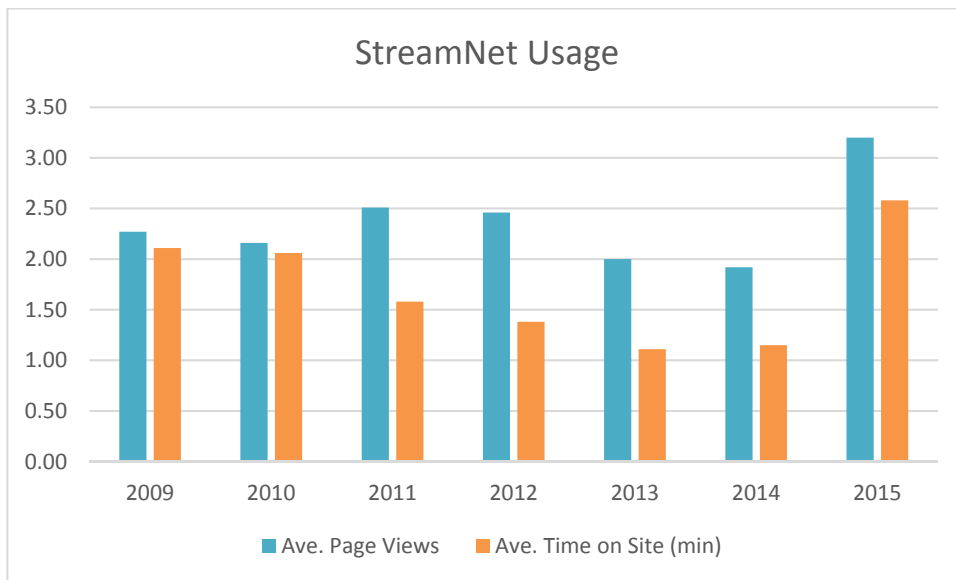
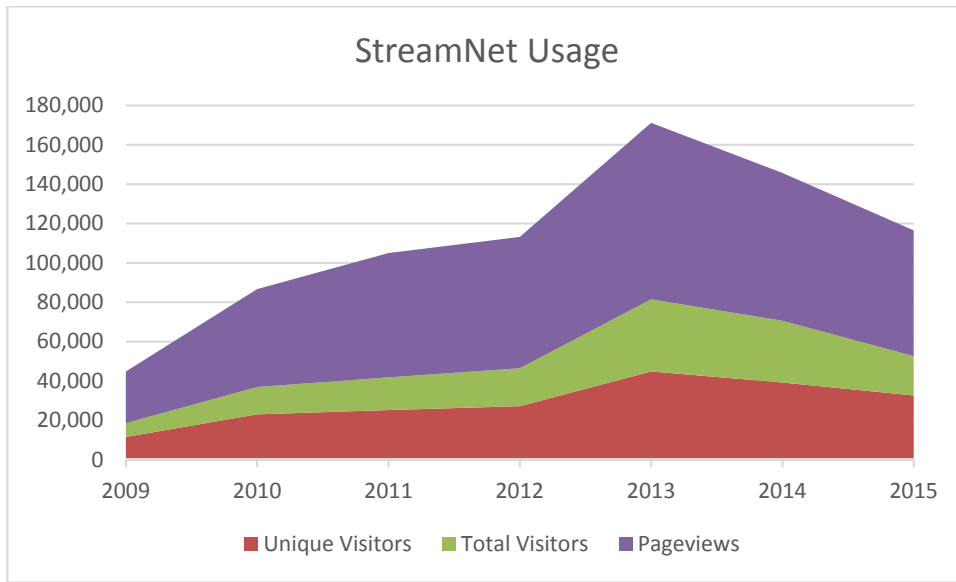
1. The StreamNet Executive Committee should continue to be used to focus and prioritize the CA Project. This should specifically include prioritizing selection of new high level indicators, taking into account regional data needs, such as NOAA status assessments and NPCC high level indicators and dashboards. Priorities should incorporate realistic assessments of available staff and other agency priorities.
2. Discussions should be held with the StreamNet Executive Committee and BPA to consider expanded membership on the Executive Committee for any entity that is a significant data provider.
3. The StreamNet Executive Committee should also continue to evaluate and prioritize updating traditional StreamNet data sets to reflect an emphasis on those that add value to ongoing regional O&M efforts. These include updating geo-referenced surveys that are supportive of a more granular understanding of high level indicator trends, and maintenance of regional databases such as fish distribution and facilities.

