StreamNet Annual Report FY-2012

Progress Report for the Extended 15 Month FY-12 Contract

BPA Project # 1988-108-04

Report covers work performed under BPA contract #(s) 54765

Report was completed under BPA contract #(s) 54765

10/1/2011 - 12/31/2012

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04/2013

This report was funded by the Bonneville Power Administration (BPA), U.S. Department of Energy, as part of BPA's program to protect, mitigate, and enhance fish and wildlife affected by the development and operation of hydroelectric facilities on the Columbia River and its tributaries. The views in this report are the author's and do not necessarily represent the views of BPA.

This report should be cited as follows:

Bruce Schmidt Bart Butterfield Dawn Anderson Cedric Cooney Steve Pastor Brodie Cox, StreamNet Annual Report FY-2012, 1/1/2011 - 12/31/2012 Annual Report, 1988-108-04, { SECTIONPAGES }

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I. Executive Project Summary/Abstract

Coordination and Data Management (RM&E)

2012 proved to be a pivotal year for the StreamNet regional fish data dissemination project. During the normal 12 month fiscal year the project continued to update the traditional data types and participate in a number of regional scale programs and forums to support data sharing. During the year the project also underwent two external reviews by the Northwest Power and Conservation Council, the Data Management Category Review and the Project Evaluation and Review Committee. Both reviews recommended continuation of the project but with a few adjustments.

The project also received significant input from Bonneville Power Administration (BPA), including budget changes and revised data priorities. All projects under the BPA Fish and Wildlife Program were asked to reduce spending to the greatest degree possible in the current contract and to reduce next year's FY-13 budget by 10-15%. These budget reductions in the FY-12 contract led to staff reductions and delay in some data delivery and postponement of some work, such as a planned contract to assist one of the Columbia Basin tribes with a database system needs assessment. BPA used a quarter of the reduced FY-13 funding to extend the FY-12 StreamNet contract for three months, during which time we revised data priorities and significantly adjusted the work plan for a shortened FY-13 contract period.

Key accomplishments in the extended 15 month FY-12 contract period included:

- All traditional StreamNet data sets were updated, mostly through 2011. Some data delivery was slightly delayed into the extension period due to reduced staffing in some partner agencies.
- Regional coordination to support regional scale data sharing continued. StreamNet partnered with the Pacific Northwest Aquatic Monitoring Partnership (PNAMP) and Columbia Basin Fish and Wildlife Foundation (CBFWF) to co-lead the Coordinated Assessments (CA) project. This Columbia Basin-wide effort is developing the means for state and tribal fish management agencies to organize and share four Viable Salmonid Population indicators (natural spawner abundance, smolt to adult return, and adult and juvenile recruits per spawner) in consistent format and to feed the estimates directly to the National Marine Fisheries Service's Salmon Population Status database. StreamNet led the technical aspects of the project, including creation of the regionally standardized Data Exchange Standard and development of a database to house and disseminate the data until an exchange network can be built.
- StreamNet continued to serve as the source of the majority of abundance data used by CBFWA to publish the Status of the Resource Report in 2012.
- A new data access interface was implemented on the website at www.streamnet.org referred to as the Integrated Query System. This approach to locating and downloading data is based on a combination of tabular filters and map based filtering. The interface is fully customizable and includes new features such as automatic depictions of location of the data source and graphic representation of the selected data, and the ability to designate customized lists of specific data that can be rapidly revisited on subsequent visits to the system to see updated data. The existing Online Query System and the Interactive Mapper remain available and active as well.
- At the end of the contract period we transitioned data development work from the traditional data updates to the new BPA priorities, which are data created by BPA funded projects and key ESA listed populations of anadromous fish. We began work on an inventory of data collected by BPA funded projects to determine the security and accessibility of those data, and initiated efforts to locate and obtain the four CA indicators and supporting metrics from our partner agencies. Most of these efforts will be addressed in FY-13, and will be accomplished before any efforts to update the traditional data sets.

II. Introduction

Coordination and Data Management (RM&E)

Monitoring, assessment and adaptive management of fish populations in the Columbia Basin require data of many types. There has been growing interest in increasing the sharing of fish and other monitoring data among agencies on a regional scale, as detailed in the FCRPS Biological Opinion (BiOp) RPAs 51, 71 and 72. In addition, data supporting 'high level indicators' (HLI) have been sought by Northwest Power and Conservation Council (NPCC) staff and by the Status of the Resource Report. And, data describing the changes in fish abundance and other characteristics over time are essential to performing adaptive management and subbasin planning. This need for access to fish related data on a regional, multi-agency basis is the primary need the StreamNet project addresses.

The majority of fish-related data originate with the region's state, tribal and federal fisheries agencies' sampling programs, but in general the data have been used internally and were difficult for other agencies or people to obtain. StreamNet has approached the difficulty of obtaining data by working cooperatively with the agencies that create the data (Table 1) to embed StreamNet supported technical staff inside the agencies to locate, obtain, standardize, georeference the data to the regional stream network (hydrography) and submit the data to a central database at Pacific States Marine Fisheries Commission (PSMFC), where they are stored, quality checked, and made publicly available through the StreamNet website, www.streamnet.org (Figure 1).

Table 1. Formal partners participating in the StreamNet project.

Participating Agency	Role	Acronym
Pacific States Marine Fisheries Commission	Project sponsor: data storage, QA and dissemination; regional coordination; project administration	PSMFC
Columbia River Inter-Tribal Fish Commission	Project partner under separate contract: manage StreamNet Library, data acquisition, data standardization	CRITFC
Idaho Department of Fish and Game	Subcontractor: data acquisition, data standardization, system development	IDFG
Montana Fish, Wildlife and Parks	Subcontractor: data acquisition, data standardization	MFWP
Oregon Department of Fish and Wildlife	Subcontractor: data acquisition, data standardization, system development	ODFW
US Fish and Wildlife Service	Subcontractor: data acquisition, data standardization for national fish hatcheries	FWS
Washington Department of Fish and Wildlife	Subcontractor: data acquisition, data standardization	WDFW

In fiscal year 2012 the project received two outside reviews and embarked on a number of significant changes in direction. The reviews by the NPCC Category Review for database projects and the NPCC Project Evaluation and Review Committee (PERC) both supported continuation of the project, but with some changes. Bonneville Power Administration (BPA) also provided significant direction to the project, extending the project contract for three months to provide time for us to adjust data priorities and

project direction. These sources of input resulted in significantly changed priorities that were instituted in the FY-13 project contract.

During FY-12, the project continued updating its normal data sets, continued regional coordination to support data management, continued a leadership role in the Coordinated Assessments project to complete a pilot effort to locate and obtain representative indicators and metrics for three VSP related indicators and to lead development of the Data Exchange Standard (DES) for the final four indicators, and developed a significantly revised work statement and budget for 2013. Results from FY-12 are being reported through this template which was designed for reporting activities related to the Research, Monitoring and Evaluation efforts under the Fish and Wildlife Program.

Actively support the coordination and standardization of regional and Program monitoring efforts with other federal, state, and tribal monitoring programs including the development and adoption of standard requirements for metrics, sample designs, data collection protocols, data dictionary, meta-data, and data access.

The StreamNet data dissemination project supports coordination and standardization of sampling metrics 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. These efforts represent the data management and data sharing aspects of monitoring; the project relies on the subject matter experts to establish and coordinate the actual monitoring designs and to conduct the monitoring.

Data standardization and sharing are accomplished by embedding various kinds of data specialists within the agencies that conduct the monitoring, where they locate and acquire the data, convert the data to the regionally consistent StreamNet Data Exchange Standard (DES), perform QA/QC, add georeferencing to tie the data to the stream network (hydrography), assist with development and utilization of database systems, and transmit the data to the central StreamNet database at PSMFC for public dissemination. Data disseminated through the project originate primarily from the Columbia Basin's state, tribal and federal fisheries management agencies, with primary focus on the Columbia Basin (Figure 2), but with other data 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 for several tribes or through the Columbia River Inter-Tribal Fish Commission (CRITFC), which is a full partner in the StreamNet project but supported through a separate contract.

StreamNet coordinates with regional entities such as Pacific Northwest Aquatic Monitoring Partnership (PNAMP), NPCC staff, Columbia Basin Fish and Wildlife Authority (CBFWA), and the region's fish management agencies (state, tribal and federal) to promote data standardization and increased data sharing, and advocates for expanding data sharing beyond the specific data types already disseminated through StreamNet's online data delivery systems at www.streamnet.org. The project is composed primarily of Information Technology (IT) specialists, and promotes the value of identifying metric priorities and standardizing sample

designs and data collection protocols where feasible as primary requisites for improving data standardization and consistency. Actual identification of those priority metrics and standardization of sampling protocols requires biological expertise and authority that StreamNet does not have; StreamNet's role has been more to encourage regional data standardization, quality assurance, management, creation of metadata, and sharing of the resulting data.

The value of StreamNet's approach of embedding IT specialists within agencies to obtain data was widely recognized in 2011 and 2012 when we hired 9 temporary data technicians who successfully conducted a pilot effort to work within the state and tribal management agencies to locate, obtain and standardize indicators and metrics for three VSP parameters as a pilot effort for the Coordinated Assessments (CA) project.

StreamNet also serves as a searchable archive for data sets that do not conform to 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, data sets from subbasin planning and the Hatchery Scientific Review Group (HSRG), and all data sets submitted to the Data Store, the StreamNet online data archive.

Work with regional federal, state and tribal agencies, and non-governmental entities to establish a coordinated, standardized, web-based distributed information network and a regional information management strategy for water, fish, and habitat data. Establish necessary administrative agreements to collaboratively implement and maintain the network and strategy.

StreamNet functions as a regional scale 'coordinated, standardized, web-based distributed information network', and can serve as a model for a more comprehensive regional information management strategy. The project is currently limited to a specific suite of over a dozen data types specifically related to fish (Table 2), but the StreamNet infrastructure and approach can serve as either the basis or a model for an expanded network that includes water, habitat and additional fish metrics and indicators. Furthermore, the project advocates for greater utilization of Information Technology (IT) that can support movement from a distributed network through a central database to one of coordinated data dissemination via web services following regional data standards.

StreamNet is currently promoting this approach through the CA project, which can serve as a further proof of concept. StreamNet is one of three entities managing this project along with PNAMP and CBFWA (now the Columbia Basin Fish and Wildlife Foundation – CBFWF). We have taken the lead technical role in the project, which is the first widespread effort among the region's state and tribal fisheries agencies, federal agencies and regional entities to initiate a coordinated approach to sharing data. The ultimate goal of the project is to initiate routine sharing of standardized data via a distributed approach similar to the EPA 'Exchange Network' concept. We believe that this approach, once implemented and integrated with the internal data management of the data source agencies, can serve as the basis for developing a wide

scale data sharing platform that can be expanded to be much more inclusive of data types, including fish, water and habitat data.

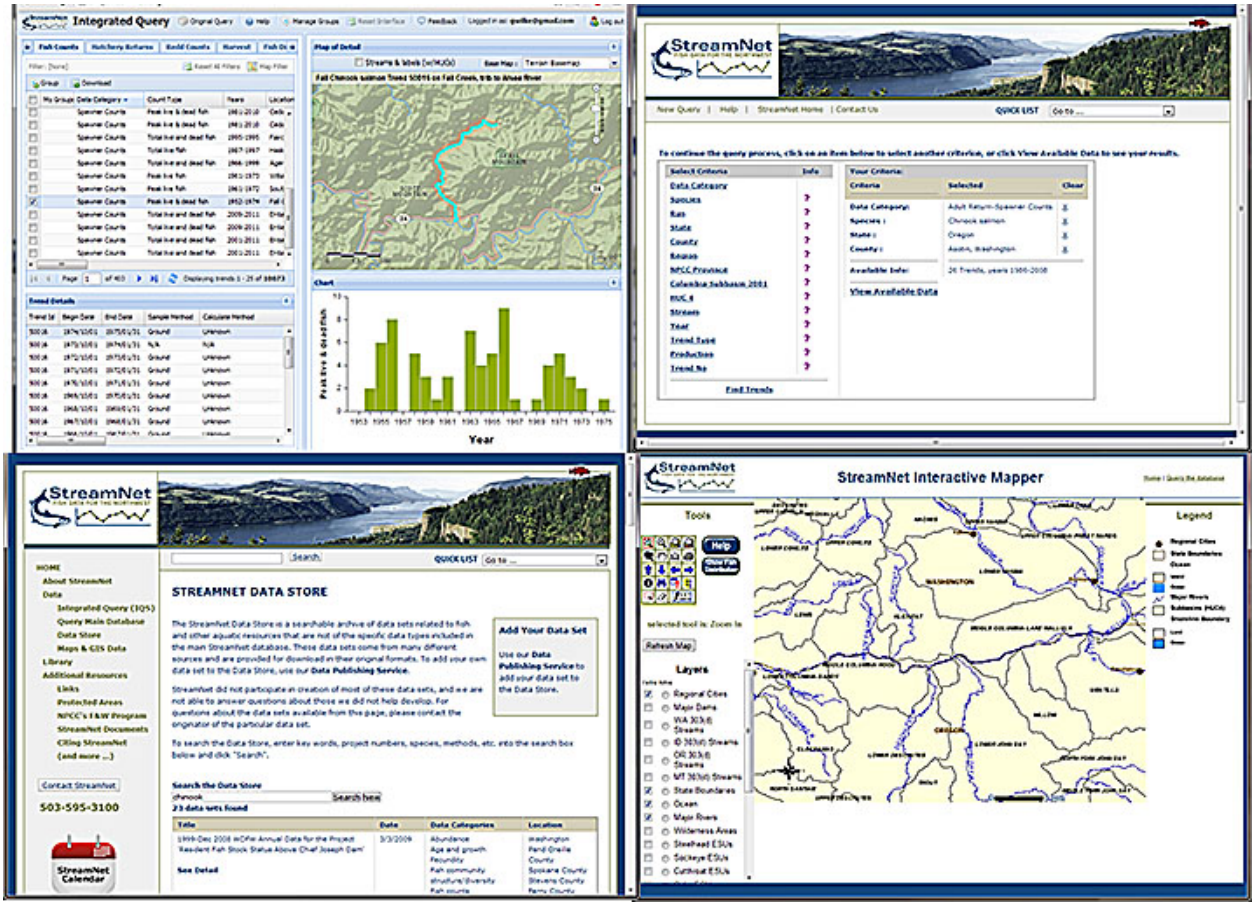

Figure 1. Data query interfaces at the StreamNet website, www.streamnet.org. Clockwise from upper left: Integrated Query System; Tabular online data query system; Interactive mapper; Data Store. Each interface provides the capability of viewing and downloading data, but each uses a different approach with different capabilities. Specific types of searches may work better in one interface than another.

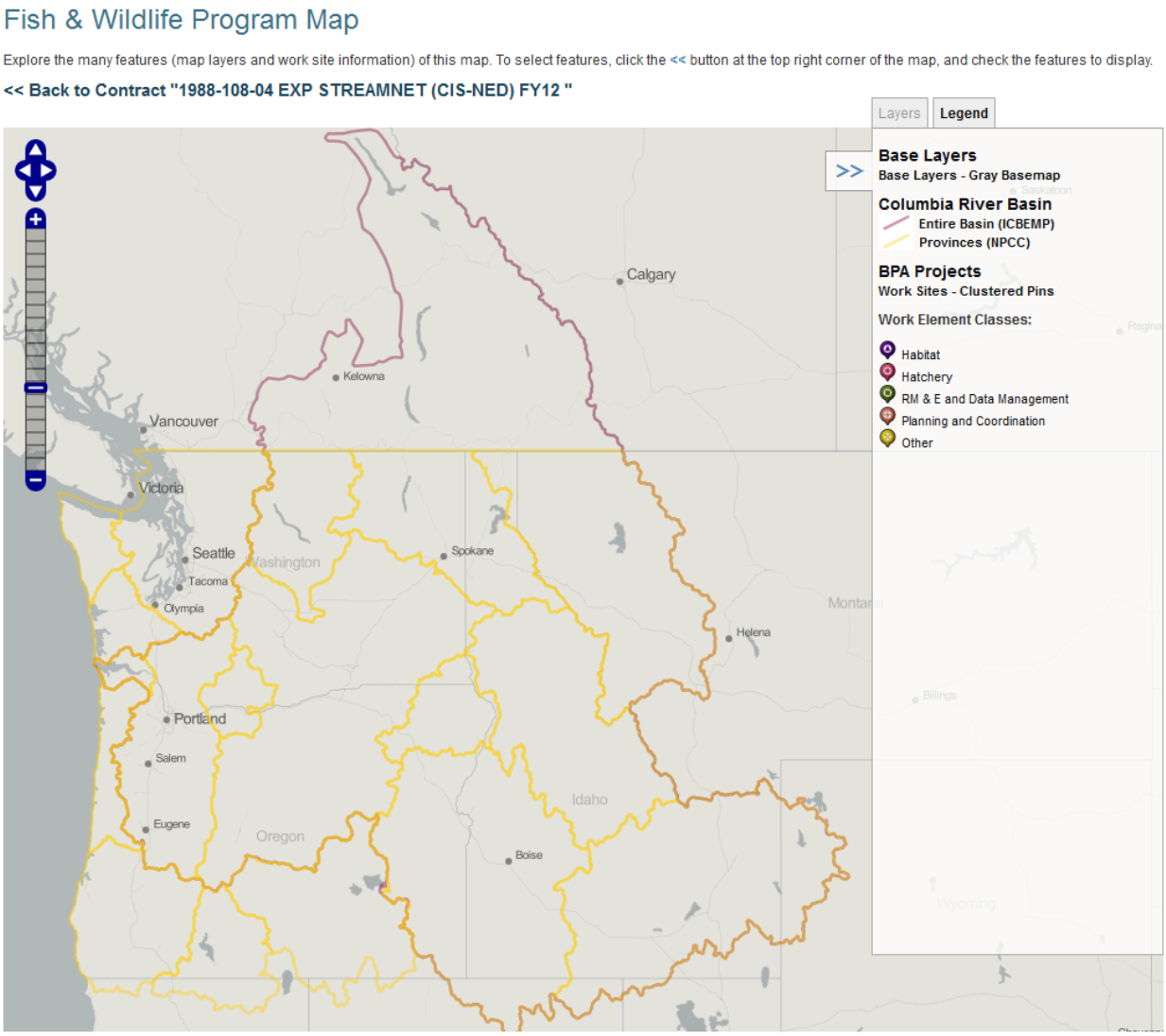

Figure 2. Map of the NPCC defined Provinces and the Columbia River Basin, where data disseminated through StreamNet are generated.

III. Work Elements / Tasks

State your hypothesis for this research study.

The 2012 StreamNet project work statement was organized around four primary Work Elements (plus three administrative Work Elements) that relate to our acquisition, management and dissemination of regionally standardized data as well as administering the project, with a total of 26 individual work element titles. These efforts contributed to collaborative data management, standardization and sharing processes, which relate directly to regional RM&E efforts.

The BiOp RM&E Strategy RPA 72 – Data Management, calls for the action agencies to “ensure that the information obtained under the auspices of the FCRPS RM&E Program is archived in appropriate data

management systems". To this end, StreamNet continued to acquire fish data from the four state fish and wildlife agencies (ODFW, WDFW, IDFG and MFWP) and one federal fisheries agency (USFWS for data from the national fish hatcheries). These data have been created through a variety of funding processes and sources, only some of which are through BPA or other federal programs, and as a result we have worked to provide all data of a given type from all sources combined. The project used subcontracts to support data stewards inside these agencies to acquire updates to the data types routinely disseminated through StreamNet (Table 2), including internal data and data provided by tribal programs in the respective states, and to convert these data to the regional data standard (Work Element 159). The data were then submitted to the StreamNet database at PSMFC, where they were quality checked and managed so they became available to the several StreamNet online data query systems (Work Element 160). The data were then made publicly available for viewing and download in standardized format through the project website, www.streamnet.org (Work Element 161).

Regional Coordination

StreamNet actively coordinated with many state and regional organizations to encourage and support development and utilization of modern IT approaches in sharing data useful in population assessment, adaptive management and reporting (Work Element 189). StreamNet staff participated actively in PNAMP, serving on the Steering Committee, Data Management Leadership Team, Metadata Work Group, and the Effectiveness Monitoring Work Group with a focus on providing data management perspective and technical assistance related to those efforts. StreamNet coordinated closely with PNAMP and CBFWA in providing technical guidance to the Coordinated Assessments, including completion of the initial pilot effort and creation of the Data Exchange Standard for the project. Coordination continued with CBFWA to ensure flow of data to the Status of the Resource report for use in updating high level indicators. Staff at the PSMFC and subcontracting agency levels also 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 Management

Data Entry

Database development and management, including data loading and QA, was performed by PSMFC staff and the subproject staff in the participating agencies in order to manage the data that are obtained, standardized and disseminated through the project. Data were obtained from the subcontracting agencies, including data provided to the state agencies by tribes in the state, loaded and quality checked, georeferenced, and converted to the DES for transmittal to the project database at PSMFC.

Data Storage

Database development is not the primary purpose of the project, only a means to the end of securing, standardizing and sharing data that are otherwise difficult to obtain in a standardized and

georeferenced format from within the data source agencies. StreamNet currently utilizes centralized databases due to the current capabilities of agency infrastructure, but 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 in the future. Data were managed and stored at the subcontracting agency level to support the 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.

Regional Sharing

StreamNet serves as a primary means of the fish management agencies to share their basic fish data in a slightly summarized format. A wide variety (Table 2) of data types primarily related to fish were disseminated through the StreamNet website at www.streamnet.org and by the agency subcontractors. We provided four primary data query approaches used to locate, display and download data from the StreamNet main database for standardized data and from the Data Store database for data that do not conform to the StreamNet DES (Figure 1).

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. GIS layers and maps are also available.

A new query approach was implemented this year that integrates both tabular and map based query approaches into a single system. This Integrated Query System (IQS) 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. The IQS was designed specifically so that additional data types can be added to the same query approach easily in the future, and it may be able to serve as a consolidated platform for sharing many kinds of data across the basin.

The fourth data query searches the Data Store online data archive that provides access to non-standardized data from any source, within or outside the StreamNet project, in native format. The Data Store interface also allows users to upload their data sets for secure storage and dissemination along with descriptive metadata. The Data Store upload procedure was revised this year to obtain project information directly from the BPA Taurus database through www.cbfish.org, and additional links with Taurus and www.monitoringmethods.org are planned.

Finally, 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.

Table 2. Types of data served through the StreamNet online data query systems

Category	Specific Data Type
Adult Fish Abundance	Estimates of spawning population
	Redd Counts
	Spawner Counts
	Dam/Weir Counts
	Spawner/Recruit Estimates
	Hatchery Returns
Fish Distribution	Anadromous Fish Distribution, Generalized
	Resident Fish Distribution, Generalized
Facilities	Dams
	Hatcheries
Barriers to Fish Migration	Barriers (in-stream features)
Harvest	Marine Harvest
	Freshwater/Estuary Harvest
GIS Layers	1:100,000 Hydrography
	StreamNet Mixed Scale Hydrography
	Fish Distribution
Archived/Static Materials and Data Sets	Photographs
	Pre-built Maps
	Protected Areas Data
	Subbasin Planning Data
	HSRG Data
	Smolt Density Model Data
	Independent Data Sets (Data Store archive)

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. During the year most data types were updated through 2011. Annual time series data are presented as 'trends' over time, while other data sets are updated on a less regular basis as the agencies generate new information, such as for distribution, facilities, diversions, barriers, etc. Trend type data disseminated through the StreamNet website, such as various fish counts and abundance estimates, are summarized on an annual basis by the StreamNet data technicians working within the data source agencies, but no further analysis is performed by the project. The project's IT and GIS expertise is not appropriate for analysis of biological data, and the project has operated under longstanding direction to refrain from data analysis. Where derived data, such as estimates of spawning populations, are disseminated through the project, they are obtained as final estimates from the source agencies for inclusion in the project's data systems.

