

January 2000
STREAMNET

Annual Report 1999



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Bonneville Power Administration
Environment, Fish and Wildlife Division
P.O. Box 3621
905 N.E. 11th Avenue
Portland, OR 97208-3621

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- FY 1999 Annual Progress Report -

Columbia River Inter-Tribal Fish Commission
Idaho Department of Fish and Game
Montana Fish, Wildlife, and Parks
Oregon Department of Fish and Wildlife
Pacific States Marine Fisheries Commission
Shoshone-Bannock Tribes
U.S. Fish and Wildlife Service
Washington Department of Fish and Wildlife

January 2000

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Columbia River Inter-Tribal Fish Commission

Objective 3. Library/Reference Services

The StreamNet Library continued in its development as a regional source of information about the Columbia River Basin. It has been a year of change. In the past year, we have:

- Redesigned and updated the brochure outlining the Library services and policies.
- Served people from over 70 different state and federal agencies, environmental organizations, universities, tribes, inter-governmental entities, consultants, etc. through walk-ins, telephone calls and email contact. Many of these are a result of referrals from regular patrons and some are a result of marketing efforts.
- Assisted people with over 400 information requests; processed over 800 interlibrary loan requests circulated approximately 200 items; and used the photocopier 8,665 times.
- Continued our cataloging efforts, resulting in a current total of 9,569 cataloged titles in the library.
- Contacted publishers of newsletters and newspapers to request gift subscriptions to support the Library.
- Began integrating the collection from the Northwest Power Planning Council and the StreamNet reference documents. Also began integrating the catalog of StreamNet documents from Montana.
- Conducted an inventory of our newsletters, newspapers and other periodicals. Re-organized the collection into one alphabetical collection. The Library began tracking journal usage for inclusion in a subscription review process. We renewed most journals for FY2000, but one no-usage, high cost journals was discontinued.
- Continued map cataloging efforts.
- We hosted several meetings of regional library groups.
- The StreamNet Library staff had a complete turnover from last fiscal year. A new Library Technician was hired in November, 1998. A search was conducted for a Librarian, as a result the Assistant Librarian was promoted to the Librarian position. A new Assistant Librarian for Reference and Interlibrary Loan was hired in May 1999.

Objective 4. Services to Fish and Wildlife Program Activities:

Project staff were active participants and contributors to a number of Fish and Wildlife Program activities.

- The Project Leader was active in CBFWA activities to develop an Annual Implementation Work Plan of projects recommended for funding in FY2000. As part of this process, he provided information as needed about the StreamNet Project and responded to review comments about the program.
- Project staff were active participants in the Multi-Species Framework process. Staff developed all the commercial fishery harvest data used in the analysis procedures.
- Project staff were significant contributors to data documentation tools and procedures which will be used by the Framework analysis.
- The Project Leader served as chair for a CBFWA inter-caucus work group developing Research, Monitoring and Evaluation Plan. The plan will include recommendations about information management needs.
- Staff have been active participants in regional discussions about watershed analysis and subbasin planning. We have paid particular attention to identifying information management problems and needs and how StreamNet might meet those needs.

Objective 5. Project Management/Coordination:

All normal management duties were successfully completed in FY99. Additional duties and work load were undertaken to provide a smooth transition to a new Project Manager.

Idaho Department of Fish and Game

Summary

This document constitutes the 1999 federal fiscal year (October 1, 1998 – September 30, 1999) annual report of activities by the Idaho Department of Fish and Game's (IDFG) StreamNet program. Project accomplishments are described relative to objectives applied to IDFG from the StreamNet *Fiscal Year 1999 Statement of Work* and the *Fiscal Year 1999 Supplemental Statement of Work*.

StreamNet's purpose is to compile, manage and distribute electronic data on the fish and, secondarily, wildlife resources in the Pacific Northwest. StreamNet is a multi-agency project authorized by the Northwest Power Planning Council's Fish and Wildlife Program. StreamNet is funded primarily by the Bonneville Power Administration as part of its 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. Other funding agencies include the Environmental Protection Agency (EPA) and the National Marine Fisheries Service (NMFS). The Pacific States Marine Fisheries Commission (PSMFC) administers StreamNet. Federal, state and tribal fish and wildlife agencies collect, manage and distribute data on the region's fish and wildlife resources. A subset of these data are compiled into standard formats and publicly distributed via an Internet World Wide Web site.