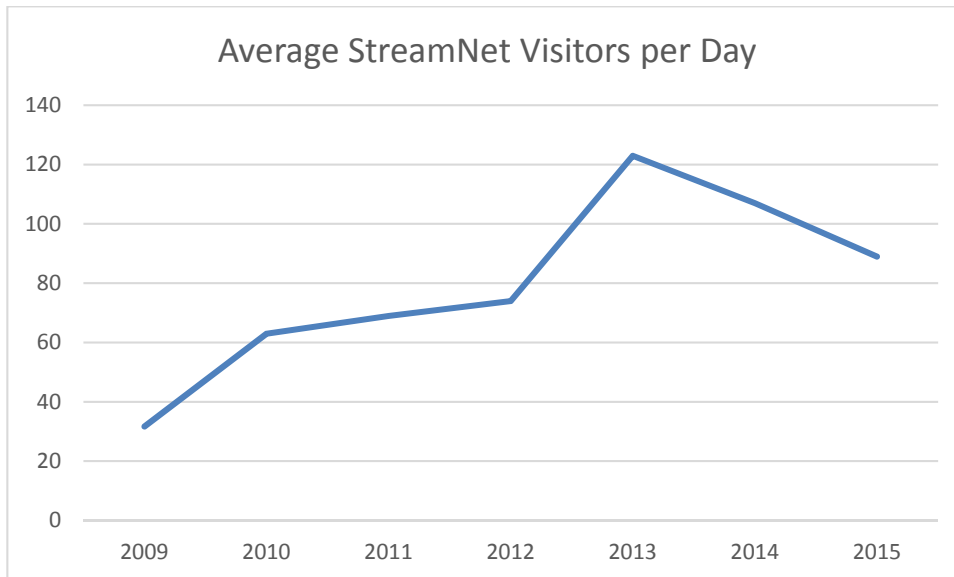
4. StreamNet should provide accessible and useful displays of information at the regional scale, with special focus on the CA project. Improvements to the StreamNet website should include GIS-based, population level graphical presentation of the high level indicators as they are developed. StreamNet should also assist in supporting the efforts of others (NOAA, NPCC, etc.) who are engaged in similar efforts by focusing on automating and streamlining the flow of data for these efforts.
5. While focusing the CA project on high level indicators that support regionally significant monitoring efforts, clear direction and consensus should be used to guide agencies and tribes to submit data that support population level assessments. Where such data are lacking, the Executive Committee should provide overall project direction to address any concerns. If warranted, they may wish to use lower level or even higher level information and incorporate that into the CA database.
6. The StreamNet Executive Committee should periodically evaluate whether regional data collection and management efforts are aligned with the high level data needs identified by the users of CA data, and recommendations for funding and support provided to BPA, NPCC, NOAA, and others from a regional perspective.
7. Where data are needed in support of regional prioritization (i.e. resident fish data for NPCC indicators and dashboards), StreamNet should prioritize infrastructure and data management assistance needed to support such indicators. This will require advance planning in order to potentially shift resources or request additional support, as agencies are currently fully committed to ongoing efforts. BPA and the StreamNet Executive Committee should clearly convey to agencies the importance of contributing to regional efforts. This will assist in gaining acceptance and buy-in from agency managers and biologists.
8. CA methodologies for calculation of high level indicators should be fully documented.
9. The StreamNet Data Store should continue to serve a role as a secure environmental data repository. If BPA has a desire to confirm that the Data Store is in receipt of datasets for projects that have designated the Data Store as their repository, an automated routine linking Pisces/cbfish and the Data Store should be developed and implemented.
10. StreamNet should continue to play a role in the development and deployment of emerging technologies in fisheries data collection through sponsorship of workshops. If available, funding the engagement of agency-embedded staff in purchasing, development and testing of these technologies, with the objective of making data collection and transfer more efficient and secure across the region, can also be a StreamNet function.
11. StreamNet should continue to seek out efficiencies and new sources of revenue in order to fund agency operations that support regional data management priorities (i.e. field data stewards that compile and provide CA data). Where appropriate, the StreamNet Executive committee should recommend increases in traditional funding and support as needed, to complete the priorities they have established.
12. StreamNet partners should focus first on updating time series data for established trends (i.e., those already defined and mapped in the regional GIS) prior to making any effort to identify and map new stream survey reaches. The mapping of new trend locations or the refined mapping of existing trends should only be attempted after determining that the necessary GIS support exists at both the local and regional level.
13. Fish Distribution as a StreamNet data category should be redefined as a GIS dataset that is exchanged (or regionally harvested from data contributors) using GIS file formats instead of regionally coordinated linear event tables. This is a significant shift from the traditional StreamNet data exchange model. While less elegant than the historic approach (using stream routes and measures), this is a practical compromise that respects budget realities. This approach should provide the desired functionality of allowing end users and regional partners to simply visualize species distribution and habitat use type in map form.

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<http://www.streamnet.org/streamnet-executive-committee-adopts-5-year-plan-for-coordinated-assessments-project/>
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ftp://ftp.streamnet.org/pub/streamnet/projman_files/Data_Sharing_Guide_2009-06-01.pdf
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6. *PNAMP 2010 Regional Data Management – RM&E Strategy Implementation Road Map (1/07/2010 draft)*
<http://www.pnamp.org/document/2772>
7. *BPA Fish & Wildlife Policy and Planning Division. June 04, 2013. A Framework for the Fish and Wildlife Program Data Management: Issues and Policy Direction for Development of a Data Management Strategy and Action Plan*
8. *Kinney, Bill. 2015 Summary Report to BPA of the StreamNet review of Fish Data Projects' Work Statement Elements and recommended assignment of Data Repository IDs from the Monitoring Methods list of Environmental Information Repositories, January 31, 2015*
9. *Coordinated Assessments for Salmon and Steelhead-PNAMP website.*
<http://www.pnamp.org/project/3129>
10. *Monitoring Methods Monitoring Protocols-website.* <https://www.monitoringmethods.org/Protocol/Index>
11. *Monitoring Resources List of Environmental Information Repositories-website.*
<https://www.monitoringresources.org/Resources/DataRepository/Index>
12. *NPCC 2015 Columbia River Basin Fish and Wildlife Program*

Appendix A: Use of Data & Products



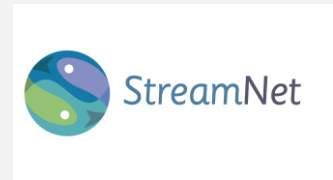


Top users of the StreamNet website (no. of visits)	2015	2014	2013	2012	2011	2010	2,009
Internet service providers (Comcast, Verizon, etc.)	9,241	17,862	17,711	12,515	4,200	8,369	2,530
State of Oregon	776	640	600	961	881	974	594
National Oceanic and Atmospheric Administration	574	349	309	385	144	572	306
Bonneville Power Administration	448	213	220	258	141	296	150
Headquarters USAISC (US Army)	394	360	462	342	96	515	277
U.S.D.A. Forest Service	347	241	393	443	0	593	339
U.S. Fish and Wildlife Service, IRM/BFO hq	256	201	109	182	111	262	185
Washington State Department of Fish and Wildlife	194	165	89	156	36	584	261
Oregon State University	187	158	186	152	40	148	64
U.S. DOI Bureau of Land Management	176	122	139	186	81	155	95
University of Washington	167	114	91	109	24	169	70
State of Idaho	158	118	120	132	63	166	128
proxad / free sas	158						
Portland State University	146	70	73	88	0	55	39
Microsoft corporation	128						
USDA Office of Operations	126	122	148	130	58	244	201
Snohomish county government	117						
Nez Perce tribe	99						
HDR	79	75	75	82	18	58	61
University of Nebraska	67						
State of Montana	74	77	67	75	8	102	45
Washington School Information Processing Cooperative	45	250	274	229	0	89	65
Ch2m Hill Inc.	45	57	62	65	0	0	0
National Wetlands Research Center, USGS	38	45	59	82	23	70	38
University of Idaho	31	46	96	0	0	0	0

Appendix B: Detailed Results

Appendix B: Detailed Results

StreamNet Annual Report Details - Calendar Year 2015



A Support transfer of data into secure and accessible repositories

Support transfer of data into secure and accessible repositories

159. Transfer/Consolidate Regionally Standardized Data

Deliverable: StreamNet participants assist sponsors in securing data in appropriate repositories, as requested. Data are stored in appropriate repositories.