New data additions were made available for viewing and download once they passed quality checks and validation of location coding. For most data types (annual "trend" type data) updates are made once a year, although in some years multiple partial data submissions may be received at PSMFC over the

course of the year. Other more general data types such as GIS layers and facilities information were updated and made available online as new information was received.

Data from the StreamNet database were reported out by making them available through the online data query systems (Figure 1). In addition, we worked directly with CBFWA to ensure smooth data flow to the Status of the Resource Report, including developing web services that could be harvested by the SOTR. In addition, during 2012 we initiated planning for working with NOAA Fisheries to develop automated means of feeding indicators and metrics from the Coordinated Assessments project to the Salmon Population Summary database. No CA data were developed during 2012, but initial work to locate these data began in some agencies and plans were made to begin capture of these data as the source agencies are able to provide them in 2013.

IV. Synthesis of Findings: Discussion/Conclusions

State whether each hypothesis was accepted or rejected and explain why.

Coordination

The StreamNet project performed its planned data management and coordination activities during the normal FY-12 period and during a three month extension to the contract which was also used to develop new directions for the FY-13 period in consultation with BPA. Details on use of the StreamNet data delivery systems and responses to direct requests for data and information are presented in Appendix A. Details of activities by individual Work Element title are presented in Appendix B.

StreamNet contributed to the coordination and standardization of regional and Program monitoring indirectly by providing advice and guidance in regards to procedures and approaches to developing data dictionaries, metadata and data sharing approaches, as requested. This was conducted primarily through our involvement with PNAMP and the Coordinated Assessments project. With our expertise primarily in information technology, we only addressed those data – related aspects of monitoring and standardization.

StreamNet staff continued participation on the PNAMP metadata work group, which produced a report outlining basic metadata components. We investigated the new ISO metadata standard in order to determine whether the metadata creation tool in the Data Store needs to be changed from its current compliance with the FGDC Biological Extension. Finding that the ISO standard does not yet have a biological extension led to a decision to continue using FGDC and to follow ISO development until there is a biological extension, at which time we will perform any needed conversion.

We actively supported improving data sharing capabilities in the region through the Coordinated Assessments project, which we co-led with PNAMP and CBFWA, by working toward promoting use of an 'exchange network' approach based on dynamic web services. We continued to work with our partners in IDFG, MFWP, ODFW and WDFW (FWS already has an internal hatchery

database system and CRITFC is working on a tribal system on other funding) to promote data standardization within agencies through assisting them with development of database systems that will ultimately have the capability to share data directly in regional format.

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 Bureau to scope out a new data management system. The ODFW StreamNet subproject initiated work to construct a database capable of serving data to the Oregon Fish Recovery Tracker interface, which was built by EcoTrust and is housed at PSMFC StreamNet. And, the WDFW StreamNet subproject coordinated with the Biological Data 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 is not qualified to address the other aspects of standardizing data gathering as outlined in this template because the designation of required metrics, sample designs, and sampling protocols requires biological expertise, not Information Technology expertise.

StreamNet supported the goal of developing a coordinated, standardized, web-based distributed information network and regional information management strategy through our involvement in PNAMP, taking a leadership role in Coordinated Assessments to initiate standardized sharing of data, and in responding to specific requests from BPA on component aspects of it, including providing some initial review and input into the BPA Data Management Framework document.

StreamNet continued to serve as an example of an initial approach toward a networked distributed approach to regional data sharing that will become possible when agency IT systems achieve the needed capabilities to serve regionally standardized data through web services. The project has the widest array of fish related data types of any of the regional database projects, with over a dozen specific data types (Table 2) and a powerful set of data delivery applications, including online data queries and publication of data and metadata as web services. The current approach obtains data from multiple distributed sources, then standardizes the data, adds georeferencing, stores the data in a centralized database, and disseminates the data through the Internet. This approach is used because the data source agencies to date do not have the internal capacities necessary to standardize the data and then serve them directly to the Internet as web services, although some are working in that direction.

StreamNet continued to coordinate with the partner agencies to move as fast as the agencies are able to building systems with that capability. The goal is to make it possible for StreamNet to harvest data directly from the agencies for loading into StreamNet through automated means, which 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. Such gains in

efficiency were realized for the first time this year in the IDFG StreamNet subproject due to their IFWIS database, which the Idaho StreamNet project helped to initiate. Once all of the data source agencies have this capability in fully functional form, we intend to work with them to develop procedures for internal conversion of the data to regional standards through a DES and then help them initiate development of an automated data dissemination approach, probably modeled after the EPA Exchange Network approach. The initial step of simply automating the data flow to StreamNet will meet nearly all of the stated objectives for a distributed network, since the data types served through StreamNet are relatively static and are only updated annually, so real time access, while desirable, is not really needed, particularly in a restricted funding environment. It may also be desirable to develop a cloud approach at PSMFC where the agencies are able to actively manage their data but maintain centralized dissemination.

Data Management

StreamNet addressed a number of data management goals as expressed by BPA staff. Many of these goals relate to the BPA RM&E data management strategy roadmap, which during fiscal year 2012 was only in internal development and not formally released. Nonetheless, StreamNet contributed to editing the draft strategy and did address a number of the components of the emerging strategy through direct project actions and collaboration with other agencies and organizations, as follows:

Identification of Management Questions and Strategies

This aspect of RM&E has been raised in the context of data management, but the identification of management questions and monitoring strategies requires biological and ecological expertise, not information technology expertise. StreamNet has continued to advocate in regional forums that data management considerations should be incorporated early in the development of monitoring plans and approaches. StreamNet contributed comments and suggestions to early drafts of the BPA Data Strategy, and among other suggestions emphasized the value of having clearly defined management questions and data needs at the regional scale which would then guide collaborative work toward establishing regional data sharing strategies and programs. Similarly, StreamNet used the NPCC's Project Evaluation and Review Committee (PERC) process to express support for the need for clear data priorities and to recommend a regional process for establishing the priority management questions and data needs, possibly along the lines of the PERC itself or an expanded Coordinated Assessments effort.

Documentation of Protocols

Previously, protocols and methods used in the creation of data were documented only through formal reports, at varying levels of detail, and for that reason StreamNet has always included the source documents for all data in the database 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 were 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 (mm.org) to describe sampling methodology is increasing, and StreamNet built a link to mm.org into the DES for the CA project to specify the protocols used to calculate the indicators and metrics. 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 in mm.org 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 along with other new work and updating the existing data types in the future.

Data Collection and Generation

StreamNet supported the management of the data generated by monitoring programs in the Basin, but did not participate directly in field sampling. We maintained a central database containing summarized fish data for the Columbia Basin, as described under Data Entry, Data Storage and Regional Sharing.

Data Entry

StreamNet continued to advocate for more rapid capture of field sampling data in electronic format during the three meetings the program manager had with IDFG, WDFW and ODFW during the year. We have been a lead proponent for use of the digital pen as a quick and easy means of capturing data in electronic format in the field without requiring complicated, bulky or fragile devices, with subsequent use and testing of the pens by MFWP and CRITFC. In 2012 we also initiated a nationwide survey of all field data capture devices that will be implemented through the Organization of Fish and Wildlife Information Managers and the Association of Fish and Wildlife Agencies next year. This survey is intended to serve to identify the capabilities, strengths and weaknesses of the many kinds of devices as an aid for agencies to decide on the most functional and cost effective devices for their kinds of sampling. We are also working within the StreamNet project to develop automated means of capturing data from the source agencies and submitting them to the StreamNet database at PSMFC to avoid the need for reentering data.

Agency Data Storage

The StreamNet subprojects in the state agencies all contributed to development or improvement of agency data storage systems in 2012, with goals to improve the speed and efficiency of data conversion to the regional standard StreamNet DES and submission to the StreamNet database, with a long term goal of helping the agencies host data in regional standard as web services. Since each state uses different approaches to their data management, actions taken by the state subprojects differed accordingly.

IDFG StreamNet participated in the maintenance and updates of core existing databases, applications and web reports that provide critical data needed across the Columbia River basin, including the JTrap (juvenile trapping) and Spawning Ground Survey applications. IDFG StreamNet helped to move the Lower Snake River Compensation Plan's hatchery application and database, originally developed and hosted by IDFG, to PSMFC. Responding to new priorities from BPA, IDFG StreamNet started to work on a database and interface to capture and store high level indicators. An initial SQL Server database was built based on the existing Coordinated Assessments data exchange standard. Discussions have already begun with IDFG fisheries personnel to develop a user interface. Ultimately, the high level indicators will be uploaded via web services into regional databases, such as StreamNet and NOAA's SPS.

MFWP StreamNet staff, in addition to maintenance and update of existing databases, assisted the Fisheries Division in continued scoping of the internal centralized fisheries data system being built by MFWP Application Development staff. StreamNet staff was involved to ensure that data being collected and stored conforms 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. Staff assisted in a training session for biologists and technicians, including those receiving BPA funds, on the use of the system focusing on data entry. StreamNet staff also developed a process which allows historic data files residing with individual biologists to be converted from one file type to another to allow for uploading into the new system. The end result is historic data will be available in the new system much sooner and with far less effort than anticipated. 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.

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. We also enhanced the data structure and user interface for Oregon's Trend database to more efficiently address SOTR and Coordinated Assessment data needs, including the accommodation of Recruits per Spawner information. Oregon developed a database to more efficiently capture scale reading and age data, and piloted an Access database to track the status of metadata and flow diagram development for Coordinated Assessment and other data collection efforts. In response to new BPA priorities, we initiated an inventory of data sets created by BPA funded projects to assess their security, accessibility, location, and format; this effort will be a primary focus in 2013. We also reached out to a few biologists to explore

avenues for getting Coordinated Assessment data converted and exchanged in the Data Exchange Standard format.

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. Systems under development and implementation include Adult Age and Scales; Traps, Weirs & Surveys; Spawning Ground Survey; and Juvenile Migration databases. These systems are being developed with the intent of holding BPA project data in a secure and transferable location and informing the Coordinated Assessment 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 2013.

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 agency data is StreamNet's primary purpose. In 2012, significant effort was placed on improving sharing of the Coordinated Assessments indicators and metrics. StreamNet led the team that developed the Data Exchange Standard for the project, and developed an initial database to contain any data that the state and tribal agencies will be able to provide in FY-13. The approach taken was to identify the specific data elements (indicators and supporting metrics along with metadata) that are desired for sharing on a regional basis. The DES specifically identifies the data elements that are to be shared for each of the four indicators, along with definitions of and required formats and units for each element. The DES will be initially used to guide the organization of data to be shared via any specific medium, whether by spreadsheet, CSV file, database file, web service, etc. Ultimately, the project envisions the data elements being hosted by the originating agency in DES format as web services that can be harvested by an exchange network. Until that is possible, StreamNet will act as an interim means of compiling and sharing the data through a common interface.

StreamNet also continued its role as a primary data sharing project in the Columbia Basin, providing ready access to the data types listed in Table 2. 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 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.

The data shared through StreamNet become available to support a variety of important activities in the Basin. Fish distribution was used by developers, consultants, universities, land management agencies and fish management agencies for environmental assessments, research and land management planning. Adult abundance data are necessary for the calculation of spawner abundance and spawner recruit rates, which are key inputs to high level indicators and population assessments. Hatchery return data were used in the calculation of spawner abundance and spawner recruit rates. Age composition of adult returns was used in the calculation of spawner recruit rates.

StreamNet's data sharing approach can also be considered as a model of how additional types of data can be shared. StreamNet shares data by supporting technical staff within the agencies that create the data to locate, obtain and standardize them, and those data are then provided to the primary data sharing systems through the central StreamNet database. The Coordinated Assessments project used StreamNet and this approach to conduct a pilot effort to identify how much data related to the four initial CA Indicators and their supporting metrics existed in the agencies and tribes, where the data were located, and whether they could be obtained and converted into a regional Data Exchange Standard. In FY-11 StreamNet hired nine temporary data specialists to do that work within the participating states and tribes and demonstrated that some of the data existed and that some did not, and that the existing data could be obtained and shared in DES format. Information gathered by that pilot effort was used in FY-12 to guide development of the DES. That success is another illustration of how well the StreamNet approach works in promoting regional data sharing, Even as StreamNet changes to take advantage of improvements in information technology, such as increasing use of automated sharing via web services, the basic approach of supporting technical staff in the agencies to organize, standardize and share the data following regional formats and procedures will continue to form the underpinning of any consistent regional data sharing system in cases where the data cannot be directly input into the database system (e.g. PIT tag data) or there are not agency-wide data systems capable of hosting data in standard format as web services.

Reporting

StreamNet essentially 'reports' the data it compiles by providing access to updated data sets of the standard data types defined in the StreamNet DES (Table 2). Those data have been routinely used for years in a variety of ways by a variety of agencies to support high level indicators, population assessment, adaptive management, guiding various planning activities, and reporting. With BPA guidance leading to significantly changed priorities beginning in FY-13, updating of these standard data sets will have to be deferred until the new priorities are met. The work with the CA project this year is leading the project to focus more on the indicators and metrics that have been identified as priorities for reporting progress on implementation of the

FCRPS Biological Opinion (BiOp), and we anticipate that these will become standard data sets disseminated through StreamNet along with the current standard data types, at least until an exchange network is constructed and all agencies can supply data to it. Updating the new and existing data will likely require improved automation of data management within the agencies that create the data and automated conversion to the StreamNet DES and submission to the project, as it became clear this year that the current approach to updating data requires more staff than is available to the project.

Lessons Learned on Implementation

StreamNet activities in 2012 were particularly diverse, with a combination of routine data updates; significant regional scale involvement through PNAMP, Coordinated Assessments, project reviews by the NPCC Category Review and PERC, and comment on the draft BPA data management framework document; and development of new directions based on input from BPA. As a result of all these activities, there were a number of 'lessons learned' this year that have useful implications for the Fish and Wildlife Program and regional scale data management and for future StreamNet project direction.

Changed StreamNet Priorities

StreamNet has for years provided access to updated trends (time series of data) and other traditional data sets (Table 2), serving as the only publicly available source for these data in regionally standardized, georeferenced format. Through those years we have proposed to expand coverage to other important data sets in the basin. However, expanding to include other data sets required the addition of a few more data specialists in the partner agencies to do the work of locating and obtaining the data because they were scattered across offices or had to be entered from hard copy reports. However, additional resources to expand staff to work on additional priority data were not forthcoming. Existing StreamNet staff members were fully occupied in obtaining updates and working with the existing data types.

In 2012 BPA provided the project with a number of new data and information priorities and requested that they be initiated in the FY-12 contract extension and fully instituted in the 2013 work plan as top priorities. This made it necessary to shift work away from updating traditional StreamNet data sets and instead concentrate on the new priorities. The result was significant changes in all aspects of the project going forward in the FY-13 work statement, including data acquisition, development of data standards, development of new databases or new configurations within existing databases, changes in the data interfaces to disseminate these data, and new approaches to developing the project work statement and budget.

Specific effects of the changes in project priorities included:

- Updating of existing data types was largely completed in 2012, but beginning in the extended quarter of FY-12 and in FY-13 work shifted to the new priorities. Updating the

traditional data must be postponed until some future year when we have the capability to again obtain updates to those data sets along with updating the new priority data sets, and any efforts to update them sooner will have to wait until work on the new priorities is completed in that year. It is unclear when this work can resume, or whether it can resume in full, given that the new priority data types will also need to be updated each year.

- Staff time at PSMFC was adjusted to focus on developing the DES and database for Coordinated Assessments indicators and metrics. That served to delay maintenance on the standard StreamNet DES and to defer work on known needed fixes and improvements to the standard StreamNet databases and data delivery interfaces. That work moved forward, but at a slower pace, with some work deferred to 2013 or dropped, although the essential work to keep the systems functioning was accomplished.
- Staff time at PSMFC and the subprojects in the extended portion of FY-12 transitioned to initiating work on the new priorities, but with reduced staffing due to reduced budgets.
- Staff time for 2013 will be diverted to the new priorities, with some staff time diverted to non-StreamNet funding doing other work due to budget reductions. We are fortunate that such outside funding for other work will be available in 2013, but there is no guarantee of such funding in the future. Most work on updating traditional data is being dropped.
- Administrative time was significantly impacted by the need to create and then produce multiple iterations to an extended FY-2012 work statement and budget and a proposed FY-2013 work statement and budget. This delayed other administrative work severely, with the largest impact being a lack of sufficient time near the end of the extended year to conduct a database needs assessment for the Shoshone-Bannock Tribes due to insufficient time to produce an RFP, solicit contractors, develop and award a contract, and perform the work before the end of the year. That effort will be attempted in FY-13.

Additional specific effects from the changed priorities within the sub-projects included:

- IDFG StreamNet
    - Beginning in the extension period of 2012, data development priorities were switched to the new top priority data types. Instructions from BPA that work on the previous data types should be deferred until after the new priority work was completed led to cessation of work on the old data types. This new directive will delay or prevent updating the traditional data sets in FY-13, even though that work could be accomplished rapidly since the data are already organized within the IFWIS database system.
- MFWP StreamNet
    -
- ODFW StreamNet
    - DES modification proposals by Oregon were postponed or dropped entirely due to changing work priorities, including adding fields for historical fish habitat, species origin and production to the Fish Distribution table, creating a juvenile abundance DES, and additional refinements to the Barrier DES.

    - Promotion of StreamNet availability and services was halted.
    - Participation in various FWP meetings increased during the 4th quarter and extension period.
- WDFW StreamNet
    - The changed priorities were incorporated into the FY-13 work statement, but did not have much effect in the FY-12 extension period.

Lessons learned from reduced funding:

1. Workload: New priorities and existing workload cannot be accomplished at the same time with existing or reduced staffing. Older work, now seen as lower priority, must be dropped or deferred. Accomplishing all of the new and old priorities would require additional staffing or increased efficiency.
2. Efficiency: The current greatest impediment to providing standardized data efficiently at the regional scale is the lack of consolidated database systems within the data source agencies. Where data are not consolidated across an agency, data acquisition and standardization cannot be automated, limiting the project to the more labor intensive approach we currently use. We have demonstrated increased efficiency where data are consolidated. For example, the IDFG IFWIS system in 2012 allowed the data steward to sort and download data for conversion to regional standards in one step, and future efforts will focus on developing means to automate the conversions and to automate the flow of data to the StreamNet database. These steps would offer significant gains in efficiency of data transfer, a valuable outcome of the years spent developing the IFWIS system. StreamNet will continue to work within our partner agencies to support development of such systems, but the speed with which they can be completed will depend on the complexity of the data, the specific approach taken by each agency, and the priority each agency places on the effort in terms of resources in addition to StreamNet. That priority will likely depend on the need for such systems internally more than their value for serving data to the broader region.
3. Short term: Given the time needed to develop and institute new consolidated approaches to data management in the data source agencies, temporary small increases in technical data staff in the StreamNet subprojects may be necessary to allow annual updates to both older and new priority data sets if that is deemed a regional need. The alternative is cessation or significant delay of annual updates to the older data sets until the efficiency gains from consolidated agency databases can be realized, which would eliminate service to those people currently using StreamNet for acquiring these data.
4. Bottom up efficiency: Efficiency of data flow might also be expanded through increased use of technology throughout the data creation and use pathway. One possible approach could be use of hand-held electronic data capture devices in the field, which would remove the need for data entry, but would require significant investment in the equipment and staff to coordinate and standardize use, establish and enforce data standards, and program the devices. This action alone would not improve data sharing efficiency regionally to the

degree that consolidating data statewide in an agency database would, but hand-held devices might serve as a catalyst for developing such systems. Use of such devices would improve data flow within the agencies and create an incentive for agencies to develop data standards, a critical step in developing consolidated databases. These are decisions that must be made by each agency. And, while it is possible to use electronic data capture devices independently without standard use and application, that approach would not yield the desired improvement in data flow efficiency. StreamNet could conduct pilot efforts within its partner agencies to test this hypothesis.

Regional Reviews

During 2012 StreamNet received significant input from the NPCC Category Review process, the NPCC PERC review and BPA, including through early review and comment on the draft BPA data management framework document. These regional scale reviews provided both direct recommendations for the project, along with general recommendations. Among these recommendations were:

- Data management should focus on addressing priority data needs. Within this recommendation was recognition of the need for a clear statement of what those priority needs are, implying the need for a process to determine and articulate the needs. The PERC recommendation specifically called for a regional scale, multi-participant group to coordinate data management needs. Specific guidance for StreamNet included
    - Focus on a number of additional priority data types, including Coordinated Assessments indicators and supporting metrics and juvenile abundance data, and SNPs genetics data
    - Assess the security and accessibility of data developed by BPA funded projects
    - Participation with integrating data discovery through MonitoringResources.org.

  See the discussion under the "Changed StreamNet Priorities" section.
- 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 work with 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. See further discussion under Changed StreamNet Priorities section.

Lessons learned from the external reviews:

5. Clear priorities: There is a need for a regional scale process to reach consensus on data priorities. This was recognized in the report from the PERC and suggested in the draft BPA data management framework. StreamNet has also recommended this in previous regional forums including PNAMP, NED, and CBFWA; at a data priorities workshop in 2006 organized by CBFWA; and in StreamNet's Data Sharing Guide

(http://www.streamnet.org/ftpfiles/projman_files/Data_Sharing_Guide_2009-06-01.pdf). The approach taken by the Coordinated Assessments project to bring together biologists, policy people, regional scale data users, and data management specialists could serve as an effective model for broader efforts to define data needs for regional scale assessment and reporting. Another good approach would be a PERC-like process that involved managers, regional scale data users and data specialists.

Coordinated Assessments

The pilot data capture effort and work with data source agencies to develop the Coordinated Assessments DES illustrated a number of issues and future needs. Key findings were that:

- The indicators are not calculated for all defined populations. Many indicators, particularly those related to productivity, are calculated for far fewer populations than others. Natural spawner abundance was the most widely calculated indicator, but many populations did not have population-scale spawner abundance estimates.
- Indicators were not always calculated to represent an entire population.
- The indicators and supporting metrics were scattered throughout most of the state and tribal agencies. The lack of consolidated, agency wide database systems within many state and tribal agencies will be a primary obstacle to developing an Exchange Network approach to sharing these indicators and supporting metrics.
- 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 indictors will require more time and/or more resources for some agencies.

Lessons learned from Coordinated Assessments:

6. Implement strategies: The state and tribal agencies need to complete the tasks outlined in their respective CA Strategies, which include multiple components: additional sampling to cover all populations, capture of additional data for some populations, sharing of data among agencies within populations, calculation of additional indicators, and development or improvement of database systems to support consolidation and standardization of the priority indicators and metrics. Without full implementation of the strategies, the ability to calculate and provide this information will be significantly slowed or remain incomplete.
7. Interim data dissemination: StreamNet will need to work to acquire and consolidate the CA indicators and metrics in order to provide an automated data feed to the NOAAF SPS database as an intermediate approach while the states and tribes work to complete the tasks in their respective Strategies and develop the ability to calculate all of the indicators, convert them to the standard DES, and publish them as web services where they can be harvested and fed to SPS and made public through an Exchange Network. Without such regional consolidation it will not be possible to establish a consistent automated data feed to SPS at the present time.