Key accomplishments for IDFG StreamNet in FFY 1999 include an annual update of anadromous fish data (redd counts, dam/weir counts, hatchery returns, and age composition). Significant updates to StreamNet's resident fish distribution data were also made, including cutthroat trout distributions and the addition of the Idaho Conservation Data Center rare and sensitive fish data holdings.

Most significantly, IDFG StreamNet made considerable progress toward development of a Fisheries Information System (FIS) that will help IDFG manage its fisheries data and provide an efficient exchange of data to the regional StreamNet program. Our progress included migration of fish distribution, general parr monitoring, fish stocking, and dams and hatchery facilities data into a Microsoft SQL Server database. Computer programs are being developed that will be used by IDFG biologists to enter and access their data. One module of the FIS has already been implemented into which information from historical collecting permits and distribution data from IDFG annual reports have been entered.

A key role of StreamNet is to distribute its information to other agencies and the public. The regional StreamNet World Wide Web site (<http://www.streamnet.org>) provides an efficient conduit for a regionally standardized subset of StreamNet data. IDFG StreamNet responded to over 200 requests for Idaho-specific StreamNet data during FFY 1999.

IDFG StreamNet had two contracts outside the Northwest Power Planning Council's Fish and Wildlife Program. Fish distribution outside the Columbia Basin, stream temperature, and water

quality limited (303 (d)) data were compiled under the authority of an EPA subcontract. A stream restoration projects database was developed and populated under a NMFS subcontract.

This report contains many acronyms with which the reader may not be familiar. A glossary of acronyms is provided at the end of this report.

Objective 1. Data Development

Task 1.1: Anadromous Fish

Prepare and maintain standardized data on anadromous salmonids and, where data are readily available, other anadromous fish, to include:

- a). Distribution and Life History
- b). Adult Abundance
- c). Juvenile Data
- d). Harvest
- e). Hatchery Production
- g). Age
- i). Populations
- j). Historic Range

Task 1.1 Accomplishments

The following data were updated from annual reports and submitted to PSMFC for addition to the StreamNet regional database. Changes in the regional StreamNet protocols required IDFG StreamNet to rework the update data utilizing new exchange formats. These data are currently being migrated to the 1:100,000 scale hydrography before we resubmit it.

- distribution of life history (use-type) stages
- adult abundance (redd counts and dam/weir counts)
- hatchery returns
- age composition

Significant progress was made in preparation of the following data. IDFG StreamNet efforts on these data concentrated on correcting mis-coded data, assuring proper linkage to the 1:100,000 scale hydrography, and building and testing data structures in the FIS.

- general parr monitoring (juvenile abundance)
- population delineations defined as species/run/production type
- fish passage barriers

Task 1.2: Resident Fish

Prepare and maintain standardized data on native resident fish and, where specifically identified, other aquatic species, to include:

- a). Distribution and Life History
- b). Adult Abundance
- d). Hatchery Production
- g). Historic Range
- h). Status

Task 1.2 Accomplishments

Distribution data for resident salmonids were updated. Records were added to the GIS fish distribution event table for use with the 1:100,000-scale hydrography by collecting data from color-coded paper maps developed by IDFG biologists. These data have been sent to PSMFC. Historical collecting permit files and recent annual reports were entered into a module of the FIS. These data have not been formatted to StreamNet exchange format and have not been sent to PSMFC.

IDFG StreamNet added the Idaho Conservation Data Center's rare and sensitive fish species holdings to the existing GIS fish distribution data.

The IDFG stocking database uses a stream and lake-referencing system called Catalog Numbers. Development of a cross-reference of Catalog Numbers to LLID (Latitude Longitude Identification number for streams) is in progress. An initial cross-reference is completed, but there are several hundred records that could not be matched.

Historic fish species' distribution data were obtained from the Interior Columbia Basin Ecosystem Management Project (ICBEMP). The data are tied to subwatersheds and is available on our GIS.

Coordination with our Fisheries Bureau was conducted for resident fish abundance data and the Snake River Native Salmonid Assessment. We will continue to work toward development of this data category.

Task 1.3: Habitat

Maintain standardized data relating to fish and aquatic habitat, to include:

- a). Stream Habitat
- c). Water Quality
- d). Stream Surveys

Task 1.3 Accomplishments

Database structures and screens for a Fisheries Information System were developed. The system will allow IDFG biologists to enter, manage, and retrieve data collected from across the state during stream and lake surveys. The system will be capable of holding both fish and habitat data.