CTCR	CTCR continues to communicate with Project Sponsors, inventory data storage and offer assistance to secure accessible repositories.
FWS	There has been no activity on this item.
IDFG	IDFG StreamNet staff continued to assist and encourage IDFG project sponsors to manage their data within secure and accessible data repositories.
MFWP	MFWP continues to communicate and support BPA projects fish biologists in MFWP with data entry, inventory data storage, and manage their data in secure and accessible repositories.
ODFW	ODFW StreamNet staff assisted and encouraged BPA, ODFW, and local project sponsors to manage or locate their data within secure and accessible data repositories.
PSMFC	Gathered suggested repository information from StreamNet partners. Readied Data Store for repository function. Worked with BPA to identify projects where data sets are created but no repository identified. zzz
WDFW	WDFW staff continued their efforts to secure field and regional data when found or identified by BPA. Most of this work was accomplished in the previous year.

B Maintain StreamNet Data Store as a secure and accessible repository

Maintain StreamNet Data Store as a secure and accessible repository

160. Create/Manage/Maintain Database

Deliverable: The Data Store data submission procedure is improved and more efficient and is increasingly used as an archive for unstructured data, particularly from BPA project sponsors. The Data Store tools integrate with mm.org and cbfish.org.

PSMFC Improved functionality of the Data Store by linking it to existing BPA contract systems and auto-populating fields, where possible. Increased functionality could be obtained with additional coordination with the Pisces system.

C CA data - coordination

CA data - coordination

189. Coordination-Columbia Basinwide

Deliverable: StreamNet provides leadership and coordination for the Coordinated Assessments project, including participation in the CA core team and planning group, leadership of the DES Development Team, leadership of the technical aspects of the project, and overall project participation and coordination. An exchange node on the EPA network is created.

CTCR CTCR Data Steward participated in CA Planning Group, Exchange Configuration Team, and Hatchery Indicators Teams for DES development, provided feedback on the DES.

FWS FWS participation has begun now that CA has begun more actively addressing hatcheries.

IDFG IDFG StreamNet staff worked with IDFG Fisheries staff at all levels of the CA project by participating in planning, DES development, database development, and exchange group meetings.

ODEW Oregon StreamNet continued to participate in CA Planning Group, DES Development Team, XCT, and StreamNet Technical Committee meetings, along with state and other regional discussions, workshops and planning efforts related to CA data flow. Focused attention was also given to NOAA TRT recovery population changes, regional information gathering requests, traditional data category definitions, overlapping population estimates, and review of StreamNet query system enhancements.

PSMFC Regular activities during the year included CA Core Team, CAPG, DES development, and XCT. A CA workshop was co-sponsored with PNAMP in April. Project administrative duties were completed. The existing EPA grant was administered, and assistance provided to WDFW in order to complete a new grant application. Project goals and objectives were reviewed with the Executive Committee, and quantitative targets set for obtaining NOSA data in FY 2015. Data flow was subsequently reviewed by BPA, and additional data was requested for "BPA priority populations".

WDFW WDFW staff created draft cross-reference of the relevant streams in the Interior Columbia and Willamette recovery domains. Staff developed the code and process to update CA tables with final products.

D CA data - DES and database

CA data - DES and database

160. Create/Manage/Maintain Database

Deliverable: The CA DES is maintained and updated to include new indicators and their supporting metrics and metadata, and CA data are loaded and QA'd in a conforming database. A node on the EPA network is maintained, and an indicator database for the same data exists on StreamNet and is linked effectively to that node. Discussions are held with states, tribes, NPCC staff, and others concerning development of DES for other fish metrics. Timelines and priorities are established in a 5 Year Plan for developing regional DES's.

CTCR	CTCR staff participated in the DES development meetings.
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FWS	FWS participation has begun now that CA has begun more actively addressing hatcheries.
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IDFG	IDFG StreamNet staff participated in the DES development meetings, and implemented changes and additions of the DES to the HiLI database and application.
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ODFW	ODFW staff contributed significant input to CA DES discussions, various forums and email correspondences throughout the year, and updated internal data systems as needed based on NOAA population and adopted DES changes. Data management protocols, manuals, databases, file naming standards, QA procedures, and directories were also updated based on these changes.
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PSMFC	C.A. database created based on DES, and data flow commenced. Reviewed DES with CAPG at spring workshop. Held meetings with DES development teams.
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PSMFC	We completed work on 3 new DES tables for indicators based on number of natural origin juvenile fish outmigrants and on natural origin juvenile (fry-parr) abundance in the wild (i.e., standing stock). The tables are named JuvenileOutmigrants, JuvenileOutmigrantsDetail, and SmoltAbundance.□
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WDFW	<p>The Data Manager met with Bio's and Research Scientists in the Lower Columbia to discuss current data format and structure. Internal databases were reviewed to ensure that they contain or could contain the raw data needed to produce the desired outputs to populate the CA database.</p> <p>The Access version of the CA database was placed on the agency server to test exchanging NOSA and SAR data. Routines and front end portals are being created to populate the tables in the CA database.</p> <p>An updated script to build a SQL Server CA database with the three adopted tables in DES version 20140418 was received this quarter. Processes to populate these tables and create a DFD for internal purposes was worked on and testing next quarter of this process will take place.</p>
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E CA data - compile data

CA data - compile data

159. Transfer/Consolidate Regionally Standardized Data

Deliverable: All available CA indicators and metrics are obtained, updated, converted to the DES format, and exchanged with the CA database.