Reduced Funding

During FY-12 BPA addressed projected revenue shortfalls by requesting that projects funded under the FWP reduce spending to the greatest extent possible and in general imposed a 10-15% budget reduction for FY-13. Since personnel related expenses make up approximately 90% of the project budget, StreamNet reduced FY-12 spending as requested primarily by moving portions of staff to other funding doing other work and leaving several positions unfilled in PSMFC StreamNet and in the subcontracting partner agencies. The result was less total time spent working on project objectives. The budget for FY-13 was reduced over 10%, and a quarter of the budget was added to the FY-12 budget to extend the contract for three months to allow time to revise project directions for FY-13.

Expenditures during the extended 15 month contract period for FY-12 turned out to be well below even the reduced amount for a variety of reasons, including: continued vacancies in subcontracting agencies, reduced cost of benefits for PSMFC StreamNet staff, PSMFC covering some costs for computer equipment and software on a one-time basis, and reduced travel. In addition, the amount of administrative time taken to revise the FY-12 budget and work statement through several iterations and to create the FY-13 budget and work statement was significant both for PSMFC and the participating agencies. As a result, some work was not accomplished, resulting in unexpended funds in several data categories, including contractual services and office supplies.

Work that was delayed, deferred or cancelled due to decreased funding in FY-12 included:

- IT needs assessment and development of a data management strategy for the Shoshone-Bannock Tribes. After completing the FY-13 work statement and budget there was insufficient time remaining in the year to put out an RFP, develop and award a contract, and complete the needs assessment. This work will be attempted in FY-13.
- Updates to the traditional data were mostly completed, but some delivery was delayed into the three month extension period. Future work to update these data is being deferred in favor of the new priorities
- Internal coordination and work to improve data flow efficiency was deferred in some subcontracting agencies due to reduced staffing.
- Impacts from the budget reduction will be more evident in the FY-13 work plans.

- No funding was available for the 0.5 FTE identified to support a data stewards in the Colville Tribes, along with operating and travel expenses, to allow the tribe to join StreamNet and begin regional data sharing as outlined in their CA strategy.
- No funding was available for the 0.5 FTE identified to support a data steward in the Shoshone-Bannock Tribes, along with operating and travel expenses, to allow the tribe to join StreamNet and begin regional data sharing. This was to be in conjunction with their needs assessment and data management strategy development.
- Data updates submitted by the partner agencies in FY-12 were quality checked and loaded into the StreamNet database, but future work to update data will depend on completing the other priorities. This essential function was not affected by the budget reductions in FY-12.

- Development of base layers such as the mixed scale regional hydrography slowed in FY-12, and will be addressed in FY-13 only as necessary to depict data through the StreamNet website.
- The impact of reduced funding will be more severe in FY-13 than it was in FY-12 when the reduced staffing from reduced funding and changed priorities impact the workload simultaneously.

Additional specific effects from reduced budgets within the sub-projects included:

- ODFW StreamNet
    - Oregon experienced reduced efficiencies as several positions were either filled with temporary staff and/or were vacant for part of the year. Budget reductions contributed to these vacancies in the latter half of the year, thereby reducing the amount of data development work that could be done. That slowed initial work on the inventory of BPA funded project data and initial efforts to locate Coordinated Assessments data in ODFW during the FY-12 extension period.
    - Reduced funds to fill the vacant software developer position prevented updating hatchery return data; reduced funding in the future will continue to prevent much of this work.
    - Promotion of StreamNet availability and services was halted.
- IDFG StreamNet
    -
- US Fish and Wildlife Service
    - The StreamNet subcontract with FWS covers only a very small portion of one person's time, primarily for participation on the StreamNet Steering Committee and for pulling data for StreamNet from the FWS database. The subcontract has never covered the total amount of time actually spent on the project, and the small reduction this year did not result in any change in data delivery or participation due to the contribution of staff time by FWS.
- MFWP StreamNet
    - Unable to fill a data steward position vacated by promotion
    - Deferred updates to existing data types
    - Deferred system and application development
    - Less time to make internal processes more efficient
    - Reduced interaction with biologists who provide the data
    - Dropped work on Yellowstone cutthroat assessment, a primary source of cutthroat trout data, which is important resident fish data (abundance, distribution, genetic purity, etc.)
- WDFW StreamNet
    - Dropped 2011 hatchery return data for focal species
    - Dropped dam facilities data exchange (not scheduled for 2012)
    - Dropped barrier data exchange
    - Dropped any StreamNet centric presentations not related to CA or BPA

Lessons learned from reduced funding:

8. Reduced funding led to reduced staff time on the StreamNet project, since the budget is primarily composed of personnel expenses. Reduced staffing will lead to slowed data development and deferred data updates. It will not be possible to update the traditional data sets and the new priority data using the traditional approach we have been using without additional staff support, particularly in the subcontracting agencies. Continued prioritization of data sets to update will be necessary each year going forward. New strategies will need to be considered, such as alternating updates year to year, etc.
9. Long term, the only way to update all desired data types and initiate sharing of additional priority data types without increasing staff support will be to make greater use of information technology to automate data standardization and sharing. This will require development or completion of consolidated agency wide database systems in the data source agencies. That in turn will require the agencies to place increased priority on data management, increase work to standardize data agency wide, and increase funding applied toward data system development throughout the data flow pathway. These are actions that are outside the control of the StreamNet project. We will assist to the greatest degree possible with existing staff.
10. Reduced staffing may lead to cessation of updating some traditional data sets.

V. References

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VI. Appendix A: Use of Data & Products

The data that are provided through the StreamNet website are used by a wide variety of people and entities, but because of the anonymous nature of the Internet, and the fact that no formal log-in is required to access data, it is very difficult to determine who, specifically, is using the data or for what purpose. This is one of several reasons why we will begin to require that people log in to use the new Integrated Query System, in addition to have the ability to maintain custom layouts and the ability to 'tag' individual records.

Statistics on use of the three primary components of the StreamNet website as calculated using Google Analytics and excluding use by StreamNet are presented in Table A1. Use of the main website continued to increase (total visits increased by 8% and number of unique visitors by 16%), but decreases were noted for use of the tabular data query system (-22% for total visits and -18% for unique visitors). The interactive mappers had a minor decrease in total visits (-2%) but an increased number of unique visitors (10%). Reasons for the declines in use from 2011 to 2012 are unclear, but the launch of the new Integrated Query System (IQS) could be a relevant factor. At this time we have not found a means of logging meaningful statistics on use of the IQS, since all querying activity takes place on a single page, counting for one instance of loading the page regardless of the time spent on the page or the number of filters set and amount of different data reviewed. We will strive to determine an appropriate way to develop meaningful statistics on use of the new IQS during the next project year.

Table A1. Summary of use statistics for the three primary independent components of the StreamNet website, excluding the new Integrated Query System and StreamNet.

	Main StreamNet web page				Online Tabular Data Query				Interactive Mappers			
	2012	2011	2010	2009	2012	2011	2010	2009	2012	2011	2010	2009
Total Visits	27,163	25,169	23,029	11,578	4,366	5,592	5,786	2,639	6,992	7,169	7,218	5,267
Unique Visitors	19,291	16,586	13,924	6,983	2,369	2,889	2,906	1,296	4,316	3,927	3,620	2,755
Pageviews	66,686	63,186	49,725	26,261	62,791	73,283	81,472	44,108	26,205	28,379	29,170	19,555
Ave. Page Views	2.46	2.51	2.16	2.27	14.38	13.1	14.08	17	3.74	3.96	4.04	3.71
Ave. Time on Site (min)	1.38	1.58	2.06	2.11	7:33	7:57	7:45	9:08	3:07	3:33	3:58	3:28

Internet service providers (ISP) continued to constitute the majority of users of the various portions of the StreamNet website (Table A2). It remains impossible to know who these visitors were, since they almost certainly range between general public to biologists working remotely from their

offices. Small offices in remote locations also may use ISPs to connect to the Internet, and some agencies are now contracting out their internet service, for example the US Fish and Wildlife Service is now using Google as their provider. State and Federal agencies continued to be the largest users among identifiable domains, with higher percentage participation in the two data query systems. Specific users where their identities could be discerned are presented in Table A3.

Table A2. Summary of types of users of the StreamNet website in FY-12, excluding the new integrated query system and StreamNet.

	StreamNet Website (partial)		Tabular Query System		Interactive Maps	
Type of User	**# Visits**	**%**	**# Visits**	**%**	**# Visits**	**%**
ISP	12,515	73	1,860	52	2,820	52
Government, Federal	2,117	12	809	23	1,443	26
Government, State/province	1,393	8	615	17	585	11
Government, county, local	0	0	0	0	64	1
Consultant, industry, company	440	3	147	4	384	7
University	745	4	111	3	123	2
Tribal	0	0	12	0	0	0
High School	0	0	0	0	40	1

Table A3. Top specific users and number of visits of the two primary StreamNet data query systems in 2012.

Top users of the tabular query system		Top users of the interactive map applications	
Agency	Visits	Agency	Visits
Internet service providers (Comcast, Verizon, etc.)	1,860	Internet service providers (Comcast, Verizon, etc.)	2,820
State of Oregon	526	State of Oregon	480
Bonneville Power Administration	215	US Forest Service	312
National Oceanic and Atmospheric Admin.	168	Headquarters USAISC	293
USDA Forest Service	159	National Oceanic and Atmospheric Administration	190
US DOI Bureau of Land Management	96	Bonneville Power Administration	135
Outsource Technologies, Inc.	94	US DOI Bureau of Land Management	131
Headquarters USAISC	68	USDA Office of Operations	124
U.S Fish and Wildlife Service IRM/BFO Hq	61	U.S. Fish and Wildlife Service IRM/BFO Hq	109
CH2M Hill Inc.	53	Parametrix	96
State of Idaho	48	Department of Homeland Security	92
Oregon State University	43	HDR	65

USDA Office of Operations	42	State of Idaho	56
Washington State Department of Fish and Wildlife	41	ICF Kaiser International	54
University of Oregon	24	Oregon State University	52
Oregon State System of Higher Education	24	CH2M Hill	41
University of Nebraska-Lincoln	20	Vigil-Agrimis, Inc	37
Nez Perce Tribe	12	The Boeing Company	33
		U.S. Environmental Protection Agency	26
		University of Washington	25
		State of Washington - Department of Fish and Wildlife	24
		King County Government	24
		Valley School District no. 70	23
		Scansafe Inc.	22
		Snohomish County Government	21
		Embarq Corporation	20
		Pierce County	19
		Oregon State System of Higher Ed.	19
		Navy Network Information Center (NNIC)	18
		Clackamas Education Service Dist.	17
		W H Pacific	16
		Portland State University	15
		Washington State Department of Fish and Wildlife	14
		Department of Interior	13
		University of Oregon	12
		Washington State Department of Transportation	11

All project participants also responded to direct requests for data or assistance with data and the StreamNet website (tables A4, A5 and A6).

Table A4. Information requests served in the contract year 2012 by each StreamNet partner, by type of organization making the request.

Request from	PSMFC	IDFG	MFWP	ODFW	WDFW
College/university	6	8	3	1	1
Government, federal	10	18[a]	8	18	2
Government, state	4	68	67	419	50
Government, tribal / Tribal organization	5	11		1	3
Government, county/local	6	1		6	
Nonprofit	4		3	12	1
Industry / commercial		14		2	
Private consultant	5		1	4	2
Regional entity					
Watershed council/group	2		1	2	
General public	3		4	14	
Unknown	3		4		1
Total	48	120	91	479	60

a. Includes one foreign

Table A5. Information requests served in the contract year 2012 by each StreamNet partner, by type of request.

Request type	PSMFC	IDFG	MFWP	ODFW	WDFW
Citing StreamNet / permission	1		1		
Data request	4	105	10	5	25
General fish information		14	11	5	
GIS data / map	20		45	101	25
Hardware / software technical support	2		6	290	
Help finding information	4		6	32	
Help with data interpretation / analysis	1		7	17	6
Help with data structure	3		1	6	4
Report error or problem	6		2		
Library / documents	1	1		4	
Information outside StreamNet's scope	1			4	
Other	5		2	15	
Total	48	120	91	479	60

Table 6. Outcome of information requests received in the contract year 2012 by StreamNet partners.

Outcome	PSMFC	IDFG	MFWP	ODFW	WDFW
Could only refer to other source		2	5	27	
Request fully satisfied	35	94	79	401	54
Request partially satisfied (may include referral to other sources)	11	24	7	30	6
Could not help at all	1			17	
Response pending				4	
Uncategorized	1				
Total	48	120	91	479	60

Appendix B: Detailed Results

Detailed Performance Report for the StreamNet Project, 2012

Period covered:
October 1, 2011 through December 31, 2012

StreamNet Project

BPA Project No. 1988-108-04

Contract No. 54765

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May, 2013

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Executive Summary

Fiscal Year 2012 (FY-12) proved to be a challenging and pivotal period for the StreamNet project. Accomplishments for the contract period centered around the project's normal updating of regionally standardized fish-related data sets and regional coordination to support data management and data flow. The project also underwent two external reviews sponsored by the Northwest Power and Conservation Council (NPCC), one the Category Review of all regional scale database projects and the other review by the Project Evaluation and Review Committee (PERC), both of which recommended continuation of the project but with changes to project direction.

The project, along with other Fish and Wildlife Program projects, also received a request from Bonneville Power Administration (BPA) to reduce spending due to decreased revenue forecasts. As a result, StreamNet was asked to reduce spending in FY-12 to the greatest degree possible and to reduce the FY-13 budget by slightly over ten percent. This was coupled with significant input from BPA on changed budget and work priorities, with priority placed on data created by BPA funded projects and for key listed anadromous salmonid species. These changes were promulgated late in the fiscal year, and were built into the FY-13 work plan. The project used a quarter of the reduced FY-13 funding amount to extend the FY-12 contract for three months to allow time to develop a revised work plan and budget for the significant changes to take effect in a 9-month FY-13 contract. This was accomplished through reducing staff time on StreamNet at PSMFC and in the subprojects, since approximately 90% of the project budget relates to personnel. Reduced staffing and changed priorities resulted in the necessity of dropping updates to our standard data sets from the FY-13 work statement and an overall slowing of data development in general. Updating standard data sets will be addressed in the future only as the new priority tasks are completed.

Revising the FY-12 work statement and budget and creating a work statement and budget for FY-13 required a number of revisions and iterations, taking more time than anticipated, and resulted in some planned work not being accomplished in FY-12. Most significant of the deferred work was the inability to conduct a data system needs assessment and develop a comprehensive data management strategy for the Shoshone Bannock Tribes, since by the time the work to develop the FY-13 work statement and budget was completed, there wasn't enough time remaining in the year to create an RFP, solicit contractors, award a contract and conduct the needs assessment. While this resulted in planned work not being done, it contributed additional savings to address BPA's budget shortfall.

During the initial 12 month period, the traditional data types specified in the original Statement of Work were updated as scheduled. In the extra three month period, technical data work began to transition to the new priorities that were built into the new FY-13 work statement

In FY-12 the project continued its strong regional coordination role, in particular with PNAMP and CBFWA, as co-lead for the Coordinated Assessments project. During the year we used the results from the pilot data gathering effort, which we led the previous year, to guide development of a formal Data Exchange Standard (DE) for the four CA indicators and supporting metrics. The DES described all data fields that are to be shared, along with their definitions and required formats. This DES will be the basis for all sharing of the CA information, and will ultimately be used to describe the contents of web services that will form the basis of an exchange network to make these data available to all interested parties. Until that becomes possible within each of the data source agencies, StreamNet will compile and disseminate those data.

Specific details of the actual tasks accomplished during the extended fiscal year 2012 are contained in the traditional StreamNet Project annual report.

Introduction

Fiscal Year 2012 proved to be a pivotal year for the StreamNet Project. While primary effort during the year was directed toward working with our partner agencies to update the standard data sets in the StreamNet database and performing routine systems operation and maintenance, the project initiated significant changes in priorities that are taking effect in FY-2013 that resulted from two project reviews and discussions directly with Bonneville Power Administration (BPA).

Near the beginning of the year StreamNet participated in the Northwest Power and Conservation Council's (NPCC) Category Review process for database projects, which resulted in a recommendation to fund the project. Later in the year the project participated in a review by the NPCC Program Evaluation and Review Committee (PERC), where the project again received a recommendation to fund, but with a 10-15% cut in budget commensurate with cuts throughout the Fish and Wildlife Program due to poor revenue forecasts for BPA, and a few other stipulations.

Near the end of the normal fiscal year when the project proposal, work statement and proposed budget were due for FY-13, BPA requested that instead the FY-12 contract would be extended for three months to allow time to review project priorities and revamp the work plan and budget to realign StreamNet priorities with BPA priorities the next year. The result was an overall ~10% reduction in the budget for all of the normal FY-13 period, rewriting and extending the FY-12 contract for three months at the reduced FY-13 budget rate, and redevelopment of the FY-13 work statement and budget for a 9 month contract period with significantly revised project priorities.

The new priorities are detailed in the FY-13 Statement of Work, but in short they are that StreamNet's data priorities are data that are created by BPA funded projects, data that relate to the priority fish populations (anadromous fish populations of direct relevance to the FCRPS Biological Opinion [BiOp]), and data that are part of the Coordinated Assessments (CA) project to initiate flow of four specific VSP indicators (natural spawner abundance, smolt to adult ratio, and adult and juvenile recruits per spawner) and supporting metrics. A number of additional specific activities were also requested and were included in the FY-13 work statement. It was acknowledged that given the new priorities, update of traditional StreamNet data types would be deferred until after the primary new priorities were completed. It is unclear at this time how or when those data will be updated in the future.

Work accomplished during the extended FY-12 contract period for each of the primary Work Elements combined is summarized below for each of the agencies participating in the StreamNet project: Pacific States Marine Fisheries Commission (PSMFC), which manages the project; Idaho Department of Fish and Game (IDFG); Montana Fish Wildlife and Parks (MFWP); Oregon Department of Fish and Wildlife (ODFW); US Fish and Wildlife Service (FWS); and Washington Department of Fish and Wildlife (WDFW). Columbia River Inter-Tribal Fish Commission (CRITFC) is also a participant in the StreamNet project, but its involvement is funded through a separate contract and was reported separately this year due to the extension to the PSMFC contract. Details of accomplishments are presented in the details section by each of the individual Work Element titles in the formal Statement of Work.

Accomplishments Summarized by Primary Work Element

Work Element 159, Data Development

Project	Accomplishments During Fiscal Year 2012
PSMFC	Direct acquisition and compilation of updates to data by PSMFC is routinely limited to updates to the regional mixed scale hydrography which is used to tie all data in StreamNet to the stream network, data that are submitted to the StreamNet data store in native format for archiving, and submission of references and documents to the StreamNet Library. Those tasks were accomplished this year. Work on maintaining the hydrography in synch with the hydrographies used in the partner states is critical for being able to relate data based on relationships on the stream network regardless of which agency the data originate from. This is more than simply being able to map the locations of data origin, but provides the capability to conduct spatial analyses.
IDFG	IDFG StreamNet made annual updates to the central StreamNet database for fish distribution, adult abundance in the wild, hatchery returns and fish age composition. Fish distribution was compiled by reviewing data from in-house databases including our Collector's Permit, Fish Stocking, Lakes and Reservoirs and Stream Survey databases. Fish distribution has traditionally been our most requested data type; although it was surpassed this year by redd counts.

Fish distribution provides an understanding of where listed fish occur and is used to guide development of high level indicators.

Adult abundance in the wild came from IDFG's Spawning Ground Survey (SGS) database and includes redd counts, carcass counts, origin and fish length used in age composition analysis. The SGS is a collaborative effort and includes data collected by the Nez Perce Tribe, Shoshone-Bannock Tribes, US Fish and Wildlife Service and US Forest Service. The data are linked to the Technical Review Team (TRT) population delineations. They are integrated with and can be used in conjunction with the IDFG BioSamples database which includes fin rays, scales and tissue samples. It can easily be linked with the IDFG Genetics database, too. The adult abundance in the wild data are used to calculate spawning ground specific population estimates and are a necessary input to high level indicators. They were used this past year to update the NOAA SPS database. Hatchery return data were compiled from the Lower Snake River Compensation Plan's (LSRCP) anadromous hatchery database. That database is important for the calculation of adult abundance in the wild. At several hatchery weirs, unclipped fish are marked and release upstream of the weir. When "recaptured" on spawning grounds the numbers are used to help inform estimates of natural origin spawner abundance. Data for calculation of fish age composition comes from both the SGS and LSRCP hatchery database, as well as the IDFG BioSamples and Genetics databases.

The age composition data delivered to the central StreamNet database are the results of a post-run analysis called "mixture analysis". It provides a corrected estimate of fish age composition that is critical for productivity analyses, such as calculating recruits per spawner for viability assessments.

BPA tasked us to determine the current and recommended data archives for Fish and Wildlife Program project data, primarily data related to fish. IDFG StreamNet queried out all the projects in Idaho from the Taurus database. The result was a total of 102 total projects, 37 of which are fish projects. IDFG staff began to contact contract managers and supervisors via email, to be followed up by phone calls to capture details. In FY-12, 11 of the projects have been completed, and the remainder will be conducted during FY-13. Because of the expanded scope and the time it takes to contact each project, IDFG StreamNet will delay delivery of traditional data types next year until the project inventory and other new priority work is completed.

MFWP Visits were made or data were received from each regional/field office to complete the annual update. Staff assisted in training regional biologists and technicians on data entry in the newly created and still under development Fish and Wildlife Information System. This system allows for biologists and technicians to enter detailed information about their sampling sites as well as individual fish captures and measurements. Additional functionality includes the ability to enter fish tagging information and calculate population estimates. Allowing direct entry of survey data will allow for high quality data to be available in a more timely fashion. Data were standardized, georeferenced and underwent quality control before scheduled annual updates to the central StreamNet database. Montana StreamNet submitted fish distribution, stream and lake survey locations and sample records, abundance trends, and reference information. Emphasis was placed on ensuring that distribution records were accurate and current for the year. Distribution data underwent additional QC as data was plotted in GIS against species general ranges. This allowed staff to find potential errors in species coding at the time of data entry. Many different StreamNet data types such as trends and genetics help to inform distribution information. Accurate distribution information is critical to many efforts undertaken by fisheries biologists including the conservation of listed species. Distribution information was also used extensively in the creation of Montana's Statewide Fish Management Plan. Sample locations and survey result data were also updated and exchanged with PSMFC. StreamNet staff developed a process by which historic data files residing with individual biologists could be converted and uploaded into the new centralized system. The result of this means historic data will not have to be hand entered into the new system, thereby saving many hours of staff time and historic data will be available in the system earlier than originally planned. Having historic data available alongside the most current information makes it easier for biologists to see changes over time and gives a more complete picture.

A significant effort was made to QC barrier location and attributes during the contract period. This resulted in over one thousand barrier records being added or edited throughout the year. Knowing where barriers are, the type of barrier and what species are affected is extremely important especially to conservation efforts such as range wide Columbia Basin Redband trout assessment and the range wide Yellowstone Cutthroat Trout assessment.

Genetic sample locations and sampling results were updated throughout the year. During the contract period 170 genetic samples which contained nearly 350 sample results were added or edited. Genetics information was submitted to the StreamNet Data Store as an independent dataset. Genetics information is used for several different purposes including determining which populations of listed or potentially listed species have the most conservation need.