Task 1.4: Facilities

Maintain standardized data relating to facilities affecting fish and aquatic habitat, to include:

- a). Dams and Fish Passage Facilities
- b). Hatcheries
- c). Diversions/Screening

Task 1.4 Accomplishments

The IDFG StreamNet dams (combined National Inventory of Dams and Idaho Department of Water Resources data sets) and hatchery facilities were linked to LLID measures in the 1:100,000-scale hydrography to capture recent changes made to the Idaho hydrography. Many dams, such as dams that hold back mine tailings, did not link to hydrography at 1:100,000 and may require 1:24,000 or larger-scale hydrography.

Both of these data sets are being input into the IDFG Fisheries Information System. They have not been submitted to PSMFC. The relationship among various hydrographic features in the GIS (e.g., streams, lakes, and dams) need to be completed to insure a correct representation in the tabular system.

Objective 2 - Data Management and Delivery

Task 2.1: Database Management

At both the regional and state levels, provide database management and administration necessary for accomplishing StreamNet objectives, to include: 1) maintaining regional and state-level StreamNet data sets, 2) processing exchange data into the regional database, 3) transporting data to SQL environment, 4) enhancing StreamNet database structures and capabilities, and 5) providing programming services to project participants to allow for efficient data entry and transfer.

Task 2.1 Accomplishments

IDFG StreamNet maintained and updated databases on the IDFG computer network and the IDFG StreamNet GIS. Data were processed into StreamNet data exchange formats and submitted to PSMFC, as described in Objective 1.

IDFG StreamNet made substantial progress toward the implementation of a Fisheries Information System, including the migration of data from Oracle to Microsoft SQL Server. The Fisheries Information System will provide data entry and data management for IDFG fisheries staff and provide efficient exchange of IDFG fisheries data to the regional StreamNet database.

One of the requirements of the Fisheries Information System is that the data must link directly to the 1:100,000-scale hydrography in GIS. Because IDFG does not have a Department-wide GIS, a tabular system was developed to represent the hydrography and attach LLID measures in GIS format to fisheries data. The system is highly dependent on consistent relationships among the various GIS hydrography layers (e.g., streams, lakes, and dams). The last of these relationships are being worked out and the system should be available during the early part of year 2000.

Task 2.2 Data Plan

Update and maintain a project data plan that identifies 1) current data holdings at the regional level, 2) data items to be incorporated in the current contract period and in future years, and 3) expectations for data development and delivery from participating organizations within the current contract period.

Task 2.2 Accomplishments

This objective was intended as a regional StreamNet objective, but similar work was necessary for IDFG StreamNet. By coordination with a related project, the *Idaho State Fish & Game Spatial Data Directory* was developed. It describes all the biological data holdings in IDFG that are or can be related to geographic features.

Task 2.3 Data Exchange Standards

Design, develop, and maintain standard codes and data exchange formats for data being compiled as part of the StreamNet project, and for similar data development initiatives. At the regional level, provide technical assistance regarding standard codes and exchange formats for Fish and Wildlife Program and ESA-related projects, and for applicable tribal data compilation activities. At the state level provide similar technical assistance for state agency data activities applicable to StreamNet. The extent of this technical assistance will be determined by data manager workload.

Task 2.3 Accomplishments

Through participation in the StreamNet Steering Committee, IDFG StreamNet contributed to the development of regional StreamNet data exchange formats. New standards were also worked on with the IDFG Fisheries Bureau that will facilitate data entry, storage, management, and retrieval in the Fish Information System.

Task 2.4 GIS Data System

Establish and implement procedures for coordination of StreamNet-related spatial data activities among participating organizations, to include regular meetings and or other communication links among participating GIS specialists. Design and maintain metadata formats for spatial data to be used by StreamNet participants. Prepare map products in

hardcopy and/or electronic format for use in Program-related aquatic resource policy, planning, and management.

Task 2.4 Accomplishments

IDFG StreamNet actively participated on the StreamNet Steering Committee and subcommittees related to GIS data. A variety of maps were produced for IDFG using the IDFG StreamNet data. The Fisheries Bureau was provided direct access to the IDFG StreamNet GIS data, via the IDFG computer network, and used the data on a regular basis. The GIS was the primary tool used for completing over 200 information requests related to presence of fish in specified sections of streams. The GIS also serves an irreplaceable role in development of the hydrographic data sets that are the foundation of the Fish Information System.