CTCR	Available CA indicators and metrics have been obtained and the process of converting to DES format and exchange has begun.
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FWS	FWS data related to all known indicators were exchanged with StreamNet.
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- IDFG** Links to data sources were updated, and the queries ran to extract, transform, and load the 1957-2006 sp-su chinook RperS data into the IDFG HiLI database.
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- ODFW** Compiled and submitted 931 NOSA, and 728 adult RperS records, and updated 93 existing NOSA records using the automated transfer process and the StreamNet API, and provided access to new and updated metadata and data analysis flow diagrams. Submissions also included 4 non-listed winter steelhead and the inclusion of 3 non-listed spring Chinook population records to NOAA's official Populations Table. Following the release of new validation rules, staff noted and corrected 94 NOSA, 472 RperS, and 2 SAR records to be resubmitted to StreamNet.
- Staff also supported efforts to update the ODFW Recovery Tracker website with information developed from the CA effort. Development of Viable Salmonid Populations (VSP) Methods Compendium reports, including GIS maps to show population, MPG, and DPS/ESU level boundaries for submitted population data continued, with two being completed and one in-progress. Additionally, one analysis protocol (NOSA) in PNAMP's Monitoring Methods.org and eight associated MM.org methods were completed this year.
-
- PSMFC** Measurable goals developed thru the Executive Committee, reviewed with the StreamNet partners, and incorporated into the Phase VII work plan. Developed a 5 year plan for the CA project, which was adopted by the Executive Committee. reviewed plan with broader CAPG group at 2015 workshop. Compared data flow with BPA priorities and initiated attempt to find additional data for BPA priority populations.
-
- WDFW** The Lower Columbia Data Steward continued working on with the Region 5 data management team the new design of the Traps weirs and Surveys (TWS) database.
- Lower Columbia Data Steward is also working with the Region 5 data management team to develop a TWS tablet version to be used this fall for testing data collection at weir/trap and hatchery sites.
- The Upper Columbia Data Steward participated in development and design of the revised schema for Region 5 TWS (Traps, Weirs, Survey] restructure. Participated in review of StreamNet CA DES and in internal data flow process to ensure delivery of upper Columbia CA data. Participated in design and development of pilot mobile application TWS for Weirs.
- Internal review to identifying data sources for Coordinated Assessments in the upper Columbia Basin. Pilot data was identified and loaded into a draft DES.

F CA data - automated data exchange

CA data - automated data exchange

160. Create/Manage/Maintain Database

Deliverable: Automated feeds of CA data to the CA database are implemented and evaluated for effectiveness, and automated data feeds to NOAAF are initiated.

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- CTCR** CTCR initially used StreamNet's Access Database/API to transfer and update Natural Origin Spawner Abundance data. Beginning in late 2014, CTCR collaborated with Sitka Technology Group to replicate the data transfer so that it occurred from their servers, which is where the CTCR data system of record now resides.
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- IDFG** IDFG StreamNet staff collaborated with PSMFC staff to create and test web services which exchanged data between IDFG and StreamNet HiLI databases. Automated exchange of data is planned to begin in 2015.

ODFW Staff maintained and enhanced internal databases and applications to extract, transform, and transfer data as necessary, along with the ODFW CA automated data exchange system to stay in sync with StreamNet CAX changes, increase robustness, implement new pre-submission validation rules, and only upload data which has been modified since the previous upload.

CA related enhancements were made to the ODFW Data Clearinghouse and conversion of a MS Access spawning ground survey database into SQL was initiated.

Staff developed flow diagram structures and tables for numerous CA metrics, and participated in the modification of the previously adopted file naming standard for VSP data files to improve overall data flow. We also updated and developed new data dictionaries for Chinook and steelhead productivity and juvenile outmigrant estimates and uploaded to the ODFW Recovery Tracker website.

PSMFC SQL Server and Access tables were created for PresmoltAbundance, JuvenileOutmigrants and JuvenileOutmigrantsDetail based on approved Data Exchange Standards. Scripts to build these SQL Server tables and an Access database were posted on the StreamNet Coordinated Assessments and PNAMP web sites. Over one thousand validation rules and related error messages were embedded into extended properties of Coordinated Assessments tables' fields in order for the StreamNet API to validate field-level values on records submitted to StreamNet against the Data Exchange Standard. In addition, 129 record-level rules are also checked, and error messages are returned to the submitting agency as well as written to a log. Reports were designed to summarize Coordinated Assessments data flow and incorporate related StreamNet Trends and NPCC Dashboard links and BPA priority tiers.

WDFW Work began on automated data feeds to StreamNet CA using the StreamNet API. Internal Agency data systems in are in the process of being modified to contain CA indicator data.

G CA data - dissemination

CA data - dissemination

161. Disseminate Raw/Summary Data and Results

Deliverable: The CA indicators, metrics and metadata are available, consistent with a Data Sharing Agreement on either the StreamNet website or EPA node.

PSMFC Work on data sharing agreement has been ongoing. Offered shared data to NOAA-Fisheries for use in current 5 year status review, but they determined that existing methodology was best for the current process. Automated sharing with multiple organizations and tested data flow. Current focus in on acquisition of NOSA indicators as prioritized by the Exec Comm. Initiating testing and configuration of the EPA node, which should go live in 2015.

H Compile high priority traditional StreamNet data

Compile high priority traditional StreamNet data

159. Transfer/Consolidate Regionally Standardized Data

Deliverable: Specific high priority data sets are updated and maintained. State hydrography layers, including streams and lakes, are maintained and updated as necessary. Data is compiled for adult abundance, spawner counts, estimates of spawning populations, hatchery returns, age composition, habitat, barriers, distribution, juvenile abundance, resident fish, hydrography, and related metrics. As regional priorities for resident fish and other fish metric data are established via a CA-like process, managers are surveyed to determine the availability of such fish metric data, by priority, to detail the availability, type, and location of data. Integration with state and tribal web-based data systems is implemented where possible to do so.

CRITFC Initiated process to regularly update linkages via monthly xml extract. Implementation is ongoing.

- CTCR** CTCR's "traditional StreamNet data" included juvenile snorkel densities, redd counts, and video counts. However, the Coordinated Assessments project now captures adult steelhead spawner estimates which the redd counts were a part of. Redd count data and snorkel densities are still available on CTCR's website, and video counts are submitted to and available on the DART website.
- FWS** Data for the most recent Return year was exchanged with regional StreamNet, and minor QA/QC issues with a small amount of older data were resolved.
- IDFG** Idaho compiled and delivered fish data to StreamNet as time and staffing allowed.
- MFWP** MFWP compiled traditional StreamNet data throughout the year and exchanged the following data: EscData-41 records; Trend-47 Records; Fish Distribution-117 records; References-46 Records; Hatcheries-7 Updated Records
- MFWP** MFWP managed and maintained hydrography data throughout the year. Much Quality Control was done on waterbodies coinciding with the development and refinement of centralized database systems. Work in progress towards having a crosswalk table between Montana LIDs and 24k NHD reaches for potential data compatibility between NHD reaches and single stream identifiers.
- ODFW** ODFW submitted 11 new and 1,341 existing (1,600 EscData) traditional data records, including index redd, peak, carcass and spawner counts, and dam/weir counts supporting recovery populations and BPA projects in the Lower Columbia/Willamette, Mid-Columbia and Snake River ESU. Staff completed efforts to align trend locations and measures to the latest National Hydrologic Dataset and provided updated hydrography records related to StreamNet trends.
- Staff added 1,154 records to the Oregon Fish Passage Barrier database, and updated Oregon Fish Habitat Distribution Database records in the mid and upper Willamette basins as well as the Hood basin.
- ODFW reviewed StreamNet's Dam and Hatchery facility information and provided input regarding issues that need to be addressed before the data can be incorporated into the regional database.
- ODFW staff attended several StreamNet Technical Meetings to development new traditional trend data category definitions. The committee crafted and approved for Steering Committee review; unique definitions and names for each trend data category to create a distinction between DES indicators and metrics.
- ODFW** Staff created a new version of the NHD-derived statewide whole stream route dataset, coordinated with OWRD & USGS on requested NHD changes, synced our dataset with NHD flowline data, and implemented updates in the Sandy and Grande Ronde basins. The data, along with the ODFW LocMaster table and the ODFW WSR data management plan were updated as warranted during the year.