ODFW ODFW StreamNet met all but one of its data delivery requirements during the fiscal year. Data delivered or made available to StreamNet included anadromous and resident fish distribution, barriers, age, various adult and juvenile abundance trends. Prolonged staff vacancies and shifts in priorities prevented the update of Oregon's hatchery return data. Ninety-nine new documents were provided to the StreamNet Library, the majority of which were related to Status of the Resource (SOTR) focal species, and data for the Coordinated Assessments (CA) project.

Distribution information contributed specifically to the John Day basin CHAMP protocol effort for salmonid habitat status and trend monitoring. Maintenance and sharing of this data type also informs the need protect mainstem and side-channel habitat for fish migration, spawning and rearing, and the identification of critical habitat throughout the basin, which is directly and indirectly called for in several BiOp RPAs (e.g. RPA 52). In Oregon, this information is used to update and maintain Essential Salmonid Habitat (ESH) designations by the Division of State Lands. None of this work could be done without StreamNet's efforts to also maintain a consistent stream layer (hydrography) for the entire basin; this work was also performed.

Oregon StreamNet added 2,703 new Barrier table records this year. Knowing where barriers are and how one impacts and relates to another contributes to the success of RPA 73 - Implementation and Compliance Monitoring, by allowing for the selection and prioritization of implementation projects and contributing information to the Region's habitat project tracking system.

Age data is used in many aspects of population monitoring throughout the basin. In Oregon, age data trends were updated for several BiOp targeted areas and populations, including the lower mainstem Columbia River, John Day, Hood, Fifteenmile, and Grand Ronde basins for summer and winter steelhead, spring and fall Chinook and chum.

Compilation and sharing of abundance data contributes to RPA 50 – Fish Population Status Monitoring where "abundance" means the number of adults that ultimately return to the spawning grounds. Oregon StreamNet abundance data efforts focused on "Focal Species" trends, 108 of which are used in the FWP Status of the Resources Report. Trends range from individual sampling efforts up to derived fish population estimates, supporting RM&E Strategy 1—Monitor Status of Selected Fish Populations. In addition, recruits per spawner trends in the BiOp targeted basins & populations including mid-Columbia steelhead, Upper Columbia Spring Chinook were added.

Dam and hatchery facility data were maintained or incidentally updated. RPA 53 – Monitor and Evaluate Migration Characteristics and River Condition, calls for action agencies to "monitor and enumerate adult salmonids passing through fishways in the FCRPS, identify potential problems, and evaluate implemented solutions." StreamNet's efforts to update and share dam and fish passage facility information provides information related to physical and staffing changes in these facilities. In addition, using other funding, Oregon StreamNet supports and maintains a web application that contributes to project tracking noted in RPA 73, which calls for the monitoring of implementation projects.

WDFW In FY-12 Washington StreamNet met all of its data exchange obligations with the exception of resident fish distribution data, which, although updated internally was not transferred to PSMFC but will be transmitted in 2013. Additionally, WDFW did not submit dam and fish passage or rearing facilities as these are required on a three year rotation, but did submit a new barriers update.

WDFW continued to develop wild adult abundance data sets where the compiler focused on the capture of adult trap data, including the development of a pilot database for North Fork Skykomish and Sunset Falls Trap. Historical data for Kalama and North Fork Toutle and 2011 annual data for Upper and Lower Columbia and Yakima River GIS points were exchanged.

WDFW submitted hatchery return data collected from biologists, however continued development of the agency's hatchery management program FfishBooks delayed some data related to CWT resolution. Additionally, staff did not complete 2010 hatcher returns data, which we anticipate submitting in early 2013. This year, work was completed on the first set of exchange reports for the lower Columbia sport and commercial database. This work will enable compilers to update the location file for the internal Age and Scale Database. The Vancouver Data Steward finished working on age collection, proofing and submitted data in the DEF format to PSMFC to update the website with 2011 data and any changes to previously submitted data.

The GIS team updated the Washington lakes layer as well as revised the routines to generate TribIDs to handle routes with adjusted measures.

StreamNet staff led the creation of a new Traps, Weirs, and Surveys database which consolidates Age and Scales, Adult Trap/Weir, and Spawner Ground Survey (SGS) databases/templates. The data collected for the above data types will all be stored in this one database. This allows for singular input of the data and a consolidated source for models that will output the Coordinated Assessment HLI's. Additionally this system will serve as a repository for several BPA projects which may lack a corporate database.

FWS Hatchery return and age data from the national fish hatcheries in the Columbia Basin were compiled by FWS and submitted to the StreamNet database.

Work Element 160, Database Management

Project	Accomplishments During Fiscal Year 2012
PSMFC	Routine database management continued during 2012 to support the dissemination of StreamNet's primary data sets, including loading, QA/QC, and internal management of all data updates provided by the sub-projects. StreamNet led the team that developed a Data Exchange Standard (DES) for the Coordinated Assessments project to describe the specific data fields for the four VSP indicators and their supporting metrics, and then used that DES format to develop a database that will house the data when actual flow of those data is initiated in FY-13. In addition, a database was designed to house the results of the BPA data inventory effort that was included in the FY-13 work statement.
IDFG	The IDFG StreamNet databases have been fully integrated into IDFG's Information Systems Bureau. As a result, IDFG now provides nearly all of the system administration functions that support StreamNet as cost-share. The only part that StreamNet personnel still manage is daily backups of databases that are then backed up by the IDFG disaster recovery system. IDFG has developed a number of enterprise fisheries databases. Key among these are the Spawning Ground (SGS), LSRCP anadromous hatchery database (now maintained by PSMFC), Juvenile Trapping (JTrap), Stream Survey, Lakes and Reservoirs, Collector's Permit and Fish Stocking. These applications are web-based or otherwise communicate with the database over the Internet and are utilized by the Nez Perce Tribe, Shoshone-Bannock Tribes, US Forest Service and other partner organizations. All of these systems can be accessed through the Idaho Fish and Wildlife Information System (IFWIS) website at https://fishandgame.idaho.gov/ifwis. IDFG StreamNet has been one of several contributors to the development of IFWIS. IDFG StreamNet provided maintenance of the SGS and JTrap applications this past year. These applications have increased the ability of IDFG to rapidly deliver data to the central StreamNet database once the annual QA and summarization are completed. Delivery time has shrunk from one to two years after data collection to just three to six months. The extra time has allowed IDFG to expand our StreamNet data holdings both temporally and spatially, as well as add new, additional data types. Current efforts are focused on developing a database and data delivery system for high level indicators. A database has already been built based on the Coordinated Assessment data exchange standards based on Technical Review Team (TRT) populations for natural origin spawner abundance, recruits per spawner and smolt-to-adult ratios. A user interface is in development that will allow IDFG staff to enter and manage these high level indicator data. The next step will be to develop a data exchange protocol with the central StreamNet database. It is anticipated this will be a dynamic, automated method using web services. IDFG StreamNet also assisted in quality control for the development of high level indicators for the past five years. This will fill in the time since the last ESA status review assessments developed by the TRT in 2008.
MFWP	Montana StreamNet staff maintained existing databases and systems throughout the year, conducting minor modifications at user's requests. Staff spent time assisting the Fisheries Bureau in scoping the internal centralized fisheries data system, and testing the new modules of the Fisheries Information System. Significant strides were made in completing some analysis methods and starting the development of others. Staff also assisted in training biologists and technicians on the use of the system. As a result of this effort many biologists have been entering their current sampling data as well as historic data into the new system. This effort will result in more comprehensive data being available more quickly. Spatial data and metadata were updated for all fisheries data layers. All fisheries GIS layers were updated to contain consistent data titles and definitions where applicable in order to make layers easier to use and understand by non-MFWP staff. A number of new ArcGIS mapping services were developed including updated hydrography services, services depicting fish distribution and survey locations, and a new service to support Montana's online fishing guide.
ODFW	Staff performed routine hardware, software, and database maintenance and management throughout the year. RPA 72 – Data Management, calls for the action agencies to "ensure that the information obtained under the auspices of the FCRPS RM&E Program is archived in appropriate data management systems". To this end, we continued efforts to improve overall data flow from the field by continuing the development and maintain the ODFW Data Clearinghouse (DC), making Oregon's natural resource information more accessible by providing centralized accumulation and distribution service. We also enhanced the data structure and user interface for Oregon's Trend database to more efficiently address SOTR and Coordinated Assessment data needs. This included spearheading the inclusion of 95% confidence interval (CI) fields for any type of abundance estimate, and to distinguish juvenile abundance estimates from juvenile counts in StreamNet's Data Exchange Format. We initiated an inventory of data sets created by BPA funded projects to assess their security, accessibility, location, and format. This inventory work will be completed in FY-2013. Oregon piloted an Access database to track the status of metadata and flow diagram development for Coordinated Assessment and other data collection efforts. Staff continued to participate in the development of the Western Governor's Association Crucial Habitat Assessment Tool & ODFW's Decision Support System. These efforts contribute to collaborative data management, standardization and sharing processes, which relate directly to RM&E Strategy 8 – Coordination and Data Management. All applicable QA/QC routines on accumulated data sets were carried out. We continued development and management of geodatabases and standardized metadata to manage GIS data.

WDFW Data Management work this fiscal year centered largely on development of regional pilot systems to serve as staging systems for the capture of adult abundance trap data before transfer to our SGS central database, facilitate transfer and conversion of hatchery returns data from our corporate FishBooks hatchery management database and conversion of the WDFW stream layer and associated data references to NHD standards. The latter part of the year saw a greater concentration of effort toward populating systems which will inform the Coordinated Assessments high level indicators DES.

FWS Efforts to better deal with complexities of FWS data and increase QA/QC continued during the year.

Work Element 161, Data Dissemination

Project Accomplishments During Fiscal Year 2012

PSMFC All data in the StreamNet databases were made publicly available for viewing and download through the StreamNet website, including through the tabular data query system, the interactive mapper, the Data Store, and through a new 'Integrated Query System' (IQS) that allows data selection from a single web page that utilizes both tabular and spatial selection capability. The new IQS works by utilizing the data in the main database published as web services, allows selection of multiple values for query criteria at one time, and has a fully customizable layout. The system also allows users to create their own lists of key data that can be re-queried in a single step on future visits to the website. Changes were implemented in the Data Store metadata upload tool to include links to information in the BPA Taurus database system through CBfish.org, and additional links will be implemented in FY-13. PSMFC staff also responded to 48 direct requests for data or assistance during the year.

IDFG Idaho StreamNet responded to 120 direct data requests in fiscal year 2012. While lower than in many previous years, this is an increase from last year, reflecting an increase in interest to fisheries data.

MFWP Staff responded to 91 information requests during the contract period. As in previous years, the majority of data requests were in the form of GIS data or map requests. A presentation on improved bathymetric data collection was given at the regional American Fisheries Society meeting which included discussion of other data types available from MFWP. StreamNet staff also attended Western Governors Association meetings related to the Wildlife Corridors and Crucial Habitat initiative and promoted StreamNet as a regional source of fisheries data for that initiative.

ODFW Oregon StreamNet provided functionality-related feedback on the Regional StreamNet query system throughout the year. We managed ODFW websites and interactive map applications to improve agency data flow to users and to StreamNet. We enhanced data flow from the field and data access by making new datasets and basic metadata available via the ODFW Data Clearinghouse, and the project results and reports of several major ODFW data collection projects were posted on a public facing website. Along with other data, we shared abundance data used in the FWP Status of the Resources Report via the StreamNet web query system. Oregon StreamNet staff continued to provide data and database consultation to EcoTrust and ODFW Monitoring Program staff regarding maintenance and enhancements to the Oregon Salmon and Steelhead Recovery Tracker, which is a data dissemination tool for Oregon's monitoring data, including data for priority populations identified in the FCRPS BiOp. These efforts give immediate and direct access to datasets of interest to FWP efforts in support of RPA 72.We also reached out to a few biologists to explore avenues for getting Coordinated Assessments data converted and exchanged in the Data Exchange Standard format. Staff attended and promoted StreamNet data types and activities during Coordinated Assessment workshops. Oregon StreamNet personnel responded to 479 direct requests for data and assistance. This is significantly more direct requests than in previous years, much of which can be attributed to the creation of a GIS Technical Support Specialist position and the 3-month extension of the fiscal year. The new position and a greater emphasis on the use of GIS and mobile technology led to hardware/software requests accounting for more than 60% of the requests we responded to.

WDFW Washington StreamNet data stewards responded to 53 significant data requests this year. The requests this year included tributary map information for select streams, maps of new smolt trap points, fish distribution, hatchery return data, mark sample data and SGS related data.

Work Element 189, Regional Coordination

Project Accomplishments During Fiscal Year 2012

PSMFC Routine coordination continued with data source agencies and regional entities such as PNAMP, NPCC, and BPA. Significant time was spent in coordination with PNAMP and CBFWA in co-leading the Coordinated Assessments project and in particular leading the technical aspects of the project. The CA project has proven successful so far because it is a collaborative effort that includes all interested parties, including the data source agencies (state and tribal fish managers), regional scale data users, and information technology specialists. The project participants have developed data sharing strategies and are poised to begin sharing the four VSP indicators regionally as the constituent elements in the strategies are put in place.

Significant time was also spent coordinating with BPA on new priorities and directions for the project and building those expectations into the extended FY-12 contract and in the FY-13 work statement and budget. We also reviewed and commented on early drafts of the BPA data management framework document.

IDFG Idaho StreamNet participated in the Coordinated Assessments Planning Group and the Data Exchange Standard development team. Input was provided in both venues to coordinate with other entities in the basin to meld identified needs into a basin-wide product. IDFG StreamNet personnel instructed IDFG biologists in the use of the Coordinated Assessments Data Exchange Standard. Preliminary discussions were held with NOAA-Fisheries to identify the data structures needed for high level indicator data and to identify where the data will come from. IDFG StreamNet also reviewed and provided comments on the BPA Draft Data Management Framework document. IDFG StreamNet provided technical support on the use of StreamNet and IDFG databases not just to IDFG personnel, but also to the Nez Perce Tribe, Shoshone-Bannock Tribes, US Forest Service and US Fish and Wildlife Service personnel. We coordinated with PSMFC to transfer the LSRCP anadromous hatchery database to PSMFC. IDFG StreamNet provided technical support to the recently completed redband trout range-wide status assessment workshops by providing data lookup, data entry and interpretation during several local workshops. These data were incorporated into our fish distribution and barrier databases.

MFWP Montana StreamNet reviewed and provided comments on the BPA Draft Data Management Framework document. Staff participated in technical committee discussions related to the creation of or edits to StreamNet Data Exchange Standards. Montana StreamNet staff met with regional entities in an effort to assist them in obtaining and storing data in such a way that will make sharing data with MFWP an easier process. The Crucial Areas Planning System (CAPS) watershed integrity methodology was provided to the BLM as a potential mechanism for comparing watersheds. Staff exchanged fisheries data to the Montana Natural Heritage Program for inclusion into their Point Observation Database. The Kalispel Tribe was contacted with respect to the work they have done relative to native fish. An effort was made to determine if there are any similarities between the sampling and analysis the Tribe and MFWP does and the potential to increase coordination. Staff provided input on how fisheries data could be incorporated into the statewide fish management plan. StreamNet staff continued to provide guidance to the Fisheries Bureau throughout the contract period. Most of this work occurs in conjunction with the development of the FWIS system; however there are additional data categories and needs that will be discussed with Fisheries Bureau staff. Montana StreamNet continued work to develop strategies to enhance and standardize data and improve data flow. Field data forms are being developed to capture consistent barriers information. Work began on the inventory and documentation of data collected under BPA projects in Montana. Staff continued to stay involved in the Western Governors Association project and were involved in several working groups. Staff were in contact with USDA Forest Service staff and Bureau of Land Management staff related to data storage and availability.

ODFW RPA's 51, 71 and 72 call for action agencies to support the coordination, data management, and annual synthesis of fish population metrics through Regional Data Repositories, facilitate and participate in ongoing regional RM&E collaboration process to develop a regional strategy for status and trend monitoring for key ESA fish populations, participate in regional coordination forums such as the PNAMP, to work with regional, Federal, State and Tribal agencies to establish a coordinated and standardized information system network to support the RM&E program and related performance assessments, and to participate in Northwest regional coordination and collaboration efforts. Under this call, Oregon StreamNet personnel participated in meetings, discussions and workshops for the coordinated Assessment (CA), Data Exchange Template Development Team (DDT) efforts, PNAMP Metadata Workgroup, Fish Leadership, and Data Management Leadership Team meetings, and worked with ODFW staff to identify data related to CA indicators. We continued to develop Data Analysis Flow Diagrams to illustrate how CA metrics are calculated and metadata were created on a limited basis. We continued coordination with staff from EcoTrust and ODFW Monitoring Program on maintenance and enhancements to the Oregon Salmon and Steelhead Recovery Tracker, which is a data dissemination tool for Oregon's monitoring data originally developed by EcoTrust. Until the project's priority changes were implemented, we gave significant attention to supporting CBFWA's SOTR report, updating SOTR data summaries contained in the StreamNet data system and responding to specific data requests as needed. ODFW StreamNet staff participated with federal and state agencies, NGO's and private industry to provide data and help build data systems that feed the StreamNet database. We placed considerable focus on partnering with other data source agencies to significantly enhance the content and collaborative stewardship of Oregon's fish passage barrier and distribution datasets.

WDFW Work continued by WDFW StreamNet staff during FY-12 to gather data for the StreamNet standard exchange data sets as defined in the SOW. However, in anticipation of the forthcoming Coordinated Assessments HLI data gathering effort, our stewards began putting their energy into assembling this data and working with the data creators to improve the flow and storage of this information. Additionally, in the latter part of this year (fifth Quarter) and at the request of BPA, the data stewards focused on preparing for the tracking down of data originating from BPA funded WDFW projects and locating suitable safe repositories for this data. We anticipate this work will be the first priority for the truncated FY-13 work statement. Affected biologist will be contacted in the early portion of 2013 for further education and assistance.

FWS Coordination was maintained with the national fish hatcheries to facilitate ongoing gathering of data.

Work Element 119, Project Administration

Project	Accomplishments During Fiscal Year 2012
PSMFC	While all routine project administration was performed throughout the year by PSMFC and all project participants, a significant additional administrative workload was imposed by the need to reduce the FY-12 budget by as much as reasonably possible and reducing the FY-13 budget request by somewhat more than 10%. In addition, BPA requested that the FY-12 contract be extended by three months to allow for discussion and implementation of revised project priorities and directions for FY-13. This was all accomplished, but several iterations were required, resulting in delays in some work, particularly the process of initiating and carrying out a needs assessment for data management within the Shoshone-Bannock tribes, which had to be deferred to FY-13. As a result of all of this, we under-spent the FY-12 budget significantly, contributing to the BPA request for savings to deal with projected revenue shortfalls.
IDFG	The IDFG StreamNet project manager provided regular supervision and project oversight through the Steering Committee an d Technical Committee. Monthly budget reviews were conducted to make sure that the StreamNet budget is properly managed. A significant amount of work went into finding a way to cover the 10% budget cut that StreamNet has received. A permanent solution has not yet been found, but IDFG did identify an approach to get us through fiscal year 2013. IDFG StreamNet submitted all of its quarterly reports and the 2011 annual report before the required deadlines. A long-term focus of the IDFG StreamNet project manager has been to blend StreamNet into every day IDFG work. That effort has paid off in many ways. IDFG now provides nearly all of the needed system administration support and IDFG contributes significantly to database and application development and maintenance all as cost share support for the StreamNet project. Perhaps most significant, IDFG biologists have come to recognize and appreciate the need and power of data management. They have become active and willing participants in data management that helps feed the StreamNet central database and the flow of fisheries data to StreamNet and partners in the Columbia River basin.
MFWP	Montana StreamNet participated in all project guidance meetings and contributed to all administrative functions related to budget adjustments, the extension of the FY-12 contract and development of the FY-14 project proposal. The Montana StreamNet Project Manager provided supervision, budget management and general oversight of the project.
ODFW	Oregon StreamNet participated fully in the Steering and Technical Committee meetings and provided input into the revised FY2012 and new FY-2013 Statements of Work. The Oregon StreamNet Project Manager provided supervision, budget management and general oversight. A permanent StreamNet Data Steward was hired in the latter part of the year and it's anticipated that a new Application Developer/Database Manager will be hired early in FY-2013. This position will help with enhancements to the Oregon Salmon and Steelhead Recovery Tracker, supporting organization of ODFW data and data flow to StreamNet.
WDFW	Due to cuts implemented at BPA, a relatively large amount of time was spent this year attempting to respond to BPA funding cuts by amending the 2012 work statement and budget and attempting to craft a truncated three quarter 2013 work statement and diminished budget. Sometimes unclear guidance from BPA necessitated last minute rewrites and modifications of these documents.
FWS	Budget, SOWs, reports and tracking spending were accomplished as needed throughout the reporting period.

Work Element 132, Produce Annual Report

Project	Accomplishments During Fiscal Year 2012
All	The Annual Report for Fiscal Year 2011 was prepared and submitted as scheduled.

Work Element 132, Produce Pisces Status Report

Project	Accomplishments During Fiscal Year 2012
All	Five 'quarterly' Status Reports were prepared and submitted as scheduled.

Detailed Accomplishments by Work Element Title

Work Element:159 Transfer/Consolidate/Regionally Standardize Data

Work Element: 159 Transfer/Consolidate/Regionally Standardize Data

Title: 1 Conduct site visits to obtain updated data from biologists

Description: Conduct scheduled site visits to offices of biologists in state, tribal and federal agencies to obtain the most recently available field data. This approach to acquiring data is used by only one of the agencies cooperating in the StreamNet project. In FY-12 begin transition to new MFWP Fish and Wildlife Information System (FWIS) for data acquisition.

Deliverable: New data are obtained by the MFWP StreamNet project to update the data categories listed in the other Data Development work element titles. Transition to Fish and Wildlife Information System is initiated.

Project	Accomplishments During Fiscal Year 2012, summarized by Work Element Title
MFWP	Visits were made or data were received from each regional/field office with additional data collected over the year to complete the annual update. Staff assisted in training regional biologists and technicians on data entry in the newly created, and still under development, Fish and Wildlife Information System. This system allows for biologists and technicians to enter detailed information about their sampling sites as well as individual fish captures and measurements. Additional functionality includes the ability to enter fish tagging information, fish distribution, limnology related data and allows biologists to calculate fish population estimates. Allowing biologists and technicians to enter their survey data into this system will allow for high quality data to be available in a more timely fashion. Multiple survey events in the system can be grouped together as a "Project" and all project data can be viewed and analyzed together. This functionality will likely benefit BPA projects when biologists have to submit reports.

Work Element: 159 Transfer/Consolidate/Regionally Standardize Data

Title: 2 Develop anadromous fish distribution data

Description: Document the occurrence, distribution and life history characteristics of anadromous fish species. These data will be georeferenced to the StreamNet mixed scale hydrography, with intent to migrate to 24K when a regionally consistent 24K routed hydrography becomes available. Maintenance of this high priority data set will continue. The state StreamNet sub-projects will maintain the existing data on anadromous fish distribution and habitat use in their respective states. New distribution information will be incorporated as they become available. Updated distribution data will be converted to the regional Generalized Fish Distribution format and conveyed ("exchanged") to the regional StreamNet database at PSMFC, where they will be incorporated into the database.

Deliverable: Data on the distribution and habitat use of anadromous fish are maintained, and updated as possible, by each of the state StreamNet sub-projects. Updated data are exchanged with the main StreamNet database at PSMFC and made available through the online data query system and interactive maps.