Task 2.6 1:100,000-scale Hydrography

Maintain the 1:100,000-scale PNW hydrography for purposes of attaching StreamNet data. Coordinate with efforts to prepare a National Hydrographic Dataset (NHD). (StreamNet may choose to serve as Pacific Northwest coordinator for a national NHD if appropriate. This, however, will require funds from outside of the Fish and Wildlife Program.)

Task 2.6 Accomplishments

Modifications were made to Idaho's portion of the StreamNet 1:100,000-scale hydrography to create an accurate representation of Idaho's hydrography in the tabular Fish Information System. One round of these changes were submitted to the regional StreamNet GIS Manager. Additional changes are awaiting submittal. In addition, work continued on the development of a lake and reservoir GIS layer integrated with the stream data.

Only streams with stream names in the GIS attribute tables for the Idaho portion of the 1:100,000-scale hydrography were previously routed and assigned LLIDs. Funded by a related project (the Bureau of Reclamation's Snake River Resources Review), a set of ArcInfo AML programs were developed to automate the routing of the remaining, unrouted streams. The programs use a set of defined rules and the topological relationships of the arcs in the hydrography to determine the new routes. The programs are dependent on the existing routes and will be applied to the hydrography after the modifications necessary for the Fisheries Information System are finalized. In addition, programs to classify and add braids to the hydrography route system were developed.

Task 2.7 Data Requests

Receive and respond to requests for data, source materials, and custom products. 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. Other priorities will include implementation of the Endangered Species Act and federal, state, and tribal natural resource management activities.

Task 2.7 Accomplishments

IDFG StreamNet now responds to all requests to the Idaho Conservation Data Center for fisheries information. These requests are usually related to requirements of the Endangered Species Act (ESA) for development actions that may affect species covered by the ESA. A variety of GIS maps of various fish data were also produced, primarily for IDFG staff.

Summary of data and map requests by IDFG StreamNet in FFY 1999.

	Federal	State	Private	Other
Data Requests	129	33	27	13
Map Requests	0	20	0	0

Objective 3 – Library/Reference Services

Task 3.1 Collection Development

Continue to develop a collection of materials applicable to the mission of StreamNet. These include, but are not limited to, the following:

- a). Documents used as source materials for data compiled in Objective 1.

Task 3.1 Accomplishments

IDFG StreamNet delivered 13 source materials to the regional StreamNet library. Each document was assigned an StreamNet reference identification number. The materials represent the sources for the data submissions described in Objective 1.

Objective 4 – Services to Fish and Wildlife Program Activities

Task 4.4 Stock Assessment Projects

StreamNet will provide technical assistance to the Upper Columbia Basin and Upper Snake River Basin resident fish stock assessment projects. Assistance will focus on a) identification of potential regionally consistent data exchange standards, b) technical assistance with hardware and software development, and c) Internet access to project data and other information. Specifics will be defined in consultation with stock assessment project managers.

Task 4.4 Accomplishments

IDFG StreamNet met with the Upper Snake River Basin Resident Fish Stock Assessment project to discuss coordination and the potential use of common data standards. Substantive progress is awaiting the development of the Fisheries Information System so that its applicability to the stock assessment's information management needs can be demonstrated.

Objective 5 – Project Management/Coordination

Task 5.1 Manage Project Activities

Administer all aspects of the project at the regional and sub-contractor levels, including oversight of budget, personnel, work statement preparation and implementation, coordination among participating agencies, and project reporting.

Task 5.1 Accomplishments

IDFG StreamNet developed a FFY2000 budget and tentative work plan. Regular performance evaluations of IDFG StreamNet staff were conducted. Progress toward IDFG StreamNet objectives were monitored and progress reports prepared and submitted to PSMFC.

Task 5.4 Coordinate with Related Activities

Maintain communications between StreamNet and other applicable regional and state-level fish and wildlife activities in order to identify means for collaborative data collection, storage, and dissemination. Collaborative data activities will specifically target tribal fishery programs within the Columbia Basin, federal land manager's fishery programs, state fish and wildlife agencies, and with respect to water use and streams development, state water resource management agencies. Collaboration with coast-wide and private data collection/compilation efforts will be pursued when this supports overall project goals. Areas of particular emphasis are 1) participation in Fish and Wildlife Program monitoring and evaluation activities, and 2) exploring opportunities for integration of StreamNet data exchange formats into Fish and Wildlife Program contract terms and conditions.

Participate in appropriate state, regional and national educational and professional conferences, including, where applicable, giving presentations, preparing poster session materials, and contributing to conference proceedings.