PSMFC	Data Category	Available Data	Years	Observations	New
	Adult Return-Redd Counts	4,959 Trends	1901-2014	46,806	149
	Adult Return-Spawner Counts	5,506 Trends	1944-2014	35,618	110
	Adult Return-Est.of Spawning Pop	3,321 Trends	1901-2014	23,111	29
	Hatchery - Returns	1,093 Trends	1906-2014	10,384	13
	Dam/Weir Counts (Ad. or Juv.)	584 Trends	1925-2014	14,722	4
	Adult Return-Spawner/Recruit Est.	15 Trends	1955-1995	555	
	Fish Counts	372 Trends	1953-2012	802	
	Harvest - Freshwater/Estuary	2,708 Trends	1894-2012	41,493	
	Harvest - Marine Landings	579 Trends	1950-1996	7,198	
	Fish Distribution	26,319 Streams		63,650	
	Facilities - Barriers (potential)	64,258 Barriers			
	Facilities - Dams	7,882 Dams			
	Facilities - Hatcheries	539 Hatcheries			
	Protected Areas	29,524 Records			

WDFW Reviewed BPA project metrics, and conducted an internal survey of WDFW data stewards to determine most appropriate WDFW databases for each metric. Final adoption of WDFW's draft new stream layer has repeatedly been delayed. When it is adopted, the StreamNet Location Manager will fully scope the layer & draft a proposal to integrate MSH with the new line work. Partners continue working to improve the linework, have different business needs for the level of accuracy and different methods to generate the best linework.

WDFW WDFW posted new stream (GeoLib.DBO.LLID_Routes) and fish distribution (GeoLib.DBO.SWIFD) on their corporate server. Both are based on a snapshot of NHD lines. Notably WDFW's older corporate layer (str24) was not removed yet and likely will remain until WDFW has fully adopted the new hydrography layer by moving all pre-existing data to georeference LLID_Routes. Final adoption of WDFW's draft new stream layer has repeatedly been delayed. When it is adopted, the StreamNet Location Manager will fully scope the layer & draft a proposal to integrate MSH with the new line work.

I Data exchange standards and database for resident fish and other metrics

Data exchange standards and database for resident fish and other metrics 160. Create/Manage/Maintain Database

Deliverable: Discussions are held with states, tribes, NPCC staff, and others concerning development of DES for resident fish and other fish metrics. Timelines and priorities are established for developing regional DESs. The existing StreamNet DES and database for fish abundance, resident fish presence, and other fish metrics are maintained and data are loaded into the StreamNet database and quality assured as they are received.

CTCR CTCR participated in the SNTC meetings held in 2014.

FWS Q-2 Input: ODFW prepared for and participated in the StreamNet Technical Meeting held in March. Staff agreed to minor changes and additions to codes and conventions in the DES.

IDFG IDFG StreamNet staff participated in SNTC meetings to maintain and develop Tier 2 DES like the Escape table.

MFWP MFWP StreamNet staff have determined that no existing DES will work for exchanging resident fish population information. However, no significant progress was made this calendar year on developing a DES due to competing priorities

MFWP As part of determining the availability of resident fish data and metrics the existing DES for resident fish were reviewed. It was determined that the number of revisions needed to existing DES' to accommodate existing data warrants the creation of new DES, and discussions have been taking place within the StreamNet technical committee members.

ODFW ODFW regularly participated in CA planning and technical meetings as well as StreamNet Technical Committee meetings. Staff contributed to traditional DES, Steering Committee proposals, and other DES discussions. No significant progress was made this calendar year on developing a resident fish DES.

PSMFC Discussions held with NPCC staff and contractors about coordinating with the resident fish data efforts associated with the Council initiative on dashboards and HLIs. StreamNet staff will support this effort. Five year plan for CA anticipates that this will be delayed until 2018.

PSMFC Relatively minor changes were identified and agreed to during 2014. A new version of the StreamNet DES will be promulgated in calendar year 2015.

WDFW WDFW continued regular participation in CA planning and technical meetings as well as StreamNet Tech Com meetings.

J Regional Coordination

Regional Coordination

189. Coordination-Columbia Basinwide

Deliverable: StreamNet participants coordinate with regional entities to manage and improve data sharing at the Columbia Basin scale. Coordinated Assessment-like efforts are initiated to determine specific target data needs and then collaboratively develop standards and methods that simplify, standardize, and automate data flow to meet regional priorities.