Project	Accomplishments During Fiscal Year 2012, summarized by Work Element Title
IDFG	Idaho StreamNet used in-house IDFG databases, including Collector's Permit, Fish Stocking, Lakes and Reservoirs, and Standard Stream Survey databases, to update their fish distribution database in anticipation of updating the StreamNet generalized fish distribution. Fish distribution has traditionally been the most requested data type. It is used by developers, consultants, universities, land management agencies and fish management agencies. The most common products are GIS layers that are used in a variety of reports. This past year it was used to update the book "Fishes of Idaho". The new version of that book is due out soon.
ODFW	All spring and fall Chinook, coho, summer and winter steelhead, chum and Pacific lamprey habitat distribution records were converted into the StreamNet data exchange format, linear referenced to the most recent version of the StreamNet regional mixed scale hydrography dataset, quality checked, and the FishDist table data (21,730 records) and a small number of stream features (17 records) and submitted to Regional StreamNet. These data were also updated on the ODFW Data Clearinghouse and the enterprise Fish Geodatabase. New Pacific lamprey records were added for Deschutes, John Day, Tualatin, and Umatilla basins. Input on other species was provided by staff in the Lower Columbia, Willamette, Grande Ronde, Malheur and John Day districts. Distribution information in the John Day contributes to the CHAMP protocol effort for salmonid habitat status and trend monitoring. Information was also

provided to Deschutes staff for mapping current sockeye habitat upstream of Round Butte dam. Efforts related to the update of Essential Salmonid Habitat (ESH) designations by the Division of State Lands (DSL) also lead to updates and additions. Records for Eulachon habitat distribution were also created this year.

WDFW Washington continued aligning their internal fish distribution models and hydrological model in use with the ultimate goal of a complete migration of this data set into National Hydrographic Dataset (NHD) compatible coordinates. As in previous years and until this process is complete, WDFW continued to convert and submit the mixed scale hydrography (MSH) routes. Additionally, WDFW SASI listed populations continue to be aligned with TRT population definitions where possible. This data set is often requested by users both internal and external to this agency, but is infrequently updated via Agency biologists.

Work Element: 159 Transfer/Consolidate/Regionally Standardize Data

Title: 3 **Develop resident fish distribution data (top priority for MFWP, lower priority for others)**

Description: Document the occurrence, distribution and life history characteristics of resident fish species, at the most current available hydrography scale. Existing resident fish distribution will be maintained, and project participants will begin expanding data for additional species. This is high priority for Montana, and new data will be developed by the other states as time allows. Updated distribution data will be exchanged to the regional StreamNet database at PSMFC, where they will be incorporated into the database.

Deliverable: Data on the distribution and habitat use of resident fish (species of primary interest) are maintained, and updated as possible, by each of the state StreamNet sub-projects. Updated data are exchanged with the main StreamNet database at PSMFC and made available through the online data query system and interactive maps.

Project Accomplishments During Fiscal Year 2012, summarized by Work Element Title

IDFG Idaho StreamNet used in-house databases, including Collector's Permit, Fish Stocking, Lakes and Reservoirs, and Standard Stream Survey databases to update their fish distribution database in anticipation of updating the StreamNet generalized fish distribution. We also participated in the redband trout range-wide status assessment workshops by contributing reference data, technical support, quality control and data entry. Fish distribution has traditionally been the most requested data type. It is used by developers, consultants, universities, land management agencies and fish management agencies. The most common products are GIS layers that are used in a variety of reports. This past year it was used to update the book "Fishes of Idaho". The new version of that book is due out soon.

MFWP Over 3,000 fish distribution records were created or edited during the contract period. An emphasis was placed on ensuring that distribution records were accurate and current for the year. Distribution data underwent additional QC as data was plotted in GIS against species general ranges. This allowed staff to find potential errors in species coding at the time of data entry. The fish distribution GIS layer and metadata were updated and made available through the MFWP public website.

Staff updated the Yellowstone Cutthroat Trout Assessment database with biologists in three states. The resulting updated spatial information was made available via a web-based mapping application. An assessment database containing reports, queries and the GIS layers was uploaded to the StreamNet Data Store to make the information publically available.

ODFW All redband habitat distribution records were converted into the StreamNet data exchange format, linear referenced to the most recent version of the StreamNet regional mixed scale hydrography dataset, quality checked, and submitted to StreamNet. These data were also updated on the ODFW Data Clearinghouse and the enterprise Fish Geodatabase.

WDFW WDFW resident fish distribution data flow stalled since the previous stewards left WDFW in 2007. StreamNet submissions are dependent on WDFW's progress. Periodically, the current WDFW GIS Unit staff worked on development, reformatting and review of redband data and coordination with other Columbia River states via the Western Governors Association Decision Support System (WGA DSS) redband distribution data. In the 5th quarter of this contract, the WDFW locations data steward worked to finalize an internal Fish Distribution update anticipated in the early part of FY-13

Work Element: 159 Transfer/Consolidate/Regionally Standardize Data

Title: 4 **Develop data for adult abundance in the wild**

Description: Develop and maintain (update all annual trends) information on adult abundance for native fish species, resident and anadromous, including escapement, redd counts, peak spawner counts, trap counts, dam and weir counts, and

resident fish populations (where calculated by other agencies). This is a high priority data type. Also included in this data category are data gathered during spawning ground surveys regarding straying of hatchery fish onto spawning areas, i.e., marked/unmarked ratio and age and sex composition. These are lower priority under level funding. Updated data will be exchanged with the regional StreamNet database at PSMFC at least once per year in the Data Exchange Format (DES).

Deliverable: Data on the abundance of fish (primary emphasis on focal species) in the wild are maintained and updated by each of the state StreamNet sub-projects. Updated data are exchanged with the main StreamNet database at PSMFC.

Project Accomplishments During Fiscal Year 2012, summarized by Work Element Title

IDFG IDFG's Spawning Ground Survey application, developed previously with significant support from IDFG StreamNet, was used by IDFG biologists to enter all of their 2011 and 2012 spawning ground survey data. IDFG StreamNet staff added Nez Perce Tribe, Shoshone-Bannock Tribes, and US Forest Service spawning ground data. IDFG StreamNet ran quality assurance processes on all of the data and assigned index transect codes and codes for ecologically significant units, major population groups and populations as used by the Technical Review Team. The 2011 spawning ground data were submitted to PSMFC during the winter of 2011/2012. IDFG StreamNet also compiled sockeye salmon dam/weir counts and submitted them to PSMFC. The 2012 spawning ground data have been compiled, quality checked and are ready for exchange to the StreamNet database, but based on instructions from BPA this is being delayed until new higher priority work is completed, such as the BPA project inventory and Coordinated Assessments high level indicators. Redd count and carcass data are necessary for the calculation of spawner abundance and spawner recruit rates.

MFWP Over 1,600 sample locations were added or edited and over 9,000 survey results were added or updated throughout the year. The abundance dataset was uploaded to the StreamNet Data Store as an independent data set while spawning surveys were exchanged in the DES format. Staff developed a process by which historic data files could be converted and uploaded into the MFWP FWIS centralized data system. The result of this means historic data will not have to be hand entered into the new system thereby saving many hours of staff time and historic data will be available in the system earlier than originally planned.

ODFW Data compilation, trend updates, & QA/QC efforts for adult abundance trends continued throughout the year. Compilation of data supporting focal species in the SOTR in all Columbia subbasins was completed in the first quarter. 1,270 Status of the Resources "Focal Species Trends" were added or updated, of which 108 trends are used directly in the Status of the Resources Report. Effort was dedicated to obtaining and updating natural spawner abundance, recruits per spawner, age structure data, and location measures. Utilizing the new data exchange format, updates to included adding confidence limits and definitions to new and existing abundance trends. Updates were submitted to Regional StreamNet staff in April and September, as scheduled, totaling 4,133 trends (22,551 escapement data records) added or updated. These submissions represented the following data types: Adult Return-Dam/Weir counts, Adult Return-Estimates of Spawning Population, Adult Return-Redd counts, and Adult Return-Peak/Other Spawning Counts, and ranged in years from 1942 to 2011. The year's work brings the total number of Oregon abundance trends to 9,225 spanning the years 1938 through 2011. The reduction in the number of trends from 2011 resulted from consolidation of 'like' trends (year ranges spread across more than one trend) and removing duplicate trends that had been created when data submitted from the field were mistakenly identified as new information, when they were in fact existing trends that had been reconstituted to more accurately reflect field data collection methods.

WDFW In FY 2012, the Vancouver Data Compiler created a new reference for the 2010 natural spawn escapement data that has not been submitted yet due to incomplete information from the biologists. This should expedite outstanding data. WDFW staff QA/QC'd the 2010 Spawning Ground Survey (SGS) data, including numerous changes and updates and several new locations. The Olympia compiler continued work on developing a series of report outputs for Washington's Lower Columbia Basin Sport and Commercial sampling program. These reports facilitate timely data exchange with Oregon fishery managers.

This compiler's efforts also focused on the capture of adult trap data. A pilot database was developed for regional biologists to enter adult trap historical data (59 - present) for the North Fork Skykomish Sunset Falls adult trap. Work was finished and current and historical data were entered in for the Kalama River and North Fork Toutle adult traps. Portions of this data are expected to be compiled and submitted in the 2012 exchange.

Conversion of juvenile trap data for the Wind River system and Mayfield dam juvenile traps began. Additionally, conversion of Sunset Dam adult trap data from 1985 to the present was completed. An Access pilot database was distributed to field personnel for the 2012 season. Conversion of Mayfield juvenile and Wind River data was completed. Data were collected from biologists, QA/QC'd by biologists and then submitted in the DES to update the website.

The data stewards updated annual exchange of 2011 spawner & escapement data for Upper Columbia, Lower Columbia & Yakima River GIS points.

Work Element: 159 Transfer/Consolidate/Regionally Standardize Data

Title: 5 Develop hatchery return data

Description: Develop (update) and maintain hatchery trend information on the return, disposition and straying (e.g., from other hatcheries) of adult fish returning to hatcheries, including information on coded wire tags. This is an anadromous related task only. Priority will be placed on updating total return and egg take data through 2011. Development of disposition data is lower priority and would require additional resources. Updated data will be exchanged with the regional StreamNet database at PSMFC at least annually. This is a CBFWA Priority 2 data type.

Deliverable: Data on the return of anadromous fish to the hatcheries are maintained and updated by the states and FWS StreamNet sub-projects. Updated data are exchanged with the main StreamNet database at PSMFC.

Project	Accomplishments During Fiscal Year 2012, summarized by Work Element Title
FWS	Return data for 2011 were sent to regional StreamNet at PSMFC, and return year 2012 data were collected and processed in the FWS CRiS database.
IDFG	The Lower Snake River Compensation Plan's hatchery return application was used by IDFG hatchery staff to enter their 2011 and 2012 salmon and steelhead hatchery return data. IDFG StreamNet ran quality assurance processes on all of the data, helped IDFG personnel reconcile discrepancies and submitted the 2011 Chinook salmon hatchery return data. Catching up on a backlog, IDFG StreamNet also submitted 2009-2012 steelhead hatchery return data to PSMFC. The 2012 Chinook salmon hatchery return data The 2012 spawning ground data have been compiled, quality checked and are ready for exchange to the StreamNet database, but based on instructions from BPA this is being delayed until new higher priority work is completed, such as the BPA project inventory and Coordinated Assessments high level indicators. Hatchery return data are used in the calculation of spawner abundance and spawner recruit rates.
ODFW	Time and resources did not allow for updates this year due to prolonged staff vacancies and shifts in priorities.
WDFW	Washington hatchery return data were collected from biologists; QA/Qc'd and then submitted in the DES to update the website. Continued implementation of the agency hatchery data management system 'Fishbooks' delayed some data related to CWT resolution. WDFW corporate did not finish 2010 hatchery returns data (CWT reconciliation) but gave the go ahead on August 15 to roll the data up for delivery to StreamNet. The corporate database is in SQL Server and field names have changed as well as lookup tables. New routines are currently being built to roll the current deliverable data up as well as future deliverables of Hatchery Returns data.

Work Element: 159 Transfer/Consolidate/Regionally Standardize Data

Title: 6 Develop dam and fish passage facility data (mid-priority), update on 3 year cycle

Description: Data on dam and fish passage facilities will be maintained and updated only on a periodic basis. Previously compiled data of this type will be maintained. Information will be updated on a rotating schedule every three years, beginning in FY-08. Additional data that may become available may be exchanged outside the schedule at the discretion of the individual projects.

Deliverable: Existing data on dam and fish passage facilities are maintained . This lower priority data set is updated and exchanged with the main StreamNet database at PSMFC on a three year rotating schedule (2008, 2011, 2014, etc.). Project Accomplishments During Fiscal Year 2012, summarized by Work Element Title.

Project	Accomplishments During Fiscal Year 2012, summarized by Work Element Title
IDFG	Dam and fish passage facility data have been a low priority data type for IDFG StreamNet for a number of years. There were no updates made this year to this data type.
MFWP	Information on 258 dams was updated throughout the year. This work was closely related to the update and QC of barrier data with the correction of many dam locations.
ODFW	Per our milestone for dam and fish passage facilities, ODFW maintained existing data, but did not actively pursue any new data. Twenty-one dam table records were submitted as a follow up to the data submission made in FY-2011. In addition, 79 Dam, Dam Purpose and Dam Type records were updated as a result of information obtained incidentally. This work element was dropped as a priority during the three month extension period.
WDFW	Although no update or exchange was required or planned this year, WDFW submitted a small update in MSH3 (Mixed

Scale Hydrography v.3) format to improve trend dam references.

Work Element: 159 Transfer/Consolidate/Regionally Standardize Data

Title: 7 **Develop hatchery facility data (key dataset), update on 3 year cycle**

Description: Develop and maintain information on anadromous and resident hatchery facilities, including information on location, design, management and authorization. Information will be updated on a rotating schedule every three years, beginning in FY-07.

Deliverable: Data on hatchery facilities are maintained by the state StreamNet sub-projects. Updated data are exchanged with the main StreamNet database at PSMFC on three year rotating schedule (2007, 2010, 2013, etc.).

Project	Accomplishments During Fiscal Year 2012, summarized by Work Element Title
FWS	FWS StreamNet submitted updates for changes at National Fish Hatcheries to PSMFC.
IDFG	Hatchery facility data have been a low priority data type for IDFG StreamNet for a number of years. Only minor updates were captured and submitted to PSMFC. These updates consisted of references and attributes for seven Nez Perce Tribe hatchery facilities.
MFWP	Hatchery facility data were maintained throughout the year with 11 hatchery facility records updated during the year and exchanged with StreamNet.
ODFW	Per our milestone for hatchery facility data, ODFW maintained existing data, but did not actively pursue any new data. Maintenance of this data was dropped as a priority during the three month extension period.
WDFW	Although no updates were planned this year, the WDFW Location Data Manager collected more spatial points for Hatchery Net Pens. She also talked with the WDFW Hatchery Administrative assistant about re-organization to improve how they internally update and share administrative data updates (i.e. hatchery managers, phone numbers, etc.). The Location Data Manager met with Hatchery staff to understand the current organizational management. Management has shifted from Complexes to Region management. This change reduces internal data management work and hopefully will allow a greater WDFW focus on other attributes.

Work Element: 159 Transfer/Consolidate/Regionally Standardize Data

Title: 8 **Develop hydrography data, including stream, lake and reservoir layers**

Description: Provide access to the regionally consistent 1:100,000 (100K) scale routed hydrography layer which has been archived. Continue development and use of the Mixed Scale Hydrography for depicting StreamNet data. The StreamNet Mixed Scale Hydrography (100K plus 24K streams that have attached fish data) serves as a step toward the eventual conversion to 24K when a regionally consistent routed 24K hydrography becomes available from other entities. Effort will also be expended toward developing a 24K Longitude-Latitude Identifier (LLID} based hydrography from NHD linework. The lakes and reservoirs layer will also be maintained. These are essential data for georeferencing all other data in StreamNet.

Deliverable: The 1:100,000 PNW hydrography layer and lakes layer are maintained and archived for use by others. The new StreamNet "mixed scale" (100K X 24K) hydrography is used for georeferencing StreamNet data until a fully routed PNW 1:24,000 scale NHD with whole stream identifiers is available through USGS.

Project	Accomplishments During Fiscal Year 2012, summarized by Work Element Title
MFWP	Coordination between MFWP and MT NRIS on Montana's hydrography continued throughout the year. Montana StreamNet staff is continuing to work with NRIS on assigning whole stream identifiers to the 1:24,000 NHD. MFWP StreamNet staff evaluated several approaches and consequently developed automation to assist in creating whole streams and assigning LLID's to those streams. The ability for biologists to identify sampling on streams not currently in the hydrography was developed in the FWIS database. The flagging of missing hydrography alerts data staff and prompts them to edit the hydrography layer.
ODFW	Oregon's Mixed Scale Hydrography (MSH) dataset was enhanced in order to support recently developed fish passage barrier and fish habitat distribution data. A total of 568 new stream features were added to the MSH dataset and those spatial data records, along with a corresponding number of LocMaster table records, were submitted to StreamNet. The methodology for migrating whole stream (LLID-based) routes to the NHD was tested and refined. The Hydrography Event Management (HEM) tools were installed and employed for migrating whole stream routes to the

NHD. Quality assurance processes were developed to ensure accurate data migration results. Whole stream routes for the lower Snake (1706), Mid-Columbia (1707), Lower Columbia (1708), and Willamette (1709) subregions were migrated to HEM compliant events on the NHD. Quality assurance reviews of resultant NHD-based whole stream route events were conducted. Route migration documentation was enhanced as the process was fine-tuned. A new hydrography route system was generated from the HEM events for testing purposes.

WDFW The Location Data Manager updated WDFW's lakes layer in their internal corporate server site. This is the first update in many years. She also drafted a plan to continue improving the layer with a focused effort in 2012. Meetings are planned at the end of this quarter to discuss and revise the strategies.

The Location Data Manager continually updated WDFW's lakes layer per current attention on mapping inland fish management releases.

Since adopting ArcGIS 10 the Location Data Manager's software does not calculate attributes. As such, it cripples progress for any data stored in file geodatabases (i.e. lake or stream hydrography). Work focused on geometry stored in native personal geodatabases or tabular data files where attribute management isn't a problem coming through MS Access. We started building a cross-reference of lake hydrography and hatchery releases. Although a cross-reference exists for lakes and PSC codes, we've never taken the extra step in verifying a release exists to verify that the correct PSC code was chosen.

The Location Data Manager revised the routines to generate TribIDs to handle routes with adjusted measures. Region 5 adjusts the hydrography to meet their needs, including measure adjustments so measure 0 begins at the bank instead of the centerline of double banked water bodies. This is the first step in working with Region 5 to understand the hydrography they use to insure georeferences of their data are handled properly in statewide datasets. Toward that end, the locations steward also attended the first three of many expected meetings with the Region5 GIS staff to improve data transfer. The Location Data Manager started testing the best ArcScan process to automatically convert bathymetry images to geometry and continued to improve the names of the Lake Layer and cross-references to hatchery data.

Work Element: 159 Transfer/Consolidate/Regionally Standardize Data

Title: 9 **Develop fish barrier data, update on 3 year cycle**

Description: Develop and maintain data sets for barriers to fish migration. Delivery of this new data type will be on a rotating basis every three years beginning in FY-09, with an update planned this year (FY-2012).

Deliverable: Data on fish barriers are maintained by the state StreamNet sub-projects. Updated data will be exchanged with the main StreamNet database at PSMFC in FY-12 on the 3 yr rotation schedule.

Project Accomplishments During Fiscal Year 2012, summarized by Work Element Title

IDFG Fish barrier data have been a low priority data type for IDFG StreamNet for a number of years. Only minor updates were captured and submitted to PSMFC. These updates consisted of barrier information captured during the redband trout range-wide status assessment workshops. The data were not submitted to PSMFC.

MFWP Existing barrier data were maintained and a significant effort was made to QC barrier location and attributes this year. This resulted in over 1,500 barrier records added or edited throughout the year. Barrier data was exchanged with StreamNet in the appropriate DES format.

ODFW Anadromous fish habitat extent was compared against barriers with an unknown passage status and where sufficient information existed, passage status was updated for these barriers occurring at the end of anadromy. Fish passage barrier data from 7 national forests within the Columbia basin were converted into the Oregon Fish Passage Barrier Standard database (OFPBDS). Analytical processes were run to identify and cull duplicate barrier features. Barrier records were linear referenced to the ODFW mixed scale hydrography dataset. We also reconciled USFS barrier features with OWEB's Oregon Watershed Restoration Inventory database.

An extensive review of fish passage barrier data across all eighteen ODFW fish districts was conducted with an emphasis on known priority barriers using StreamNet and non-StreamNet funding. A total of 534 pdf maps were created and distributed to district staff to facilitate the review and input. Maps included a topographic base, fish habitat data along with barrier type and passage status. Efforts were made to capture feedback from district staff and incorporate their input into the OFPBDS database. Previously unidentified barrier features were added, passage status information was updated and other records were confirmed as current and accurate. Metadata for the OFPBDS dataset were updated to describe recent data incorporation and quality assurance efforts. A total of 2,703 new Barrier table records; 1,489 updated Barrier table records; 79 Dam, Dam Purpose and Dam Type table records and 17,494 Fish Barrier table records were submitted to PSMFC.

WDFW A new barrier update was submitted this year referencing the latest StreamNet hydrography layer (MSH3) at the end

of September, 2012. Other work on barriers centered on Yakima River barrier point collection and integration.

Work Element: 159 Transfer/Consolidate/Regionally Standardize Data

Title: 10 **Develop fish age data**

Description: Develop and maintain information on age/sex composition of returning adults, primarily for anadromous species. This is a CBFWA Priority 2 data type.

Deliverable: Data on age composition of returning adult fish are available through the StreamNet website.

Project Accomplishments During Fiscal Year 2012, summarized by Work Element Title

FWS Fish age data were updated for the most recent run year, 2011, and exchanged with the StreamNet database at PSMFC in conjunction with the hatchery return data.

IDFG Fish age data became available to IDFG StreamNet at the end of the third quarter of fiscal year 2012. After running quality assurance routines the Chinook salmon post-run age composition analysis results associated with hatchery returns were submitted to PSMFC during the fourth quarter. Age composition of adult returns is used in the calculation of spawner recruit rates.

ODFW In association with adult abundance in the wild trends (WE 159-Title 4 above), 31 age data trends were updated during the year representing 3,434 records. Data were from the lower mainstem Columbia River, and the John Day, Hood, Fifteenmile, and Grand Ronde basins for summer and winter steelhead, spring and fall Chinook and chum salmon.

WDFW This year, work was completed on the first set of exchange reports for the lower Columbia sport and commercial database. This work will enable compilers to update the location file for the internal Age and Scale Database.

The Vancouver Data Steward finished working on age collection, proofing and submitted data in the DES format to PSMFC to update the website with 2011 data and changes to previously submitted data.

Work Element: 159 Transfer/Consolidate/Regionally Standardize Data

Title: 11 **Develop other data sets**

Description: On an opportunistic basis, develop other types of data as available or as requested by FWP participants. This relates to data relevant to StreamNet objectives which would be developed by StreamNet cooperators and also includes data developed by other agencies or projects. Actual acquisition, standardization, georeferencing and distribution of these data will be dependent on available time and funding. These data may be included in the main StreamNet database in the future, or may be obtained and distributed as independent data sets in native format in the Data Store. Priority for development of other data by StreamNet varies depending on the data type for each participating agency. Receiving and posting independent data sets from other entities in the Data Store is a high priority.