Task 5.4 Accomplishments

StreamNet can be most effective when it is an integral component of each state's fish and wildlife management agency. IDFG StreamNet has stepped up its collaboration with the Fisheries Bureau in IDFG. With the development of the Fisheries Information System

and the application of the StreamNet GIS to in-state needs, it is hoped IDFG StreamNet will become an integral part of IDFG.

The GIS staff of IDFG StreamNet attended the 1999 Northwest ArcInfo User's Conference. Ideas were exchanged and much was learned from other GIS professionals from around the northwest. There was a notable increase in federal participants this year, particular from the Forest Service. Much of the Forest Service work displayed development of their own hydrography layers and their use to manage and display fisheries information.

Objective 6 – EPA Environmental Data Development

Task 6.1 Salmonid Distribution

Continue the collection, linkage and improvement of salmonid species distribution and population data. This will include identification of legal status (state and federal) and where available, population delineation data.

Task 6.1 Accomplishments

This task is related to tasks 1.1 and 1.2, however, it expressly provided for work outside the Columbia Basin. Distribution data for Yellowstone, Bonneville, and Bear Lake Cutthroat Trout in southeastern Idaho were updated.

Task 6.3 Stream Temperature Summary Data

Gather stream temperature summary data from agencies and groups collecting these data and link to PNW hydrography. List of summary statistics to be developed in consultation with all parties with a stake in the likely analytical products, particularly the states and EPA.

Task 6.3 Accomplishments

Water temperature data that are not normally sent to the Idaho Division of Environmental Quality were obtained from IDFG research biologists. The data were summarized and a sample submitted to PSMFC.

Task 6.5 Water Quality Data

Write data exchange format for spatial 303(d) data to standardize methods and forms used by various states in the region. Conversion of existing data to new format, referencing to regional 100k hydrography. Use of event data model to allow for integration of data into participant StreamNet organization's spatial and tabular data systems.

Task 6.5 Accomplishments

IDFG StreamNet obtained the Water Quality Limited (303 (d)) GIS data from the Idaho Division of Environmental Quality. The data are available on the IDFG StreamNet GIS server.

Objective 8 – NMFS Habitat Restoration Projects

Task 8.1 Standardized Format

The first task is to specify, in a standardized format, the types of information on habitat restoration projects to be included in StreamNet. PSMFC will work cooperatively with NMFS to specify this information. Required data elements include project title, sponsoring agency or agencies, name/address/phone number of project manager, salmon and steelhead stocks expected to benefit from the restoration, location/size/physical characteristics of the treated area, predominant land use and land ownership patterns in the treated area, beginning and completion dates of the restoration, types and magnitude of restoration activities undertaken, and restoration costs by year. The data system will also include an inflation factor and several alternative discount factors to allow annual project costs to be corrected for inflation and discounted over time. The data system will be structured to allow the habitat restoration information to be linked to data on salmon and steelhead abundance, hatchery releases and returns, and marine and freshwater harvests that are already available in StreamNet. The specification and format being used in StreamNet for BPA habitat restoration projects will provide a starting point for how the projects will be characterized in the data system, with final specification to be decided in consultation with NMFS.

Task 8.1 Accomplishments

Working with other StreamNet participants, a regional data exchange standard was developed for habitat restoration projects (available at http://www.streamnet.org/data_exch_form.html).

Task 8.2 Data Development

The second task is for PSMFC to gather and incorporate into StreamNet, to the extent feasible, information on all habitat restoration projects initiated since 1980 for the benefit of salmon or steelhead stocks in California, Oregon, Washington and Idaho. These data will be incorporated into StreamNet according to the standardized format specified in Task 1. NMFS will assist PSMFC in identifying key contact persons and in accessing sources of habitat restoration data. These data sources include existing reports documenting habitat restoration projects associated with NOAA's Northwest Emergency Assistance Program, Natural Resource Conservation Service, U.S. Forest Service, Army Corp of Engineers, Environmental Protection Agency, and other projects.

Task 8.2 Accomplishments

Concurrently with the data exchange standard, IDFG StreamNet helped develop a database and user-interface for non-BPA funded restoration projects. Approximately 50 non-BPA funded restoration projects reside in the database obtained from IDFG annual reports. These data were submitted to PSMFC.