-
- All** StreamNet staff are working with NPCC, PNAMP, BPA, and others to determine if certain habitat indicators would benefit from a regional data sharing collaboration. Communication with NFHs is ongoing.
-
- All** StreamNet partners presented information on the project at multiple forums, including the NPCC, AFS, and related organizations.
- Oregon StreamNet promoted CA, StreamNet and good data management at a gathering for agency fish research and management staff. A poster titled "From Fish to Website: Managing Steelhead Abundance Data for Northeast-Central Oregon" was presented at the 145th Annual AFS meeting in Portland, OR. Staff also met with agency managers and the East Region meeting to promote good data management practices and relational database usage.
-
- CTCR** CTCR anadromous division coordinated with other separately funded CTCR programs such as the Chief Joseph Hatchery and the Resident Fish Department to keep them informed of the efforts and data structure CTCR was using for the Coordinated Assessments project.
-
- FWS** Routine data collection was accomplished with the majority of National Fish Hatcheries. Additional effort was required for one hatchery.
-
- IDFG** IDFG StreamNet staff continued to assist and encourage non-FWP project sponsors to manage data their data within secure and accessible data repositories like the Standard Stream Survey (SSS) and Lake and Reservoir Survey (LRS) databases. IDFG StreamNet staff coordinated data collection, compilation, management, and access with federal, state, and tribal collaborators. IDFG StreamNet staff coordinated data needs and priorities for the FWP and potential data sources within FWP projects.
-
- MFWP** Staff participated in Western Association of Fish and Wildlife Agencies(WAFWA) efforts which relate directly to the use of StreamNet data. No other support was identified or requested.
-
- MFWP** StreamNet staff attended annual meeting in Bozeman for Yellowstone Cutthroat Trout Geographic Management Unit (GMU) personnel. Staff coordinated data update meetings. MFWP StreamNet staff updated the central YCT Assessment database with 2015 data. Staff submitted a YCT Range-Wide2015 Access database and YCT2015update geodatabase to StreamNet Data Store.
-
- ODFW** Oregon StreamNet reviewed and commented on the draft and final letters and repository spreadsheets to project sponsors from StreamNet and BPA to properly secure and provide accessibility of BPA funded data.
- Staff worked with PNAMP staff to assess if VSP Methods Compendium reports and protocols could be incorporated into MonitoringMethods.org (MM.org).
- Staff reviewed the NPCC Fish and Wildlife Committee draft "Methodology to Identify and Review Projects for Cost Savings" document and provided comments, and attended a demonstration of NOAA's newly developed Recovery Action Database. We also commented on the ODFW's information asset classification proposal.
-
- PSMFC** Prioritized coordination efforts through the formation of the Executive Committee, CA project, improved website, presentations to NPCC, and other activities. Working on habitat indicators.

-
- PSMFC** Held a data integration forum in September, 2014. Direct improvements were made as a result of the forum, including development of a common facilities GIS dataset to improve quality and function in StreamNet, RMIS, and PTAGIS. Informal discussions continued in 2015. Particular emphasis was placed on including PSMFC hatchery database managers (all of the above plus the Fish Passage Center) included in discussions of hatchery data sharing.
-
- PSMFC** Worked with PNAMP to foster documentation and encourage improvement and participation in mm.org. Prioritizing documentation of analytical protocols used to calculate NOSA indicators. Worked with data providers and CRITFC to ensure that documentation of trends via links to StreamNet library were maintained and updated.
-
- PSMFC** Integrated Data Management Objectives into the current SOW, the CA project, and the general priorities of the StreamNet project. Reviewed CA data flow with BPA and embarked on additional effort to obtain data, particularly NOSA and juvenile data, for BPA priority populations.
-
- WDFW** WDFW provided support to the program, including leadership of the CA project through the EPA grant process.

K Disseminate Data

Disseminate Data

161. Disseminate Raw/Summary Data and Results

Deliverable: Website(s) provide functional, attractive, and relevant access to key data, including CA indicators. Requests for information or assistance are responded to within one business day at PSMFC. If within StreamNet capabilities, requested help or information is provided as rapidly as reasonably possible within existing resources. Metadata for the pilot explorer are provided to Sitka via web services in conformity with the project metadata exchange standards. All data that are submitted by the source agencies are available for review and download through the StreamNet online query systems and as web services.

-
- CTCR** CTCR responded to 12 data requests this year which were either met by directing users to appropriate data sources, or by running specific queries in the OBMEP database to fulfill the request.
-
- FWS** No StreamNet specific requests were noted during the report year.
-
- IDFG** IDFG StreamNet staff responded to at least 32 data requests. The number of data requests continues to decrease as the number of IFWIS users increases, and people find data for themselves.
-
- MFWP** MFWP staff responded to 83 requests in 2015. 70 requests were fully satisfied, 12 were partially satisfied with requestors referred to appropriate data sources, 1 was referred to other info sources.
-
- ODEW** Oregon StreamNet responded to 35 requests this year; 28 of which were completely or partially satisfied.
-
- PSMFC** Made significant improvements to the website and the Data Store in 2014. The StreamNet web site was redesigned and the new version made public in December. Maintained website and regularly fixed errors. Commenced design of CA data display and query system. Reviewed with Steering and Executive Committees as well as CAPG. Initiated integration with NPCC dashboards and indicators. Discussed integration with NPCC Objectives database.

PSMFC Direct requests for information have become less frequent over the years, as our web site has been more stable and our services more robust. Only 14 direct requests were received in 2014. These requests break out as follows:

AGENCY TYPE

College / university = 1
General public / other = 1
Government, county / local = 1
Government, federal = 4
Government, state = 1
Government, tribal / tribal organization = 1
Industrial / commercial = 1
Nonprofit organization = 2
Private consultant = 1
Unknown = 1

REQUEST TYPE

Data request = 2
GIS data / map = 3
Help finding information = 2
Help with data interpretation / analysis = 1
Library / documents = 3
Report error or problem = 1
Other = 2

OUTCOME

Could only refer user to other info source(s) = 2
Request fully satisfied = 7
Request partially satisfied = 5

PSMFC Project was terminated by USACE due to contracting restrictions.

WDFW WDFW StreamNet staff responded to 10 data requests this year pertaining to spatial data and data sharing with ODFW as well as escapement data for Columbia and non Columbia tributaries.

L Enhance data efficiency - system development

Enhance data efficiency - system development

160. Create/Manage/Maintain Database

Deliverable: Agency database systems and procedures are enhanced over time to improve data flow efficiency. Web services are established, and automated flow of data to StreamNet is tested.

CTCR Beginning in late 2014, CTCR collaborated with Sitka Technology Group to establish direct connections between StreamNet's and Sitka's servers, which is where the CTCR data system of record now resides.

IDFG	IDFG StreamNet staff completed, corrected, and standardized data source workbooks for natural origin HiLI data. This will reduce data entry errors, and speed the data flow to the StreamNet HiLI database.
MFWP	StreamNet staff have implemented internal scripting to allow for a more streamlined process for submitting data to StreamNet. StreamNet staff and MFWP application developers did not have time or resources to investigate or implement web services for MFWP data.
ODFW	Staff added 10 new Data Clearinghouse records, and updated 43 existing records, increasing overall data availability and our ability to flow data using automated approaches. Staff worked with research staff to improve barrier data flow from the field into a centralized database. An integrated mapper data capture system was completed and incorporated into an existing web application. In time, this mapper could be expanded to enhance the flow of data from the field to NRIMP and StreamNet. Oregon StreamNet continued refining and testing a pilot web map for supporting mobile data access, update and creation of fish passage barrier data, and explored the potential to test this out more broadly across the basin.
PSMFC	Automated data flow has been initiated for several partners. Developed automated data validation techniques and reviewed with partners.
PSMFC	Continued to provide financial support to partners for database development and maintenance. Improved coordination with NOAA and NPCC.