Deliverable: Other fish related data (in addition to the standard StreamNet data categories) are obtained, preserved and made available through the StreamNet website as they become available on an opportunistic basis. Data sets that do not fit into the StreamNet data exchange formats are posted as independent data sets in their native format in the StreamNet Data Store.

Project Accomplishments During Fiscal Year 2012, summarized by Work Element Title

PSMFC "Other" data refers to data types that are not covered by StreamNet's Data Exchange Standard (DES). A significant amount of effort in 2012 focused on data related to Coordinated Assessments (CA), and PSMFC StreamNet personnel took a leadership role in initial discussions regarding information to be targeted for the CA project and helped CA participants reach agreement on the information necessary to create estimates for four high level indicators: natural origin spawner abundance; smolt to adult ratio; adult recruits per spawner; and juvenile recruits per spawner. We also initiated planning in preparation for capturing the CA indicators and metrics data on behalf of the CA participants until use of an exchange network becomes possible.

PSMFC personnel participated in review of CRITFC's salmonid population crosswalk application. Biological and computer technology / user interface suggestions and feedback we provided to CRITFC helped to improve the product. Population definition and depiction through the crosswalk tool will have direct relevance and support for the CA project and potentially to BiOp RPA 71.

Six data sets were added to the Data Store archive this fiscal year and two existing data sets were updated. While this is not a large number of data sets, we are prepared to handle many more as they are submitted by BPA contractors in the coming years. We provided minor assistance to people as necessary as they added their data sets to the Data Store. We reviewed every submitted data set for clarity, utility, and metadata quality, and we screened uploaded files for

viruses, malware, and inappropriate content before making them live. Discussions were held several times between StreamNet personnel and BPA to clarify BPA's needs regarding the Data Store and to gain direction from BPA regarding changes to the Data Store system that they would like to see implemented.

With the defunding of the National Biological Information Facility during this fiscal year, a number of resources available there could have been lost. While we have not done anything to make it available for use in the region, the NBII website was examined and portions of it of potential utility for the Pacific Northwest were copied and archived to prevent permanent loss so that they can be made available if future need arises.

IDFG As a technical assistance project, IDFG StreamNet located and evaluated data storage and sharing websites for in-stream temperature data for IDFG fish research projects. IDFG StreamNet also helped IDFG fisheries geo-reference and compile fish stocking data from 1914 to 1967. In response to mid-year priority changes by BPA, IDFG StreamNet changed its focus to the BPA project inventory and Coordinated Assessments. Data were exported from Taurus (http://cbfish.org) to extract BPA funded projects in Idaho, excluding only Nez Perce Tribe projects which were assigned to the Columbia River Intertribal Fish Commission. IDFG StreamNet started making initial contacts with project leaders to assess their data storage practices. For Coordinated Assessments, IDFG StreamNet Coordinated with IDFG biologists and managers to develop a plan to deliver high-level indicator data. A database to locally store high level indicators was created, based on the existing CA data exchange standards. IDFG StreamNet also helped IDFG personnel compile natural origin spawner abundance into the high level indicator data exchange standard. BPA tasked us to determine the current and recommended data archives for Fish and Wildlife Program projects. Initially focused on just fish projects, it was later expanded to include all projects. IDFG StreamNet queried out all the projects in Idaho from the Taurus database. The result was a total of 102 projects, 37 of which are fish projects. Contract managers and supervisors were contacted via email. That is being followed up by phone calls to each to capture details. So far, 11 of the 102 projects have been completed. Because of the expanded scope and the time it takes to contact each project, IDFG StreamNet will delay delivery of traditional data types until the project inventory is completed in FY-13.

MFWP Montana StreamNet maintained and updated genetic and restoration project data throughout the year. During the contract period 170 genetic samples which contained nearly 350 sample results and close to 200 restoration projects were added or edited during the year. Genetics information was submitted to the StreamNet Data Store as an independent dataset and restoration projects were exchanged with PSMFC via the DES.

Montana StreamNet began efforts to inventory data sets created by BPA funded projects. The breadth, location, format, security and accessibility of the data sets were assessed. StreamNet staff made recommendations for future data storage. The data sets themselves will be addressed in the next fiscal year.

ODFW No requests were received to post independent datasets from Oregon. Updates to data sets other than those previously mentioned were submitted along with other scheduled data exchanges, including the addition of 4 new Recruits per Spawner trends (1985-2007) in the Grande Ronde (spring Chinook), Joseph Creek (summer steelhead), Catherine Creek (spring Chinook), and Fifteenmile Creek (winter steelhead).

Mid-way through the last quarter, we initiated efforts to inventory data sets created by BPA funded projects to assess their security, accessibility, location, and format. Sixteen requests were made using a standard email and spreadsheet template; 12 were returned by the end of year. These were reviewed, leading to a number of process questions that will be addressed in FY-2013. In addition, many contract managers requested additional guidance and/or had questions about the inventory effort. Therefore, metadata creation and posting data to accessible locations were delayed. We also reached out to a few biologists to explore avenues for getting Coordinated Assessments data converted and exchanged in the DES format.

WDFW Location and data management staff oversaw and assisted with the creation of a Traps, Weirs, and Surveys database. This database is a combination of the Age and Scales, Adult Trap/Weir, and Spawner Ground Survey (SGS) databases / templates. The data collected for the above data types will all be stored in this one database. This allows for singular input of the data. Data from this database will help feed the statistical models that will output the 4 CA HLI's.

Data to create the Lower Columbia Coho Abundance estimates were delivered to Dan Rawding to run through the statistical model to create SAR, NOR, HOR. This was successful and is in a preliminary report. These data will be delivered following peer review and the results are in final report form.

WDFW staff began to identify and break out BPA related fish data reporting and track down project data and contacts. This data set has been identified as a priority by BPA funders. WDFW continued development CA and supporting databases. Additionally, public sharing of these data sets can be accomplished by publishing these agency datasets to Data.Wa.Gov open data website.

Work Element: 159 Transfer/Consolidate/Regionally Standardize Data

Title: 12 **Document data sources and help build the library collection**

Description: StreamNet project participants will acquire documents, reports, publications and agency reports (gray literature) that document data sources for the data included in the StreamNet database or that relate to Fish and Wildlife Program activities and fish and wildlife resources in the Columbia Basin and the Pacific Northwest and submit them to the StreamNet Library at CRITFC for access by regional scientists, agencies, interested parties and other libraries.

Deliverable: The collection in the StreamNet Library is increased by addition of pertinent publications and reports and by reference documents documenting the data added to the StreamNet database.

Project	Accomplishments During Fiscal Year 2012, summarized by Work Element Title
PSMFC	Staff maintained coordination of references for data source documents between the StreamNet database and the StreamNet Library catalog, and submitted additional documents to the library as they became available.
FWS	No new reference materials were sent to the library this year.
IDFG	New references were prepared and submitted with all the IDFG fish data submitted to PSMFC, including spawning ground surveys, hatchery returns, age composition and hatchery facility updates. Obsolete reference documents were replaced with updated references and digital references were submitted to replace paper documents.
MFWP	Montana StreamNet entered over 100 library entries during the year. The data and electronic references were exchanged with Regional StreamNet. In addition, electronic links to documents available through the MFWP website were provided to the library in an effort to update the StreamNet library database and allow for greater public access.
ODFW	Oregon StreamNet submitted 221 new and updated reference records to the StreamNet Library this year related to data developed for WE 159 and quality assurance/quality control (QAQC) efforts, ranging in years from 1826 - 2012. Ninety-nine were new documents to the StreamNet Library, the majority of which were related to Status of the Resource (SOTR) focal species, and Coordinated Assessments (CA). Except for QAQC efforts related to abundance trend updates, directed QAQC efforts for references were foregone this year due to other priorities. Staff continued collecting reference materials from the ODFW Clackamas Library and maintaining a bibliography database to document materials located for dissemination to the StreamNet Library, as well as other Libraries. From their efforts, nearly 19,000 references were delivered to the StreamNet Library for addition to their library collection. In all, more than 22,000 documents were distributed rather than being recycled. Staff continued to distribute ODFW Library materials to the StreamNet Library, as well as to ODFW office locations. All materials will be distributed or recycled in FY-2013.
WDFW	At the beginning of this year, QA/QC was performed by the StreamNet Librarian and found where some reference materials were missing. Those references were located and re-submitted to the Regional Library. The Vancouver Data Compiler sent a copy of a final report that was originally incomplete to the library that was requested by the library staff. Staff continued creating new references in regards to new data collection for submission. The Data Manager updated several References that referenced old databases that have been updated. The Data Stewards submitted new references to the library that were created for the data submission to PSMFC StreamNet.

Work Element:160 Create/Manage/Maintain Database

Work Element: 160 Create/Manage/Maintain Database

Title: 1 **System administration**

Description: All StreamNet cooperators will manage and maintain the computer systems (hardware and software) necessary for acquiring, quality checking, formatting in regionally consistent format, georeferencing, backing up, and transmitting tabular and GIS data to the StreamNet database at PSMFC, and for storing, managing, documenting, backing up, quality checking and disseminating the data at PSMFC. This is a high priority work element that is essential to proper functioning of the project, even though it operates largely in the background.

Deliverable: The computer systems used to obtain, store, manage, back up, and distribute data (hardware and software) are maintained in functioning condition and updated as needed at PSMFC and the participating agencies.

Project	Accomplishments During Fiscal Year 2012, summarized by Work Element Title
PSMFC	Basic computer system administration functions were performed during the year to support the databases and data dissemination systems for the project. Database, web application and map servers were maintained throughout the project period. Software licenses were maintained, and software upgrades were installed as needed. Web applications were moved to a virtual server environment to improve speed and to shift some system administration functions to

PSMFC IT personnel. Databases supporting both the older and newer web query systems were moved to a new database server running Windows Server 2008 R2 and SQL Server 2008 R2, along with the Lower Snake River Compensation Plan's existing Hatchery Data Management System. New SQL Server instances were also created on that new server to support staging and production versions of the new LSRCP FINS system that is being developed.

FWS FWS IT staff maintained and updated IT infrastructure throughout the contract period on non-StreamNet funding.

IDFG Most of the IDFG StreamNet computer system administration is now provided by IDFG with non-StreamNet funds. The main thing IDFG StreamNet continues to do is run daily backups of SQL Server databases, which are subsequently backed up by IDFG's enterprise disaster recovery system.

MFWP All computer systems were maintained throughout the year. StreamNet staff tested a virtual desktop installation of ArcGIS v10 in the first quarter. A beta version of ArcGIS server 10.1 was installed in the third quarter and the virtual desktop installation was upgraded to 10.1. Testing configurations will continue to occur in FY 2013.

ODFW Oregon StreamNet performed routine system maintenance and upgraded hardware and software as needed. Service packs were also installed as necessary to ensure proper functionality and appropriate server and desktop security measures were implemented. We also outlined alternatives for upgrading the Tomcat servlet connector that is used in conjunction with ArcIMS.

We continued providing GIS license support to several dozen staff throughout the year. A concurrent use ArcView license pool was established combining 124 users under 18 licenses in an effort to reduce the overall number of licenses needed by the agency. There are only 8 concurrent use ArcView licenses not participating. Late in the year, we started planning and coordinating with ODFW IT staff for an agency-wide ArcGIS Desktop 10.1 upgrade, and worked to identify staff to participate in a pilot automated upgrade before extending it out agency wide. The production GIS license server and map server were updated to support ArcGIS Desktop 10.1 across the agency. We anticipate this deployment occurring in FY-13. We also acquired and authorized a concurrent use VBA extension license and enabled access for all concurrent use license users.

The National Hydrography Dataset (NHD) Hydro Event Management (HEM) tools, version 2.5.4440 were also installed. This software is used for creating and managing events on the NHD v2.

WDFW The usual backups were performed and WDFW systems were maintained and upgraded in accordance with agency best practices and schedules. To this end, staff moved from XP to Windows 7 and MS Office 10. In the second Quarter, the WDFW StreamNet Locations Manager moved to ArcGIS 10 and worked with IT to fix problems creating metadata. In subsequent quarters WDFW staff found that the ArcGIS10 migration created other problems as well, including the realization that the software does not calculate attributes. As such, it cripples progress for any data stored in file geodatabases (i.e. lake or stream hydrography). The Locations manager is still working with WDFW IT to resolve these issues.

Work Element: 160 Create/Manage/Maintain Database

Title: 2 **Application and interface development**

Description: All StreamNet cooperators will develop and maintain computer applications and interfaces that facilitate the entry, management and dissemination of tabular and GIS data at the regional and subcontracting agency levels. This will include development of new applications and tools as well as maintenance or modification of existing applications. To the degree possible, cooperators will share code and applications between agencies and with other data source agencies to maximize project efficiency.

Deliverable: The databases, computer applications and interfaces necessary for obtaining, storing, managing and disseminating data are developed and maintained in such a way that they support accomplishment of project goals.

Project Accomplishments During Fiscal Year 2012, summarized by Work Element Title

PSMFC Applications and interfaces were maintained and developed as needed to support the basic data acquisition and dissemination functions of the StreamNet project. The signature accomplishment this year was completion and implementation of the new Integrated Query System which combines both tabular and map-based approaches to obtaining data from StreamNet together on a single query system page. This new system lets people more easily browse data of interest, displays a map of where the data were collected, and shows graphs of time series data. To help people get familiar with the new system, a quick-start guide was created and made available as well.

The new Integrated Query system was designed to access and integrate tabular and spatial data by leveraging publicly accessible web services published by StreamNet. Regionally standardized tabular data in the StreamNet database are georeferenced and cross-referenced to a number of location types (e.g., streams, watersheds, administrative boundaries, etc.) These tabular data are published and accessible as services via the web as are their geographic representations. Through the use of common unique identifiers and an address system, each fish data record relates

directly to a feature in a published web map service (driven by ESRI's ArcGIS Server REST API). This allows a close and rapid connection between the map view of the location in question and detailed fish data records.

For integration with other systems, an XML metadata output from the Data Store in FGDC-compliant format was defined for use in web services. This has not yet been implemented, and will likely be modified before these web services are created.

The Data Publishing Service was maintained this fiscal year without major changes, but potential changes were explored during the year for future implementation. To support integrating the Data Store and Data Publishing Service with CBFish, the metadata we collect for the Data Store were inventoried and compared to the information available from CBFish. The overlap seemed rather scant, but further investigations are continuing into additional information that could be automatically gathered from CBFish, MonitoringMethods.org, and other sources to implement variables (such as metrics or locations) from BPA's Taurus system as search criteria in the Data Store. As part of this effort to integrate the Data Store and CBFish, the Regional Biologist researched the current state of the North American Profile of the ISO metadata standard (NAP) in relation to biological data. What was learned is that NOAA has been working to define a biological profile for the NAP, but it is not yet officially adopted. Further, the XML schemas created to implement it are extremely complex, and while formatted correctly ("well-formed" XML) they still have some internal inconsistencies (not "valid" XML) in all cases. Further, an update to the NAP is expected. Therefore we determined that it is best at this time to continue to use the FGDC-compliant metadata that we currently use for the Data Store, while monitoring the status of a biological profile for the NAP. There are, however, several new items in the NAP that are not in the FGDC standard; we will attempt to incorporate these into the Data Store metadata as we move forward.

A new system was selected to replace the internal "forum" that we developed and have been using for nearly a decade. Our forum is used to document and archive multi-agency discussions, deliberations and decisions made related to technical issues. This proposed new system was tested, but was not met with unanimous favorable reviews in fiscal year 2012. Further testing and tuning will be conducted in FY-2013.

With support from USFWS in California, a data entry, management, QC, and analysis system for smolt trapping has been developed over the past two years by PSMFC personnel. During the fiscal year significant progress was achieved. By the end of the fiscal year the system was nearly entirely functional for data entry, was near functional for data analysis, had significant data quality controls in place, and included completed utilities for such things as assigning runs to fish and matching marked fish to releases in order to help determine trapping efficiency. Work on this project under USFWS funding will continue in FY-13. Biologists from ODFW, WDFW, IDFG, and tribes have all expressed interest in this system, and it is hoped that it will soon provide a means of easily capturing data and providing consistent smolt production estimates for use in population assessments and analyses important for Coordinated Assessments and for population monitoring and survival estimation by NMFS. The application will be made available to all agencies and tribes in the Columbia Basin when it is fully functional. (As this report was being completed in early FY-13, PSMFC and WDFW StreamNet personnel met to compare this system with the JMX system managed by WDFW. It is believed that these two systems should be able to share data without much difficulty.)

FWS All databases, computer applications and interfaces were maintained and in some cases enhanced.

IDFG This past year, IDFG StreamNet's application development focused on maintaining and updating core existing applications that provide critical data needed across the Columbia River basin. At the request of IDFG biologists a number of changes were made to the juvenile trapping and spawning ground applications and databases. Both the user interfaces and web reports were modified. In order to import data from Excel files, the .Net IIS web server was modified to allow uploads of XML data sources from Excel. The Lower Snake River Compensation Plan hatchery database steering committee decided to move the hatchery database and application development to PSMFC as a neutral host. IDFG StreamNet helped PSMFC migrate and set up the database and system. Responding to new priorities from BPA, IDFG StreamNet started to work on a database and interface to capture and store high level indicators. An initial SQL Server database was built based on the existing Coordinated Assessments data exchange standards. Discussions have already begun with IDFG fisheries personnel to develop a user interface. Ultimately, the high level indicators will be uploaded to PSMFC to reside in a basin-wide database.

MFWP Databases, applications and interfaces were maintained throughout the year with minor modifications made at user's request. Staff spent time assisting the Fisheries bureau in scoping the internal centralized fisheries data system, and testing the new modules of the Fisheries Information System. Significant strides were made in completing some analysis methods and starting the development of others. Staff also assisted in training biologists and technicians on the use of the system. As a result of this effort many biologists have entered current sampling data as well as historic data into the new system. This effort will result in more comprehensive data being available more quickly.

ODFW Application and interface development and maintenance efforts this year included enhancing the data structure and user interface for Oregon's Trend database to accommodate Recruits per Spawner information and changes to age data compilation. The Data Contacts database was modified with new fields and validation rules as needed. 'How-To'

documents were also updated as needed. The approval of DES changes allowed staff to implement the addition of Estimates of Juvenile Populations and Juvenile Counts in Trend look-up tables and 95% confidence limits to the EscData Table.

The ODFW GIS Data Explorer was updated to include the current Oregon Fish Passage Barrier Data Standard dataset, to display historical habitat and the recently added Essential Salmonid Habitat attribute, and to symbolize all new combinations of barrier type and passage status that were not in the previous version. This site is made available to district staff for viewing the barrier and distribution data with background orthoimagery. Oregon StreamNet GIS staff explored the capabilities and limitations of ArcGIS Online 10.1 and developed a basic web application with fish habitat distribution and barrier data.

Oregon StreamNet continued efforts to improve overall data flow from the field by continuing the development of a data management and delivery system that also provides benefits to field projects. During the year, 41 new dataset records were made public through the ODFW Data Clearinghouse (DC), and 4 existing records were modified to improve searchability. We continued to contact DC record owners to request they review and update their posted datasets. We also continued to pursue replacement owners and transfer ownership as applicable for orphaned DC records. Owners were assigned for 2 orphaned records this year. Staff also reviewed and modified the structure of the agency's online "Data Catalog", which incompletely catalogs ODFW data collection efforts.

Staff developed an Access database for the Corvallis Scale Reading project, and piloted an Access database to track the status of metadata and flow diagram development for Coordinated Assessment and other data collection efforts.

WDFW StreamNet staff continued to refine and update the Region 5 Age and Scales database. This data set contains age data related to the natural spawn and hatchery returns data delivered to StreamNet and has elements that will contribute to the Coordinate Assessment indicators

The Location Data Manager adopted new routines to publish weekly updates to the lake layer yet the process cannot be fully tested until software metadata problems related to ArcGIS 10 implementation are solved.

This year, the Vancouver Data Steward along with the Olympia Data Compiler built several access applications to store and summarize data for Sport and Commercial, Age & Scales, JMX template, and Trap/Weir/Survey databases. In addition to standard StreamNet exchange data sets, these systems will also contribute to Coordinated Assessment data elements.

All WDFW StreamNet staff are working on updating all Region 5 databases and/or data that holds the raw data that will feed the models to output the selected HLI numbers to feed the DET. These systems will be expanded to hold all Columbia River data. Considerable amount of time and effort is being put into this so data flow is streamlined, more accurate data is stored, it is readily available, and efficiencies achieved by all parties involved.

Work Element: 160 Create/Manage/Maintain Database

Title: 3 **Data (content) management**

Description: The StreamNet project will manage data at the regional and subcontracting agency levels to assure timely and accurate data flow from source to final distribution. Activities include exchange of data to PSMFC, loading data, updating data, quality assurance procedures, metadata development, etc.

Deliverable: Data are maintained and managed at PSMFC and the cooperating projects so that they are available through the StreamNet website and cooperating agency websites, and metadata are published as web services.

Project Accomplishments During Fiscal Year 2012, summarized by Work Element Title

PSMFC Management of the data in the StreamNet databases continued as a major function of the project, even though it largely takes place in the background. This acquisition, standardization, georeferencing, QA/QC, storage and dissemination of data is the core of the project. StreamNet data compilers added 133 new trend series of fish count data during this extended project year, and an additional 4,144 new fish count records to the database (and updated a similar number of fish count records), bringing the total number of trend series to nearly 20,000 and specific observations to more than 178,500. A summary of all trend data and new data added between October 2011 and the end of 2012, as well as a detailed report of all trend data holdings is attached to this annual report (Appendix A). Over 20,000 fish distribution records were updated. Another 20,000 Barriers, 13,400 records qualifying which fish species and how they are affected by the barriers, and over 3,280 new dams were identified in Oregon. Additional new records loaded included 5,200 locations added to the mixed-scale hydrography, 800 fish age records, and 722 references. These tabular updates were also incorporated into the project's GIS and made available as downloadable spatial data, via web map services, and interactive applications.

A database was created conforming to the Coordinated Assessments Data Exchange Standard that defined the indicators and metrics addressed in the Coordinated Assessments effort: estimates of natural origin spawner

abundance; smolt to adult ratios; adult recruits per spawner; and juvenile recruits per spawner. This database is to be used for acquisition of Coordinated Assessments indicators and metrics in the next project year.

Various data quality control checks were performed on a regular basis to the tabular and spatial data. As potential errors or logical inconsistencies were found, the proper StreamNet personnel from the various agencies were informed so that errors were corrected and data remained consistent at the source and project levels. Data errors and issues were thus reduced during the fiscal year.

The new Integrated Query System unexpectedly provided us with additional easy ways to identify data errors, and this ability was utilized to examine locations defined for some time series (trend) data. Because multi-location data (what we call "supercodes") can be easily identified and mapped in the IQS without the need for GIS software, the geographic and tabular portions of data linked to our current supercodes were examined. We found some combinations of supercodes and data types that were inappropriate. For example, dam counts were tied to supercodes; apparently data entry technicians interpreted dam counts to represent all areas above the dam. While that is the correct way to interpret the meaning of a dam count, it is not the correct way to represent dam count data in a data set. Another set of issues found was mapping trends on tributaries to double-bank streams (e.g., streams which enter the Columbia River) and having the resulting map be correct. We found that an adjustment needed to be made for these locations to map correctly. Issues such as these that were identified were brought to the attention of appropriate personnel so that corrections could be made, and some classes of these issues have already been corrected. Others are ongoing.