Glossary of Acronyms

100k	1:100,000 scale
303 (d)	Section of the Clean Water Act referring to water quality limited waters
AML	Arc Macro Language: a programming language in ArcInfo
ArcInfo	A GIS software program
BPA	Bonneville Power Administration
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FFY	Federal fiscal year: October 1 – September 30.
FIS	Fish Information System being developed by IDFG
GIS	Geographic Information System
ICBEMP	Interior Columbia Basin Ecosystem Management Program
IDFG	Idaho Department of Fish and Game
LLID	Latitude-longitude Identification code for streams
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
PNW	Pacific Northwest: includes Idaho, Oregon, Montana and Washington
PSMFC	Pacific States Marine Fisheries Commission

Montana Department of Fish, Wildlife and Parks

Objective 1: Data Development

- The update to the Fisheries Resource Classification System is completed. Maps of the classification by hydrologic unit and reports of the data and the results of the assessment will be distributed in FY2000. This was an update to the original Montana Rivers Study. Will provide a summary of classification statistics during FY2000. Considerable data were updated and added during this 2-year process.
- Updated the MRIS Fish Distribution table with information on all streams that appeared “fishless”; i.e. part of the MRIS stream database but no record of fish species present. Provided list of these streams to FWP biologists and requested a determination of whether they were surveyed and no fish found; surveyed and fish found or not surveyed. Of the 2000 river reaches identified, 75% have not been surveyed.
- Updated the FWP Dewatered Stream List, Protected Areas, population trend data, and angling pressure.
- Completed update of the spatial and tabular components of the genetic sampling databases; restructured the data into two tables with species in one and sampling information in the other to make a “one-to-many” relationship. Coordinated with the University of Montana Wild Salmon and Trout Genetics Lab on data reporting.
- Inherited/received a Lakes BOR Contract providing a .5 FTE for the remainder of FY99 and FY00. Jenni Corbin will transfer most of her time to this effort which will include redesigning the data structure, creating an edit/entry program in Access, and collecting data through personal interviews with state and federal biologists and review of existing documents. LLID’s will also be assigned to the centroid of each lake if time allows.
- Sent out maps, tabular lists, and instructions to state and federal fisheries biologists for the annual updating and editing of MRIS bull trout data; made follow-up phone calls and received all edited products back ; will input in FY00.
- Collected information from state, federal, and private hatcheries for the StreamNet hatcheries database and sent to StreamNet in data exchange format. Created a GIS coverage of Montana private and public hatchery data. Received outplant data from FWP Hatcheries and sent to StreamNet regional data manager in data exchange format.
- Modified FWP Restoration edit/entry program in Access and began entering records into the database. Completed the input of MFWP’s stream restoration projects, reviewed StreamNet data exchange format and attended a meeting in Gladstone to further review structure. Next year will simplify/modify the data exchange format to obtain restoration projects conducted for all Montana’s fish species of special concern. Created draft map of FWP Restoration Projects and will send out to regional FWP staff for review.

Objective 2: Data Management and Delivery

- The Fisheries Division moved forward on a Native Species Management Plan and asked for StreamNet staff to support needed GIS products and StreamNet fish distribution data. Had initial meetings at the Fisheries Division meeting in December; and StreamNet staff has taken the lead on the *Identification of Native Species Management Areas*; using fish distribution data from MRIS. Created draft process using committee of MFWP fisheries biologists, refined process following GIS products that were produced and will be provide second draft of areas at the Fisheries Division meeting in January 2000.
- Redesigned the MRIS data structures to “streamize” the data prior to assigning LLIDS; used the State’s watercode number and converted reach data into “from and to measures”. NRIS continued scoping MRIS to web task. Evaluated MRIS 100k river reach number to StreamNet 100k reach number matches in Western Montana and found significant discrepancies. Wrote and ran algorithm that converts MRIS database data tables from reach based to stream based tables. Designed prototype web layout for MRIS application. Began programming of application. Continued work on MRIS database and prototype web system. Nearly complete with the Phase I web product (all text based). The system will be made available to the public in the first quarter of FY2000. Made final changes to MRIS database (population estimate data, fish presence data, and fishery classification and web application (interface, help file, etc.). Developed and coded ad-hoc mapping program for web interface. Tested web application extensively. Details of mediated requests will be provided next quarter.
- MRIS requests for FY99:
 - 23 served by NRIS during 1st quarter.
 - 35 served by NRIS during 2nd quarter.
 - 37 served by NRIS during 3rd quarter.
 - 35 served by NRIS during 4th quarter. Total: 130 requests
- The new Montana Rivers Information System (MRIS) website is now online!! Take a look at: <http://web1.nris.state.mt.us/scripts/esrimap.dll?name=MRIS2&Cmd=INST> The website contains information concerning fish distribution and supporting data such as genetics, population surveys, angler pressure, and stream level data on Protected Areas, management, physical characteristics; tables to be added will included restoration projects, trend data, water leasing and instream flow reservations. All web development was funded by the MDFWP Fisheries Division.
- **Received and responded to:**
 - 17 Fisheries related GIS requests 1st^h quarter.
 - 26 Fisheries related GIS requests 2nd quarter.
 - 13 Fisheries related GIS requests 3rd quarter.
 - 17 Fisheries related GIS requests 4th quarter. Total: 73 requests