M Coordinate testing of field data capture devices & software

Coordinate testing of field data capture devices & software

189. Coordination-Columbia Basinwide

Deliverable: Conduct a comprehensive survey (to include a wide variety of devices and users) on the durability and utility of these devices in various field settings. Results are posted on the StreamNet website, and shared at professional meetings and in publications. Results are reported at a workshop held during the FY, and used to guide additional work in the future.

CTCR	CTCR was not involved in the field trials of data capture devices, but was able to provide information on their experience with electronic field devices that they already use and have developed custom applications for. CTCR participated in the Emerging Technologies in Mobile Data Collection Workshop in the fall of 2014.
IDFG	IDFG staff participated in the EFDC Workshop. They presented their findings, and participated in several follow up meetings for further development of the snorkel app, and again shared their findings.
MFWP	MFWP did not take part in any field data collection testing in 2015. In November of 2015 MFWP attended the Field Technology Conference for Data Collection in Forestry, Fisheries, and Natural Resources.
ODFW	Oregon StreamNet reacquired three mobile devices that were returned to PSMFC after device trials ended. These will be used to test, develop and promote mobile data collection within ODFW. In November 2015, staff attended the Field Technology Conference for Data Collection in Forestry, Fisheries, and Natural Resources.
PSMFC	PSMFC co-sponsored a workshop on device usage with Sitka Technologies and PNAMP in 2014. Over 100 people attended. Also held follow-up discussions on development of snorkel survey applications with several sponsors. Held a second workshop in 2015 in conjunction with SITKA and Western Forestry and Conservation Association. Also appeared successful, over 100 attendees again.

WDFW WDFW representatives attended and participated all workshops sponsored by PSMFC relating to Mobil and CA development this year

N Metadata exchange through Monitoring Explorer pilot project

Metadata exchange through Monitoring Explorer pilot project

161. Disseminate Raw/Summary Data and Results

Deliverable: Metadata for the pilot explorer are provided to Sitka via web services in conformity with the project metadata exchange standards.

PSMFC Continued participation in this work element.

O Data sharing agreements

Data sharing agreements

161. Disseminate Raw/Summary Data and Results

Deliverable: Data Sharing Agreements are implemented effectively for CA and the Data Store.

PSMFC Data sharing agreements were written, reviewed, modified, and adopted for both the CA project and the Data Store.

P Infrastructure and base operations

Infrastructure and base operations

160. Create/Manage/Maintain Database

Deliverable: Project infrastructure and databases are maintained and updated as needed to acquire, manage and disseminate referenced data.

Specific actions may include:

1. Computer system administration, including maintenance and upgrades to hardware and software, backup and recovery, and system security, as necessary
2. Application of appropriate data management and QA/QC procedures in loading and managing data and creation of metadata
3. Creation and maintenance of interfaces and applications to enhance data flow efficiency
4. Participation in routine management and improvement of the StreamNet Data Exchange Standard working through the Steering Committee.
5. Obtain reference documents for all data developed under WE 159 and submit them for inclusion in the collection and catalog, and,
6. Encourage and support the flow of agency reports and publications related to Columbia Basin fish and wildlife resources to the library.
7. Maintain and further develop integrated search capabilities based on the Fish Species geo-spatial datasets.

CTCR CTCR collaborated with Sitka Technology Group to host and manage CTCR's OBMEP database. Sitka maintains database infrastructure and runs routine and redundant backups of CTCR data. They also maintain existing custom applications and are developing new tools for collecting, editing, finalizing, and distributing fisheries data.

FWS FWS IT continues to support the infrastructure and software required to perform StreamNet activity.

-
- IDFG** IDFG StreamNet staff did regular system and database administration, backup and recovery. We also updated applications and web services for StreamNet data and Coordinated Assessments. The IDFG spatial fishery databases were updated with new data. Existing applications and databases were enhanced per user feedback, and new applications and databases were supported by technical staff.
-
- MFWP** MFWP Stream Net maintained computer infrastructure and operations to assure efficient and effective management and flow of data internally and from MFWP to the StreamNet database. MFWP is actively maintaining, designing and developing the database and infrastructure of the Fisheries Information System. Much of this work is being done by MFWP Application Development staff not funded with StreamNet dollars. MFWP staff, both funded and not funded by StreamNet, continue to develop or enhance tools to update hydrography layers and automate uploads of standalone database information into Montana Fisheries Information System for public dissemination. MFWP StreamNet staff continues to support and update relevant GIS mapping services and datasets for the FWPMapper, the internal web mapping application, and for dissemination to the public. A references database for documents continues to be updated and supported.
-
- ODFW** Routine system management and maintenance was performed throughout the year. Data management protocols, manuals, databases, file naming standards, and directories were updated and managed to accommodate population names, traditional StreamNet and Coordinated Assessments DES modifications, as needed.
- Staff conducted data quality assurance reviews within and between fish distribution and fish passage barrier data and improved the accuracy and consistency of each. Also, alternatives for resolving seemingly conflicting data were identified. The data structure and user interface for Oregon's Trend database were updated and enhanced. QA/QC was opportunistically conducted during data updates.
- Server infrastructure and application migration to .NET 4.6, Visual Studio 2013, Windows Server 2012 and SQL Server 2012 continued. Processes to mitigate against catastrophic failures were updated. Migration to ArcGIS Server 10.3 was completed. Non-CA related enhancements were initiated to the ODFW Data Clearinghouse to promote efficient data management and sharing.
- Oregon StreamNet staff chaired and participated in GIS Coordination Group activities, including coordinating with the ODFW Director to distribute a second memo to staff reiterating direction to develop simple metadata across the agency and spelling out the near term objectives.
- ODFW updated and added new references to the StreamNet Library in support of BPA funded projects and Coordinated Assessments, submitting 9 updated reference records, and 9 new documents to the Library.
-
- PSMFC** Maintained operations of the database(s), improved functionality of the Data Store, and improved website design and function. Maintained DES through periodic review and discussion with partners. Worked with library staff to resolve issues related to updating links to documents. Implemented improvements to the facilities mapper across multiple PSMFC databases and programs.
-
- WDFW** WDFW continued to develop and maintain regional and corporate systems which hold and report SN and CA data sets

Q Manage project activities

Manage project activities

119. Manage and Administer Projects

Deliverable: Regional data management priorities are addressed and project staff and budgets are effectively managed. Work detailed in this SOW is accomplished. Required SOW and budget documents are prepared and submitted on schedule.