The quality control procedures that are conducted at every level were inventoried and described. We also conducted a brief survey of StreamNet web site users and received 27 responses. Both these reports can be found on our Documents page at http://www.streamnet.org/reports_pubs.cfm.

FWS The FWS CRiS database, the source of FWS data for StreamNet, was constantly updated as information became available.

IDFG Idaho StreamNet submitted spawning ground survey trend groups to PSMFC for testing in the StreamNet database and online query system. Quality assurance procedures were conducted on all data submitted to PSMFC, including spawning ground survey, hatchery return and age composition data. These quality assurance procedures were summarized and submitted to PSMFC. A summary of data sources for each dataset was also developed and sent to PSMFC. Because of local requirements, IDFG StreamNet keeps its hydrography in a different map projection than PSMFC. Those systems were cross-walked and a dynamic view was created which relates StreamNet stream measures to stream measures used by IDFG. IDFG StreamNet also developed cross reference tables and views for hatchery return and redd count trends for taxonomy codes and methodologies. To finalize the process, the archaic trends in the StreamNet database were updated with the new IDFG trend information. During the last quarter, IDFG StreamNet worked closely with IDFG and NOAA Fisheries personnel to help provide quality assurance processes for natural origin spawner abundance high level indicators.

MFWP Data were checked for accuracy throughout the year. Due to the state of the new FIS centralized database for Montana fisheries data, significant additional quality assurance measures were conducted outside of the system as biologists and technicians got familiar with the data entry. This included additional QC of location information through the use of mapping services and GIS. It also included the building of crosswalks of MFWP data fields to StreamNet allowed values. Staff identified additional QC measures to be included in the FIS data system and will work with MFWP application development staff to get them incorporated into the system.

As in other states, when data is exchanged with PSMFC there are many specific data quality measures undertaken to ensure that the data are accurate and meet the exchange standard specifications.

Spatial data and metadata were updated for all fisheries layers. All fisheries GIS layers were updated to contain consistent data titles and definitions where applicable in an effort to make layers easier to use and understand by non-MFWP staff. A number of new ArcGIS mapping services were developed including updated hydrography services, services depicting fish distribution and survey locations, and a new service to support Montana's online fishing guide.

ODFW Routine effort was spent this year ensuring the data quality (correctness and consistency across the years of data availability) of Oregon's existing StreamNet Trend information. Staff coordinated with Regional StreamNet to confirm correctness and/or rectify discrepancies that were discovered during routine QA/QC processes for data exchanges. Oregon staff spent some time correcting and updating issues with missing and/or changed LLID's and missing or incorrect Begin and End feet for existing trends. This process resulted in 21,773 updated measures for trends and fish distribution.

With each data submission, we worked with PSMFC StreamNet staff to ensure exchange compliance, including issues related to locations, survey dates, CalcMethID coding, Supercode Streams location, and LifeHistoryID coding.

Following the guidelines for naming and titling non-standard references, staff finished correcting reference records to reflect the new naming convention for datasets, edited the Author’s field according to the standard convention, and

included fields for File Format and Reference Update Frequency. QA/QC was performed on 415 references. Sixty-four groups of duplicate or overlapping references were consolidated into single references.

QA/QC was performed on several spatial datasets including USFS barrier data during conversion to the Oregon Fish Passage Barrier Data Standard (OFPBDS) database, whole stream route – based hydrography data during migration to the NHD and fish passage barrier data as they were analyzed in relation to anadromous fish habitat distribution data. Metadata were developed for a newly published pacific lamprey habitat distribution dataset. The final USFS Barrier data to OFPBDS conversion crosswalk was documented.

WDFW The Location Data Manager drafted a two page document focused on how to determine and report relevant Position Format and Datum when reporting GPS readings. WDFW StreamNet data compilers vetted Yakima Basin redd points received to-date, amassing all the data in one file. These points were then reviewed to resolve a long-standing projection issue for one source's data or were in need of additional data. The Data Manager continued updating Hatchery Returns Trend data after conducting quality checks.

Washington StreamNet staff updated QA/QC procedures for the collection, storage, and exchange of WDFW data, and continued standard data content management for StreamNet datasets in accordance with the SOW

Work Element: 160 Create/Manage/Maintain Database

Title: 4 **Data exchange standard development**

Description: The project will establish and maintain data exchange standards to ensure regionally consistent content and format of data that originate from multiple data sources. We will maintain adopted data exchange formats for data categories described under Work Element 159 and may develop standards for priority new data types, if necessary. This task will provide coordination and technical assistance regarding interpretation of database structures and codes. The formal process for creating new and revising old DEFs may require significant amounts of time, potentially more than a year, for complex data categories.

Deliverable: The formal Data Exchange Formats that are used to standardize data regionally are maintained and updated as needed. Additions and changes to the DES are made in accordance with the DES guidance document. At least one new updated DES version is adopted during the year.

Project Accomplishments During Fiscal Year 2012, summarized by Work Element Title

PSMFC A new version of the StreamNet Data Exchange Standard -- version 2012.1 -- was promulgated Oct. 2, 2012. It included new exchange standards for number of repeat spawners in a run of iteroparous species, and confidence limits for trend data. It also included new fields to track the most recent date a barrier was surveyed, to discuss the history of a barrier, and to indicate explicitly whether a barrier is natural or human-caused. New data categories were created for "Estimates of juvenile populations" and "Juvenile counts" to address the need to add juvenile data to StreamNet as expressed by BPA. We also made changes to better reflect our current "mixed scale hydrography" GIS layer by removing references to stream scale that had been used in the past. We briefly reviewed our ability to define historical fish distribution and combine this information across the 4 states. No improvement was seen as possible relative to the last time we examined this issue several years ago.

StreamNet also led a work group which created a Data Exchange Standard for the Coordinated Assessments project, which we transformed into a formal Data Exchange Standard (DES) document. The DES includes high level indicators of natural origin spawner abundance, smolt to adult survival rates, adult recruits per spawner, and juvenile recruits per spawner. The information in the DES identifies each piece of desired information, along with its name, description, data type and codes/conventions that define the range of expected values.

FWS No DESs directly related to FWS data were worked on this past year.

IDFG Idaho StreamNet participated in StreamNet Technical Committee meetings to discuss DES standards. Discussions were initiated with IDFG fisheries personnel to develop methods and sources for a juvenile abundance data exchange standard. IDFG StreamNet also participated in the development team for the data exchange standard for Coordinated Assessments' high level indicators.

MFWP Staff participated in StreamNet Technical Committee meeting to discuss DES changes. Updates to the barriers DES were reviewed for implications to Montana's data collection and storage. Data Exchange Standard 2012-2 was reviewed and discussions were held through the StreamNet forum related to potential changes to the DES for fish

ODFW Oregon StreamNet staff participated in and contributed to discussions during technical committee meetings on DES related issues. Staff proposed, and the committee adopted a change to add 95% confidence interval (CI) fields to the EscData table for any type of abundance estimate, and to distinguish juvenile abundance estimates from juvenile counts in the Trend table. Other topics proposed by Oregon and discussed during technical committee meetings include adding fields for historical fish habitat, species origin and production to the Fish Distribution table, creating a

juvenile abundance DES, and additional refinements to the Barrier DES. Unfortunately, these proposals were postponed or dropped entirely due to changing work priorities. Staff reviewed and commented on the 2012.1 version of the DES.

WDFW Washington StreamNet regional technical staff attended and participated in all StreamNet meetings to discuss DES standards. There were no concerted efforts to make any changes to the DES this year. All talks centered on the new Juveniles DES and data standard development for Coordinated Assessment datasets. As time permitted, some planning centered on augmenting the WA Fish Distribution format to capture historic data and adequately attribute the data to provide more detail.

Work Element:161 Disseminate Raw & Summary Data and Results

Work Element: 161 Disseminate Raw & Summary Data and Results

Title: 1 **Develop and maintain Internet sites for data dissemination**

Description: StreamNet will continue to maintain and enhance the StreamNet Internet sites to provide access to tabular and GIS data from the StreamNet database. PSMFC will maintain and enhance the primary project website (www.streamnet.org) and associated applications, including the data query system, the interactive map applications and the Data Store. Partner agencies will assist with routine periodic review and comment on the primary website and may disseminate data through websites associated with their agency's StreamNet project and references housed in the StreamNet Library. Priority will be given to disseminating data and references developed through Work Element 159. The website will also be used to archive data sets developed by FWP participants for data that do not fit within the StreamNet DES (Data Store archive function), including the means to index and search the archive. Metadata will be published as web services, making all data findable through external portals.

Deliverable: Internet sites for the dissemination of data at PSMFC and the participating agencies are maintained and functional. New web pages and features are developed as necessary to maximize the availability and utility of data. Metadata are published as web services.

Project Accomplishments During Fiscal Year 2012, summarized by Work Element Title

PSMFC The StreamNet website, www.streamnet.org, continued to serve as the primary means of disseminating regionally standardized data from the project. The website was maintained during the year. Through routine QA, a few errors that appeared were quickly identified and resolved; these involved the Data Store, Data Publishing Service, and a few other pages. Links of interest were added to our links page. The main StreamNet database was published in Microsoft Access format twice during this fiscal year (early and late in 2012). Difficulties noticed on the StreamNet Library web site were reported to CRITFC and followed until resolved.

The new Integrated Query System (IQS) was implemented, providing a new and simplified means to search for and download data, as described in the Applications and Interfaces work element portion of this report. The new query web page is fully customizable for individual users and allows both tabular and map based searches for data, along with the ability to select multiple values of selection criteria at one time. This later capability makes it easier to assemble and download data sets from a wider area or for combinations of species or other criteria. The existing tabular query system and interactive mapper will remain functional along with the new IQS for the foreseeable future, because each has unique capabilities. As the IQS is further refined and perfected, we will attempt to move additional functionality into it, and at some future date may be able to transition more fully from the previous approaches.

StreamNet data and metadata were also published as web services, allowing for discovery through web clearinghouses such as data.gov, and for direct download. The web services serve an additional function, in that the new IQS accesses our own web services as part of the new data query approach.

Statistics on use of the three primary components of the StreamNet website as calculated using Google Analytics and excluding use by StreamNet are presented in Table B1. Use of the main website continued to increase (total visits increased by 8% and number of unique visitors increased by 16%), but decreases were noted for use of the tabular data query system (-22% for total visits and -18% for unique visitors). The interactive mappers had a minor decrease in total visits (-2%) but an increased number of unique visitors (10%). Reasons for the declines in use from 2011 to 2012 are unclear, but the launch of the new Integrated Query System could be a relevant factor. At this time we have not found a means of logging meaningful statistics on use of the IQS, since all querying activity takes place on one page, counting for one instance of loading the page regardless of the time spent on the page or the number of filters set and amount of different data reviewed. We will strive to determine an appropriate way to develop meaningful statistics on use of the new IQS during the next project year.

Table B1. Summary of use statistics for the three primary independent components of the StreamNet website, excluding the new Integrated Query System and StreamNet.

	Main StreamNet web page				Online Tabular Data Query				Interactive Mappers			
	2012	2011	2010	2009	2012	2011	2010	2009	2012	2011	2010	2009
Total Visits	27,163	25,169	23,029	11,578	4,366	5,592	5,786	2,639	6,992	7,169	7,218	5,267
Unique Visitors	19,291	16,586	13,924	6,983	2,369	2,889	2,906	1,296	4,316	3,927	3,620	2,755
Pageviews	66,686	63,186	49,725	26,261	62,791	73,283	81,472	44,108	26,205	28,379	29,170	19,555
Ave. Page Views	2.46	2.51	2.16	2.27	14.38	13.1	14.08	17	3.74	3.96	4.04	3.71
Ave. Time on Site (min)	1.38	1.58	2.06	2.11	7:33	7:57	7:45	9:08	3:07	3:33	3:58	3:28

Internet service providers (ISP) continued to constitute the majority of users of the various portions of the StreamNet website (Table B2). It remains impossible to know who these visitors were, since they almost certainly range between general public and biologists working remotely from their offices. Small offices in remote locations also may use ISPs to connect to the Internet, and we were told by a biologist from one federal agency that he thought that email traffic from his office was routed to a central agency server that had contracted its Internet connectivity to an ISP (we have not yet verified whether this is accurate). State and Federal agencies continued to be the largest users among identifiable domains.

Table B2. Summary of types of users of the StreamNet website in FY-12, excluding the new integrated query system and StreamNet.

	StreamNet Website (partial)		Tabular Query System		Interactive Maps	
Type of User	**# Visits**	**%**	**# Visits**	**%**	**# Visits**	**%**
ISP	12,515	73	1,860	52	2,820	52
Government, Federal	2,117	12	809	23	1,443	26
Government, State	1,393	8	615	17	585	11
Government, county, local	0	0	0	0	64	1
Consultant, industry, company	440	3	147	4	384	7
University	745	4	111	3	123	2
Tribal	0	0	12	0	0	0
High School	0	0	0	0	40	1

IDFG Idaho StreamNet used the StreamNet website on a regular basis and directed many data requests to the StreamNet Data Store and Data Query. The new StreamNet query system was reviewed and relevant feedback provided to PSMFC.

MFWP The new StreamNet query system was reviewed and comments were provided. An issue related to the uploading of a file to the Data Store was found. StreamNet staff was made aware of the issue and it was promptly fixed.

ODFW Functionality-related feedback was provided to Regional StreamNet staff throughout the year, the majority of which centered on the new web query system.

All Oregon StreamNet websites were maintained and updated as needed throughout the year. Significant time was spent fixing broken links that resulted from agency mandated security measures. Also, an undocumented feature truncated the content of a number of web pages. Fixes for both these issues will continue as time allows in FY-2013. GIS staff created 2,972 web image maps for chum, coho, fall and spring Chinook, and summer and winter steelhead to facilitate access to the pdf format distribution quad maps available on the NRIMP Data Resources page. These replaced the 2010 versions. They also created 1,570 updated barrier quad maps as well as an image map to facilitate access to the pdf format barrier maps.

We continued to manage the Corvallis Research Lab's (CRL) website, where project results and reports of several major ODFW data collection projects are posted. This gives Oregon StreamNet immediate and direct access to datasets of interest to StreamNet. Ten progress, annual and information reports were posted to the site this year.

While metadata are not yet available from ODFW via web services, metadata was made available along with ArcGIS datasets and/or via the ODFW Data Clearinghouse.

WDFW Washington StreamNet participated in review and comment of the ongoing StreamNet web presence development and refinement at technical meetings and quarterly Steering Committee meetings.

Work Element: 161 Disseminate Raw & Summary Data and Results

Title: 2 **Respond to data/information requests**

Description: Receive and respond to requests for data, maps and other information; source materials; and custom data products at the regional and cooperating agency levels, as appropriate. Response to requests will be honored within the limits of available resources, with priority given to information requests having direct relevance to the Fish and Wildlife Program and data source agencies/departments. Other priorities will include implementation of the Endangered Species Act and federal, state, and tribal natural resource management activities. Custom data development will be dependent on available resources.

Deliverable: Requests for information or assistance are responded to in a timely manner (within one business day at PSMFC). If within StreamNet capabilities, requested help or information is provided as rapidly as reasonably possible within existing resources.

Project Accomplishments During Fiscal Year 2012, summarized by Work Element Title

All Project participants responded to direct requests for information or assistance during the contract period (tables B3, B4 and B5). Details of each participant's activities in serving information requests is provided following the tables.

Table B3. Information requests served in the contract year 2012 by each StreamNet partner, by type of organization making the request.

Request from	PSMFC	IDFG	MFWP	ODFW	WDFW
College/university	6	8	3	1	1
Government, federal	10	18[a]	8	18	2
Government, state	4	68	67	419	50
Government, tribal / Tribal organization	5	11		1	3
Government, county/local	6	1		6	
Nonprofit	4		3	12	1
Industry / commercial		14		2	
Private consultant	5		1	4	2
Regional entity					
Watershed council/group	2		1	2	
General public	3		4	14	
Unknown	3		4	0	1
Total	48	120	91	479	60

b. Includes one foreign

Table B4. Information requests served in the contract year 2012 by each StreamNet partner, by type of request.

Request type	PSMFC	IDFG	MFWP	ODFW	WDFW
Citing StreamNet / permission	1		1	0	
Data request	4	105	10	5	25
General fish information		14	11	5	
GIS data / map	20		45	101	25
Hardware / software technical support	2		6	290	
Help finding information	4		6	32	
Help with data interpretation / analysis	1		7	17	6
Help with data structure	3		1	6	4
Report error or problem	6		2	0	
Library / documents	1	1		4	
Information outside StreamNet's scope	1			4	
Other	5		2	15	
Total	48	120	91	479	60

Table B5. Outcome of information requests received in the contract year 2012 by StreamNet partners.

Outcome	PSMFC	IDFG	MFWP	ODFW	WDFW
Could only refer to other source			5	27	
Request fully satisfied	35		79	401	54
Request partially satisfied (may include referral to other sources)	11		7	30	6
Could not help at all	1			17	
Response pending				4	
Uncategorized	1				
Total	48		91	479	60

PSMFC PSFMC personnel responded to 48 requests for information / assistance during the fiscal year, as summarized in Tables B3, B4 and B5.

FWS No StreamNet specific requests were received this year.

IDFG Idaho StreamNet responded to 120 direct data requests, as summarized in the tables. While lower than in many previous years, this is an increase from last year, reflecting an increase in interest in fisheries data. We have been referring many people to the StreamNet website. Their feedback about the StreamNet website has been positive and many weren't previously aware it existed. Also, the Idaho Fish and Wildlife Information System website (https://fishandgame.idaho.gov/ifwis) is serving much of IDFG's fisheries data with controlled access.

MFWP Staff responded to 91 information or data requests during the contract period as summarized in the tables. The majority of requests continued to be map requests. The MFWP website contains both the MT Fishing Guide and the MFISH data query system which serve a significant amount of fisheries data. Spatial data layers are also available for

public consumption via the MFWP website.

ODFW Oregon StreamNet responded to 479 requests. The significant increase in requests is due in part to the creation of a GIS Technical Support Specialist position and the 3-month extension of the fiscal year. Hardware/Software requests accounted for more than 60% of the requests we responded to. This is 3.5 times higher than in FY-11.

WDFW Project staff responded to and fulfilled 54 significant data requests as summarized in the tables. Where possible, requestors were referred to the StreamNet website online query systems first.

Work Element: 161 Disseminate Raw & Summary Data and Results

Title: 3 **Promote availability of StreamNet data and encourage participation in the project**

Description: Participate in scientific, professional, and other relevant groups to increase awareness of the StreamNet project, inform others of the data and data related services available from the project, and to encourage participation by others in providing relevant data to the project.

Deliverable: The project and its data and services are made better known among potential data sources and data users, leading ultimately to increased participation in providing and using data.

Project Accomplishments During Fiscal Year 2012, summarized by Work Element Title

PSMFC One StreamNet Newsletter was published and sent out on December 19, 2012. Announcements included updated data available, the new Integrated Query System, Data Store news, StreamNet's role in Coordinated Assessments, and the smolt data entry / QC / analysis system.

Work was begun to update the StreamNet Strategic Plan during this fiscal year. This effort will continue into FY-13.

FWS All possible informal opportunities to educate colleagues about StreamNet were utilized.

IDFG Idaho StreamNet promoted the project by referring people to its website. Their feedback about the website has been positive and people found it to be a good resource that they weren't previously aware of. Also, there appeared to be misperceptions of StreamNet within IDFG, so IDFG StreamNet has been working internally at IDFG to explain StreamNet to more people.

MFWP StreamNet staff attended Fisheries Bureau meetings to stay involved and inform others on services performed and available. A demonstration of Crucial Areas Data (CAPS) was given to the MT Dept. of Transportation in an effort to promote use of the system in planning stages. A presentation on improved bathymetric data collection was given at the regional American Fisheries Society meeting which included discussion of other data types available. StreamNet staff also attended Western Governor's Association meetings related to the Wildlife Corridors and Crucial Habitat initiative and promoted StreamNet as a regional source of fisheries data for that initiative.

ODFW A presentation on the Fish Passage Barrier inventory and prioritization project was delivered at ODFW headquarters. Information in the presentation included StreamNet's role in developing and sharing this and other information, and details on data standardization and compilation efforts required to enable the prioritization. The same presentation was adapted and delivered at the Urban and Regional Information Systems Association (URISA) GIS Pro meeting in Portland as part of a panel titled, "Innovative Applications of GIS in Natural Resources". StreamNet was also promoted during Coordinated Assessment workshops.

WDFW StreamNet Staff, where possible, steered data requestors both internally and from the general public the to the StreamNet website. If more specific information was needed, they handled the request themselves from StreamNet contributing data sets. WDFW promoted the availability of both Columbia and non-Columbia River data at the Salmon Recovery Funding Board in fall of 2012.

Work Element:189 Regional Coordination

Work Element: 189 Regional Coordination

Title: 1 **Support regional efforts under the Fish and Wildlife Program**

Description: Participate in planning, development and/or coordination meetings with regional projects and programs related to the Fish and Wildlife Program (FWP) to help develop a regional data management framework, to establish data type and data service priorities, and to provide advice in the area of data management, as requested. Provide input on ways StreamNet can effectively contribute to the programs and general advice about data management.

Participate in coordination groups (e.g., CBFWA, PNAMP, etc.), advisory groups, task forces, etc. whose purpose is to enhance the effectiveness of the FWP relative to its data development activities.

Deliverable: StreamNet staff have participated actively in and supported projects funded through the FWP, including CBFWA and PNAMP. StreamNet functions as a recognized component of the regional data management framework.