-
- All** Regular meetings of both groups were held in 2015. The Executive Committee started to provide guidance to the CA project in 2015, including adoption of a 5 year plan for the project.

All	Completed as required in CY 2015.
All	Completed as required in CY 2015.
All	Completed as required in CY 2015.
All	Completed as required in CY 2015.
CTCR	CTCR staff participated StreamNet Steering Committee meeting.
FWS	Pastor participated in Steering Committee activities and assured that activities were occurring as planned. Assured that activities were occurring as planned.
IDFG	IDFG StreamNet staff participated in project management and the StreamNet Steering Committee meetings. IDFG StreamNet staff and budget were effectively managed. Participated in limited discussions of the SOW. IDFG StreamNet staff provided input for the FY 2015 Statement of Work and Budget. IDFG StreamNet staff were effectively supervised.
MFWP	MFWP StreamNet staff participated in project management, StreamNet Technical and Steering committee meetings. Budgets were effectively tracked and managed. Staff participated in all relevant budget and Statement of Work discussions and provided input to SOW and budget.
ODFW	ODFW StreamNet staff participated in project management, StreamNet Technical and Steering committee meetings. ODFW StreamNet staff were effectively supervised and budget were managed throughout the year. ODFW StreamNet staff provided input to the FY-2016 Statement of Work and budget, and submitted updated inventory and cost share reports to Regional StreamNet. A GIS Technician was hired to help with distribution and barrier data enhancements, and three contract developers were hired to develop and enhance existing data collection and storage systems.
PSMFC	Held regular meetings with the Executive Committee, the Steering Committee, BPA, NPCC, and others to ensure program alignment with regional fish and wildlife managers. Substantially simplified and streamlined the SOW from FY 14 to FY 15. Reduced PSMFC staff dependence on BPA budget and made funds available to other partners.
PSMFC	Completed as required in CY 2015.
PSMFC	Completed as required in CY 2015.
PSMFC	Completed as required in CY 2015.
PSMFC	Completed as required in CY 2015.
PSMFC	Completed as required in CY 2015.
PSMFC	Completed as required in CY 2015.
PSMFC	Completed as required in CY 2015.
PSMFC	Completed as required in CY 2015.
WDFW	WDFW StreamNet staff actively participated in Steering Committee and Executive meetings, conference calls, Coordinated Assessment Planning Committee, and others throughout the year.

R Annual Report 1/1/2014 - 12/31/2014

Annual Report 1/1/2014 - 12/31/2014

132. Produce (Annual) Progress Report

Deliverable: Finalize and submit 2014 Annual Report to BPA for upload into Pisces and cbfish

CTCR	CTCR provided input for the Annual Report
FWS	Input was provided for the Annual Report.
IDFG	IDFG StreamNet staff provided their input for the Annual Report.
MFWP	MFWP StreamNet staff provided input for the annual report.
ODEW	Oregon StreamNet provided input to the CY 2014 Annual Report.
PSMFC	Completed as required in CY 2014.
WDFW	Completed as required in CY 2014.

S Periodic Status Reports for BPA

Periodic Status Reports for BPA

185. Produce Pisces Status Report

Deliverable: Status Report submitted on quarterly schedule.

All	Completed as required in CY 2015.
All	Completed as required in CY 2015.
All	Completed as required in CY 2015.
All	Completed as required in CY 2015.
All	Completed as required in CY 2016.
All	
All	
All	

T Produce Calendar Year 2014 BiOp Report

Produce Calendar Year 2014 BiOp Report

202. Produce BiOp RPA Report

Deliverable: Finalize and submit Calendar Year 2014 BiOp Report to BPA for upload into Pisces and cbfish.

PSMFC Completed as required in CY 2014.

PSMFC Completed as required in CY 2014.

PSMFC Completed as required in CY 2015.

U Annual Report 1/1/2015 - 12/31/2015

Annual Report 1/1/2015 - 12/31/2015

132. Produce (Annual) Progress Report

Deliverable: Finalize and submit 2015 Annual Report to BPA for upload into Pisces and cbfish

CTCR

FWS

IDFG

MFWP

ODEW

PSMFC

WDEW

V Produce Calendar Year 2015 BiOp Report

Produce Calendar Year 2015 BiOp Report

202. Produce BiOp RPA Report

Deliverable: Finalize and submit Calendar Year 2015 BiOp Report to BPA for upload into Pisces and cbfish.

PSMFC

PSMFC

PSMFC

W Other accomplishments

Other accomplishments

986. Catch-all for FY-14 SOW items or anything else in Calendar Year 2014

Deliverable: Catch-all for elements from the FY-14 SOW or anything else you'd like to report

CTCR	CTCR did not conduct any work beyond the SOW.
FWS	Nothing else to report.
IDFG	IDFG StreamNet staff did not do any work outside of the SOW.
MFWP	MFWP StreamNet staff did not conduct any work outside of the SOW.
ODFW	Using other funding, ODFW StreamNet staff developed data analysis flow diagrams for coastal recovery populations and exchanged CA DES level data to the StreamNet API, expanded coho distribution data outside the Columbia basin in support of Div. of State Lands essential salmonid habitat mapping update and rule making, integrated data from the coastal monitoring frame into distribution datasets and USFS barrier data into the Oregon Barrier Database, participated in ESRI GIS license purchasing activities. GIS staff evaluated fish distribution data summaries in Western Oregon related to new rules that may be developed by the Oregon Dept. of Forestry to minimize impacts of forestry operations on stream temperature within salmon, steelhead and bull trout streams.
PSMFC	Work has been reported elsewhere.
WDFW	WDFW StreamNet staff did not do any work outside of the SOW.

X Other accomplishments

Other accomplishments

986. Catch-all for FY-15 SOW items or anything else in Calendar Year 2015

Deliverable: Catch-all for elements from the FY-15 SOW or anything else you'd like to report

CTCR	
FWS	
IDFG	
MFWP	
ODFW	
PSMFC	