Project	Accomplishments During Fiscal Year 2012, summarized by Work Element Title
PSMFC	Coordination in support of the Fish and Wildlife Program continued, with significant involvement in the Pacific Northwest Aquatic Monitoring Partnership (PNAMP), including as a member of the PNAMP Steering Committee, the Data Management Leadership Team, and various work groups in support of increased regional capabilities for sharing data of value to population assessments, adaptive management, and calculation of high level indicators. Particular effort was focused on the Coordinated Assessments (CA) project, a regional effort to acquire, standardize and disseminate data (four specific indicators related to Viable Salmonid Population analysis and supporting metrics) that is being led by a three member group that includes StreamNet, PNAMP and the Columbia Basin Fish and Wildlife Authority. StreamNet's role in CA focused on collaborative project guidance and leading the technical efforts to develop the Data Exchange Standard. StreamNet also led and completed the effort to use temporary data technicians to perform an initial test of the availability of the required indicators and metrics in the participating state management agencies and tribes. Fiscal Year 2012 was a pivotal year for StreamNet, with significant changes in direction beginning in FY-13. Multiple discussions were held with BPA staff both at BPA and at StreamNet Steering Committee meetings to clarify priorities and plan for future work to meet them. This was done in conjunction with an approximate 10% cut in funding. Results from these discussions led to plans to place highest priority on data created by BPA funded projects and for priority anadromous fish populations related to the FCRPS Biological Opinion. It was recognized that updating existing data types in the StreamNet database would have to be deferred in order to meet the new priorities under the Fish and Wildlife Program.
IDFG	Idaho StreamNet participated in the Coordinated Assessments Planning Group and Data Exchange Standards development team. IDFG reviewed and provided comments about the BPA draft Data Management Framework document. During the last quarter, IDFG StreamNet worked with IDFG and NOAA Fisheries on Coordinated Assessments high level indicators and the BPA project inventory.
MFWP	StreamNet staff met with regional entities in an effort to assist them in obtaining and storing data in such a way that will make sharing data with MFWP an easier process. The Crucial Areas Planning System (CAPS) watershed integrity methodology was provided to the BLM as a potential mechanism for comparing watersheds.
ODFW	Oregon StreamNet staff participated in a number of regularly scheduled PNAMP meetings, including Metadata Workgroup, Fish Leadership, and Data Management Leadership Team meetings. We also participated in and/or monitored the activities of coordinated assessment planning group and DET Development team meetings and workshops. During these meetings and activities, staff contributed to shared discussions about data management-related activities, future directions, and funding options. Staff continued to participate in the development of the Western Governor's Association Crucial Habitat Assessment Tool & ODFW's Decision Support System. These efforts contribute to collaborative data management, standardization and sharing processes, which relate directly to the use of StreamNet data. Much of Oregon's participation was performed with non-StreamNet funds.
WDFW	In FY 2012, StreamNet staff was contacted to consult and assist in support of the NPCC Fish and Wildlife Program due to their technical expertise and knowledge of Columbia River data. This year, the Vancouver Data Compiler continued to work on the Regional Evaluation Project with the new Psion handheld data loggers as a troubleshooter and to QA/QC the data downloading. StreamNet staff came up with fixes for PIT tag reader implementation problems, changed the forms for enhanced usability and ran summary counts for biologists. Once the project was finished, data was proofed and compiled, templates were created for data submission to the PTAGIS database. StreamNet staff began a separate project creating different field collection forms using the same units employed in steelhead surveys. A great deal of research was spent trying to get GPS units to work with the Psion WAP units and still needs to be finalized and tested, but summary forms are complete. The Data Manager tested the Sport and Commercial database that was built to house collected data on the new handheld data loggers. Meetings with ODFW have taken place to work out a DES (Data Exchange Standard) to transfer data from WDFW's database to the ODFW mainframe database. XML will be used to transfer the data and field mapping is taking place. StreamNet staff is being used on this project due to their knowledge of the data, relationship with ODFW staff, technical skills and expertise. This year, Washington StreamNet staff attended several meeting related to PNAMP sub-groups, including DMLT, Metadata work group, Coordinated Assessments, and others.

Work Element: 189 Regional Coordination

Title: 2 **Coordinate with and support data source agencies**

Description: Coordinate with state, tribal and federal fish and wildlife agencies/departments that develop data of interest to StreamNet's mission to streamline data capture, determine agency data management needs and work to improve their internal data management and data transfer to StreamNet. Demonstrate data management tools and applications developed by StreamNet staff and others to increase interest in and adoption of similar tools to improve data flow and automation. Support development of internal data management capabilities and data automation to the degree possible under existing funding, and attempt to link data tools to reporting and decision making. Encourage data sharing in exchange for help with data management.

Deliverable: Data capture and management tools demonstrated to agencies and regional groups. Increased involvement with tribes and development of plans to increase capture of tribal data. Increased commitment of agencies to increased data flow automation.

Project	Accomplishments During Fiscal Year 2012, summarized by Work Element Title
PSMFC	Regional StreamNet staff provided assistance to the data providing agencies by addressing questions from them and their StreamNet compilers and providing guidance regarding data management and data flow. The Program Manager met with program managers from IDFG, WDFW and ODFW to discuss agency needs and priorities. Staff reviewed and provided feedback to Yakama Indian Nation (YIN) biologists regarding a proposed field form they created for recording anecdotal observations of lampreys. PSMFC staff met with YIN biologists Patrick Luke and Ralph Lampman to discuss data collection and sharing relative to lampreys and other species. We gave them feedback on their proposed field form -- suggesting they generalize it so that it was for all species -- and subsequently sent them the observations database that was developed for use with the coastal cutthroat trout status assessment project which PSMFC StreamNet staff have been involved with under other funding. We suggested which parts of that database they should look through and pointed to fields we thought would be most helpful for them on anecdotal field observations data forms. Staff began the process of locating data sets that have been created using BPA funding over the years. We created a data system to capture this information, and we also began preparing to capture, archive, and disseminate these data sets if they are not already located in secure and accessible locations. The majority of this inventory work will be conducted next year.
IDFG	Idaho StreamNet provided instruction and technical assistance in the use, data entry and data access of the Spawning Ground Survey application and the Lower Snake River Compensation Plan hatchery database. Entities helped included IDFG, Nez Perce Tribe, Shoshone-Bannock Tribes, US Forest Service and the US Fish and Wildlife Service. IDFG StreamNet coordinated with and helped PSMFC migrate the Lower Snake River Compensation Plan hatchery database to PSMFC and to keep reports up and running. We are currently working with data source agencies on Coordinated Assessments high level indicators and the BPA project inventory.
MFWP	Staff exchanged fisheries data to the Natural Heritage Program for inclusion into their Point Observation Database. The Kalispel Tribe was contacted with respect to the work they have done relative to native fish. An effort was made to determine if there are any similarities between the sampling and analysis the Tribe and MFWP does. Staff provided input on how CAPS data could be incorporated into a statewide fish management plan. StreamNet staff continues to provide guidance to the Fisheries Bureau. Most of this work occurs in conjunction with the development of the FWIS system; however there are additional data categories and needs that will be discussed with Fisheries Bureau staff. Staff members are developing strategies to enhance and standardize data and improve data flow. Field data forms are being developed to capture consistent barriers information. Work began on the inventory and documentation of data collected under BPA projects in Montana.
ODFW	Oregon StreamNet personnel worked with ODFW, USGS, EPA, Oregon Water Resources Department, the OSU Institute for Natural Resources, the Department of Administrative Services Geospatial Enterprise Office, OWEB, BLM, ODOT, Department of Land Conservation and Development, Oregon Dept. of Forestry and others on a variety of data projects that provided data to StreamNet and also helped all the partners develop data systems that support their needs. Oregon StreamNet staff worked with the Department of State Lands and ODFW field and management staff to provide the best information possible for updating Oregon's Essential Salmonid Habitat (ESH) designations. Oregon StreamNet staff met with the ODFW Native Fish Investigations Project, provided an overview of the StreamNet project, its primary purpose, target audience and types of data that are managed by the project, then met with each NFIP staff person separately to review the datasets they work with and discuss how those datasets might be reorganized to either simplify them, improve their usability and also facilitate data flow to StreamNet. Staff members continued to chair and participate in the ODFW GIS Coordination Group, including several Group and Subgroup meetings. Efforts focused on developing tiered metadata formats/standards for the agency in multiple

formats (Access, Excel, XML and ArcCatalog), developing guidance documents for these formats, our GIS Coordination Group (GCG) intranet site redesign, and planning how to address FGDC/ISO metadata standard issues. Other topics include data classification, GIS user tracking, ArcGIS 10.1 upgrade, ArcGIS Online, mobile GIS, Data Utility / Quality, the DSS, Location Data Standard, training opportunities and workshops, a year end evaluation of the GCG, and producing quarterly GIS Newsletters for agency staff including writing articles and related documents. .

WDFW Washington StreamNet staff (local biologists, the Location Data Manager and Olympia StreamNet compiler) started working with the tribe and USFS in the Yakima basin to establish one master point file for notable points (i.e. redds, fish observations, index points, barriers, etc.). Yakama (YKFP) staff volunteered to steward the file and create web based tools to display the points. Discussion on the formats to submit, maintain and display the data started and are not final yet. When the vision and role of each partner is clarified, the effort will improve data flow and quality control. Staff explored ArcGIS Online features that would truly enable it as a tool for Q&A with the biologists.

This year the Vancouver Data compiler attended the sturgeon Hydro workshop held at the WDFW Vancouver office. All StreamNet staff spent two days at the WDFW Science Division Meeting in Olympia. WDFW StreamNet employees attended a free seminar for researching new data collection devices that could be used for stream surveys and trap data collection. These people also attended the Region 5 all staff meeting with the director.

Work Element: 189 Regional Coordination

Title: 3 **Coordinate with related activities outside of the FWP**

Description: Maintain communications between StreamNet and other applicable regional, federal, tribal, private and state-level agencies and activities beyond the Council's Fish and Wildlife Program to identify means for collaboration on data capture and management. On request or as possible, work toward capture of data not currently being entered in StreamNet.

Deliverable: Coordination with fish and wildlife programs outside of the FWP on data issues and availability is conducted as possible or needed.

Project Accomplishments During Fiscal Year 2012, summarized by Work Element Title

PSMFC Regional StreamNet personnel were involved in coordination with several projects outside of the Fish and Wildlife Program. The smolt trapping database, led by the USFWS in Sacramento, CA was a source of funding for creating a tool that should be useful within the Columbia Basin. Also on outside funding we coordinated with and supported an international group of scientists working toward a range-wide assessment of coastal cutthroat trout. Our roles were in database and GIS support.

In order to determine how StreamNet data would serve NMFS's ESA needs, PSMFC staff examined the NMFS SPS database website at https://www.webapps.nwfsc.noaa.gov/sps. A query was run on that system, and a list of the data that were included in the output was created. There was little that StreamNet does not have the ability to help provide. We will need to create the ability to assign data to TRT defined populations, which is a capability we are currently developing. SPS data, however, are summarized by population while data in the StreamNet database are raw or annually summarized for specific sampling locations. In effect, StreamNet data are the types of raw data that SPS data are based on. The logic necessary for assigning StreamNet data to TRT populations was developed; a few minor details are left to complete. This logic will let us program the computer to make these determinations so that human interaction will not be necessary to specify population for each of our time series and other data types. The result will be a means of sorting data so that they can be queried by population for feeding into population assessments and other regional scale evaluations. This will be integrated with the data flowing from the Coordinated Assessments project.

The Regional Biologist attended the Anadromous Run Forecasting Workshop in Portland on November 6-7, 2012. The main lesson from this workshop is that improving the availability of estimates of numbers of smolts migrating to the sea is the main contribution we can make to support this effort, which contributed to plans to develop juvenile fish abundance data standards and adding these data to the StreamNet database beginning next year.

IDFG Idaho StreamNet provided technical support, data references and data entry during several workshops for the range-wide redband trout status assessment. IDFG StreamNet coordinated with and helped PSMFC migrate the Lower Snake River Compensation Plan hatchery database to PSMFC. Technical assistance was provided to the Idaho Department of Environmental Quality in the use of StreamNet and IFWIS data.

MFWP Staff continued to stay involved in the Western Governors Association project and were involved in several working groups. Staff members have been in contact with USDA Forest Service staff and Bureau of Land Management staff related to data storage and availability. Staff provided data and assistance to many outside entities and cooperators through an internal mediated data request process.

ODFW Oregon StreamNet staff continued coordination with staff from EcoTrust and ODFW Monitoring Program staff on EcoTrust’s project to help ODFW discuss and document the data and data management needs of ODFW’s Monitoring

Program, and corresponding enhancements to the Oregon Salmon and Steelhead Recovery Tracker, which is a data dissemination tool for Oregon's monitoring data. Oregon StreamNet staff continued to provide data and database consultation.

ODFW StreamNet staff participated with federal and state agencies, NGO's and private industry to provide data and help build data systems that feed the StreamNet database.

WDFW Washington continued development of the Juvenile Migrant Exchange (JMX) in conjunction with the Northwest Indian Fisheries Commission (NWIFC),and initiated a sister project called the Nearshore Data Exchange (NDX) to capture and share nearshore and estuary biological data. We continued development of Redband Data associated with the Western Governors Association DSS. WDFW continued development of its Salmon Conservation Reporting Engine (SCoRE) and associated contributing data sets. WDFW assisted in the development of the State of the Salmon

Work Element: 189 Regional Coordination

Title: 4 **Support regional scale reporting on status and trends for HLI, BiOp, etc.**

Description: Support the capture and organization of data needed to produce assessments of population status and trends, such as for the Status of the Resource report (SOTR), Coordinated Assessments, other High Level Indicators (HLI) or BiOp related assessments. Participate with developers of these reports to understand needed raw data to create the indicators, and work with data source agencies to facilitate improved data flow to the data analysis and reporting mechanisms. The actual data development to support these efforts will be conducted under WE 159.

Deliverable: StreamNet functions as an integral component of data flow to regional reporting of population status and trend indicators.

Project Accomplishments During Fiscal Year 2012, summarized by Work Element Title

PSMFC StreamNet personnel at PSMFC and in several partner agencies were active members of the Coordinated Assessments project, which will be acquiring, standardizing and disseminating four specific high level indicators related to VSP analysis, and supporting future widespread sharing of these indicators. In addition to general coordination we provided the following services:

- We led the development team to define Data Exchange Standards DES) in cooperation with data source agencies, BPA, and NMFS. A DES document was created by PSMFC staff to reflect these standards and guide data providers in managing and sharing these data.
- PSMFC staff created databases to capture and house these data. Staff in the state projects improved upon the data capture database.
- StreamNet staff from multiple agencies began gathering data to load into the CA database at PSMFC.
- PSMFC pursued and received from NMFS a definitive list of population names and boundaries for listed ESUs. This list was necessary for defining and sharing data for populations as defined by NMFS, but this list was not readily available.

StreamNet continued to provide the majority of fish abundance data used in the Status of the Resource Report, which provides regional scale tracking of population indicators for all subbasins in the Columbia Basin.

IDFG Idaho StreamNet provided technical assistance to NOAA-Fisheries and IDFG biologists to complete high level indicators for spawner recruit rates, natural origin spawner abundance and smolt-to-adult ratios through 2009. These high level indicators were submitted to NOAA's Salmon Population Summary (SPS) database. IDFG StreamNet helped instruct IDFG fisheries personnel in the use of the Coordinated Assessments DES so they could update the data with 2011 data and make changes to methods. We coordinated with IDFG and the Coordinated Assessments Planning Group to prepare for exchange of high level indicators. Preliminary meetings were held with IDFG and NOAA Fisheries personnel to identify the data structures necessary for holding high level indicator data and identify where the data will come from.

MFWP Montana StreamNet was not involved with the efforts to obtain high level VSP Indicators under the Coordinated Assessments due to the current focus on anadromous species.

ODFW Oregon StreamNet staff prepared for and participated in Coordinated Assessments (CA) meetings and DES Development Team (DDT) meeting. Though staff vacancies limited this effort, Oregon StreamNet continued creating analysis flow diagrams to illustrate how CA metrics are calculated and metadata for the natural spawner abundance, adult and juvenile recruits per spawner and smolt-to-adult return rates for numerous populations.

Focus was given to supporting CBFWA's Status of the Resource (SOTR) report, identifying trends represented in the 2011 and 2012 SOTR reports that need to be updated for the new upcoming SOTR. Updating of SOTR data summaries contained in the StreamNet data system continued until priority changes were implemented. Aside from

compiling abundance information to populate SOTR datasets, Oregon StreamNet staff worked to identify irregular references between trend IDs and current SOTR references, reconcile StreamNet holdings with SOTR summaries, and review the newly updated SOTR report for accuracy.

WDFW Washington StreamNet staff routinely participated in Coordinated Assessment DES development throughout the year and assembly of contributing data sets and their associated data flow from field collection events to headquarters. Additionally, WDFW took the lead in a grant application to EPA to facilitate the creation of a transfer mechanism for Coordinate Assessments HLIs to StreamNet and among the participating states.

Work Element:119 Manage and Administer Projects

Work Element: 119 Manage and Administer Projects

Title: 1 **Manage project activities**

Description: Administer all aspects of the StreamNet project at the regional and cooperating agency levels, including oversight of budget, personnel (including training and staff development, and hiring and supervision of data technicians in support of the Coordinated Assessments), work statement / budget preparation and implementation, coordination among participating agencies, and project guidance through active participation in the StreamNet Steering

Deliverable: Project staff and budgets are effectively managed, work detailed in this SOW is accomplished, and required SOW/budget documents are prepared and submitted on schedule.

Project Accomplishments During Fiscal Year 2012, summarized by Work Element Title

PSMFC All project participants conducted project management activities throughout the extended contract year. Specific activities included:

- The StreamNet Steering Committee met five times during the extended contract period to review priorities and provide guidance for the project.
- PSMFC staff guided work done by the subcontracting partners
- Project staff at PSMFC and the subprojects conducted routine personnel management throughout the contract period to assure work focused on meeting objectives specified in the Statement of Work.
- All project participants tracked budget expenditures throughout the period.
- All project participants contributed to development of the project proposal, work statement and budget for Fiscal Year 2013. This turned out to be a significant workload, since following the initial FY-13 proposal a decision was made to extend the FY-12 contract for three months before implementing a nine month contract in FY-13. This led to several revisions to the work statements and budgets for both FY-12 and FY-13. This effort was further complicated by a budget reduction of slightly over 10%, which resulted in the need to reduce staff time on the project, since the majority of the budget is for personnel at both PSMFC and the subcontracting agencies. This approach, while significantly time consuming, allowed for general continuation of the FY-12 work for an additional three months while revised priorities for FY-13 were developed.
- The FY-12 accrual estimate was provided to BPA.

FWS A budget was created and followed, and all work was accomplished. Activities were completed on time.

IDFG The Idaho StreamNet project manager provided supervision and project oversight to IDFG StreamNet personnel. Monthly budget reviews were completed and spending was properly managed. A significant amount of work has gone into finding funds to cover the 10% budget cut instituted by BPA on StreamNet. A final solution for FY-13 has not yet been reached, but a general approach has been agreed to within IDFG. The IDFG StreamNet project manager participated in all Steering Committee meetings.

MFWP Montana participated in all StreamNet Steering Committee meetings either through travel to Portland or via webinar. Technical staff participated in Technical Committee meeting conference calls. All SOW and budget documents were prepared as instructed and submitted on schedule.

ODFW Oregon StreamNet participated fully in the Steering and Technical Committee meetings and provided input into the revised FY-12 and new FY-13 Statements of Work. The Oregon StreamNet Project Manager provided supervision, budget management and general oversight. Staff also took required training, and applicable discretionary training as time and resources allowed.

Several positions were either filled with temporary staff and/or were vacant for part of the year. Budget reductions contributed to these vacancies in the latter part of the year. A permanent Data Steward was hired after the position was occupied by a temp or contractor for over a year. We also hired a Barrier & Distribution GIS Analysts using a combination of StreamNet and other funds. Attempts to fill our Application Developer/Database Manager position

were not successful. The only suitable candidate declined the position. Recruitment was re-initiated with more candidates applying. We anticipate filling the position early in FY-13.

WDFW The Washington Project Manager continued to manage this project to the best of his abilities and in the face of a financial and time frame which continued to shift throughout the year. Reports and spending were carried out in accordance with the 2012 SOW and Budget breakdown. All Steering Committee meetings, Technical meetings and conference calls were attended.

Work Element:132 Produce Annual Report

Work Element: 132 Produce Annual Report

Title: 1 **Annual report**

Description: Produce a detailed annual report for FY-11 project activities within 60 days of the beginning of the fiscal year.

Deliverable: Annual report submitted to BPA

Project Accomplishments During Fiscal Year 2012, summarized by Work Element Title

All Project participants contributed reports on their activities under their subcontracts for FY-2011 to PSMFC, which prepared and submitted the FY-11 Annual Report to BPA via upload to the Pisces project management system. The report was submitted on schedule.

Work Element:185 Produce Pisces Status Report

Work Element: 185 Produce Pisces Status Report

Title: 1 **Quarterly reports**

Description: The Contractor shall report on the status of milestones and deliverables in Pisces. Reports shall be completed quarterly as determined by the BPA COTR. Additionally, when indicating a deliverable milestone as COMPLETE, the contractor shall provide metrics and the final location (latitude and longitude) prior to submitting the report to the BPA COTR.

Deliverable: Quarterly Status Reports are submitted on schedule

Project Accomplishments During Fiscal Year 2012, summarized by Work Element Title

All The StreamNet project submitted five quarterly reports during the extended contract period. All project participants reported on their specified Work Elements and Milestones in the Pisces interface. The Program Manager contributed reports for activities under the PSMFC Work Elements and Milestones, edited the complete reports, and then submitted them by the required deadlines.

Work Accomplished Outside the Statement of Work

Description: Summary of any activities that took place outside the formal SOW milestones and/or that were accomplished on funding other than the StreamNet contract.

Deliverable: Report on activities that were related to the StreamNet mission that occurred opportunistically, or that related to the StreamNet mission but were funded through other sources.

Project Accomplishments During Fiscal Year 2012, summarized by Work Element Title

PSMFC PSMFC led a project funded by the US Fish and Wildlife Service in Sacramento, CA, to develop a stand-alone platform to input data from rotary screw traps and other juvenile salmonid traps, perform analyses to calculate smolt production and confidence intervals, and produce standardized reports of the results. StreamNet staff at PSMFC spent a portion of time on this project. Based on discussions with agencies and tribes in the Columbia Basin, we anticipate that this database platform will be of significant utility here, particularly for smaller agencies such as at the tribes. We are working to make sure that the data will be compatible with and equivalent to data in agency systems such as the WDFW JMX application and the juvenile abundance portion of the IDFG IFWIS system. An advantage of using a

platform such as this in the Columbia Basin is that the data developed will be consistent among all entities using it, which will facilitate sharing of data.

Staff also continued participation in a coast-wide project to compile data for coastal cutthroat trout (CCT) in preparation for a formal assessment. This project was funded through the Western Native Trout Initiative, PSMFC and other sources. StreamNet created and hosted a GIS application that displays known verified CCT occurrences as a means of assessing species distribution.

IDFG With non-StreamNet funds, work continued on building the whole-stream (LLID) routing system on the 1:24,000 scale National Hydrography Dataset for Idaho. All the named streams have been routed based on the 1:100,000 scale StreamNet hydrography. A web-based mapping hydro review tool has been completed. During the next year, IDFG regional staff will review the new routing and submit necessary changes.

MFWP State-wide fish distribution data were updated and/or maintained, as were population estimates. This was possible due to the field data being entered into a centralized data system by biologists or technicians. Staff assisted in the completion of the first Statewide Fish Management Plan. This plan will help guide priority-setting and decision-making for waters in Montana. Much of the data collected and managed under the StreamNet contract was used to formulate tables, charts and maps for the plan.

ODFW Oregon StreamNet and other entities continued to support the non-Columbia portion of the ODFW Fish Passage Barrier and Fish Habitat Distribution datasets. Staff members were able to increase the number of non-Columbia barriers to 16,410 and convert those data into the Oregon Fish Passage Barrier Data Standard format (OFPBDS). The latest version of the OFPBDS dataset contains nearly 31,000 barrier features from numerous sources. Updated barrier data consistent with the regional hydrography were submitted to PSMFC StreamNet as a result of these efforts. We also added Chinook and steelhead historical distribution in the Klamath Basin.

GIS staff members once again were called on to create and/or update layers used on Oregon's angling regulations using non-StreamNet funding. This effort involved working with managers and field biologists to correct errors and incorporate changes, helping to coordinate the printing process, and safeguarding image quality during the printer and website posting processes. In addition, staff initiated efforts to digitally represent angling regulation features for use on mobile devices. This work will improve ODFW's ability to manage, monitor and regulate angling in the Columbia basin.

We continued a joint project with ODFW monitoring and evaluation staff and NOAA-Fisheries on a data management effort centered on information that fulfills Recovery Planning data needs. NOAA has elected to continue to fund an expanded effort in the next fiscal year.

ODFW continued to support the database application designed to track Restoration and Enhancement Program funding applications through enhancements and fixes. We also continued support of the online Fish Screening and Passage, and Fish Passage Transport databases.

WDFW Washington StreamNet staff used non-PSMFC funds to continue to implement our hydro layer migration to NHD routing criteria. Staff also continued to support internal systems promoting Fish data flow as time and external funding