- Completed all maps and reports for the MFWP Fisheries Resource Classification System. Ratings are part of the website and atlas maps and reports will be distributed to Helena and regional staff in FY2000.
- Completed necessary clean-up work of coverage to prepare for LLID assignment. Sent Montana's cleaned hydrography, which is now compatible with regional coverage, to Duane Anderson which will be included in NHD. Continued processing of 4th Code Hydrologic Unit stream coverages for assignment of the new Longitude-Latitude (LLID) numbering system. Our processing of these coverages involves editing stream names and their courses so that the coverages are synchronized with the Forest Service's 1:24,000 stream coverages. Received and reviewed several test plots of the NHD data via the USGS website.
- Automated process for generating westslope cutthroat genetic distribution maps by hydrounit. All maps contain a table by sample with date, genetic purity by species, number of fish in sample, and collector. Sent to all FWP/federal biologists along with information from the Wild Trout and Salmon Genetics Lab in Missoula.

Objective 3: Library/Reference Services

- Completed entering Fisheries Division Library documents into a library cataloging system. 3200 records were entered into the system. Final clean up included spot checked catalog including quality checking of entries, checking assigned StreamNet ID, locating missing streams and waterbodies,; providing Y2K compliance. Provided library reference documents electronically including the watercode and StreamNetID fields to StreamNet Fisheries Staff for use in the web version of the Montana Rivers Information System; created CDs of the system for back up and distribution use; and sent the entire program and records to Lenora on CD in the Marc Format.

Objective 4: Fish and Wildlife Program Activities

- Converted brook trout private ponds from TRS data in FWP Private Pond Database to a GIS coverage. Provided to FWP fish managers Bull Trout Distribution/Core Area Base Map and mylar overlays of brook trout distribution, private ponds stocked with brook trout, and a blank mylar to create management areas for the Private Pond Brook Trout Stocking Policy within Bull Trout habitat.
- Received all Bull Trout edit maps back from biologists. Will input into system in FY2000 when new MRIS edit/entry program by LLID is completed.
- Updated Bull Trout Nodal Areas due to several errors in original coverage.

Objective 5: Project Management and Coordination

- Attended Steering Committee Meeting in October in Boise, Portland and Gladstone. Attended data exchange meeting on resident fish in Portland.
- Attended StreamNet meeting in Olympia, Washington to coordinate GIS projects among the four Northwest states: Washington, Oregon, Idaho, and Montana. Updated the other states'

representatives on our current activities and saw a StreamNet produced application using MapObjects.

- Hired Kim Lindstrom to fill a part-time GIS Programmer Analyst position in the Kalispell office and Steve Carson to fill a full-time Fisheries Programmer Analyst in the Helena office.
- Reviewed several documents and responded to several Fish and Wildlife Program issues.

Oregon Department of Fish and Wildlife

Major Accomplishments for FY-99:

1. Delivered 15 significant data products during FY-99 (see "[FY-99 Data Deliveries](#)" below).
2. Continued progress on the *Status Report, Columbia River Fish Runs and Fisheries, 1938-1998* (Task 1.1a, b, d, e, f, and 2.6).
3. Continued verifying location and physical information for barriers in our Barriers database with Oregon field biologists. To date, there are 2,142 (up from 890 in FY-98) barrier records that need to be verified by field staff. These barriers will be submitted to StreamNet as they are verified by ODFW biologists. (Task 1.1a, 1.2a, 1.4a, and 6.1a).
4. Developed a field data form and MS Access database to capture fish observation data derived incidentally during normal field activities. This data will be used to document our fish distribution data set - the Presence table in the StreamNet data exchange format. (Task 1.1a, 1.2a, 5.1, and 6.1a)
5. Completed the final round of distribution data updates for anadromous and some resident species in the Tillamook, Necanicum, Nestucca, Willamette, Rogue, Umpqua, Lower Deschutes, Lower John Day, Hood River and Trout Creek basins. (Task 1.1a, 1.2a, and 6.1a)
6. Enhanced the Oregon barrier photographic database (the MapCat table in the StreamNet data exchange format) by scanning ODFW slides taken during Aquatic Inventory surveys. There are now 146 barrier photographs available to be displayed on-line (up from 2 in FY-98). (Task 1.1a, 1.2a, and 6.1a).
7. Acquired and compiled daily hydrological data for Bonneville Dam including temperature, turbidity, flow, and spill. (Tasks 1.1b).
8. Reviewed and/or updated 99% of Oregon's on-line Dam/Weir Count trends for anadromous fish. No new Dam/Weir Count trends were added to the abundance database. (Task 1.1b)
9. Reviewed and/or updated 95% of Oregon's on-line Redd Count trends for anadromous fish. No new Redd Count trends were added to the abundance database. (Task 1.1b)
10. Reviewed and/or updated 96% of Oregon's on-line Estimates of Spawning trends for anadromous fish. No new Estimates of Spawning trends were added to the abundance database. (Task 1.1b)
11. Reviewed and/or updated 96% of Oregon's on-line Peak Count trends for anadromous fish. In addition, 940 trends were added to the abundance database. (Task 1.1b)
12. Formatted and posted in-season fishery management information (hydrological data, and harvest estimates) on CRM/ODFW web page for Willamette spring chinook fishery and falls conditions, 21 Columbia River Compact hearings, and 1 Joint State Hearing. (Tasks 1.1b, 1.1d and 2.7).
13. Acquired, compiled, and maintained in-season updates of harvest estimates by species in Columbia River commercial fisheries (Task 1.1d).
14. Compiled age data for Deschutes River fall chinook salmon (1998), northeast Oregon spring chinook index populations (1996-98), and John Day spring chinook index populations (1995-98). (Task 1.1g).
15. Updated 14% of Oregon's hatchery return trends to match the new data exchange format. (Tasks 1.1f and 7.2)

16. Reviewed for accuracy and/or updated 100% of Oregon's on-line abundance trends where data is currently collected for resident fish. No new resident abundance trends were added to this database. (Task 1.2b)
17. Modified Oregon's Hatchery Facilities data to comply with the StreamNet data exchange format. (Task 1.4b).
18. Created the final database structure for StreamNet Habitat Restoration Project Data. (Task 1.5 and 8.2)
19. Worked with USACE personnel and Fish and Wildlife managers of other agencies to streamline acquisition of hydrological data used in anadromous stock status monitoring and run size forecasting. Also, attended numerous USACE Fish Passage Operations meetings (Task 2.2).
20. Submitted comments on numerous components of the data exchange format throughout FY-99. (Task 2.3).
21. Developed metadata for Oregon's anadromous fish distribution data sets. (Task 2.6).
22. Completed updating & rectifying discrepancies in the stream route coding system in the Oregon portion of the PNW 100K Hydrography. (Task 2.6).
23. A total of 33 data, 286 document, 8 map/GIS related, and 12 other requests were answered during FY-99. A detailed list by requester and request type can be made available upon request. (Task 2.7).
24. Assisted Fish and Wildlife managers and CBFWA staff with organizing FY2000 BPA proposals and FY2000 draft Annual Implementation Work Plan subbasin summary templates into computerized working directories by Oregon subbasin (Task 4.5d).
25. Recruited for and hired Oregon's StreamNet Database Manager and Oregon's GIS Analyst. (Task 5.1).
26. One or more staff members participated in 62 essential project coordination meetings. (Task 5.1).
27. Added 3,564 Stratified Random Sampling (SRS) survey to the StreamNet abundance trend table. (Task 7.1)

FY-99 Data Deliveries (sorted by delivery month):

- 1) Submitted updated adult abundance estimates and indices for anadromous and resident species with available 1997 and 1998 data. (Task 1.1a and 1.2a) -- 3/99 and 9/99.
- 2) Provided a midyear - FY-99 StreamNet GIS Data set Status Report, which included data specific 6-month plans and target deliverables for the fiscal year. (Task 5.1) -- 4/99.
- 3) Submitted the final database structure for StreamNet Habitat Restoration Project Data to StreamNet for use by all StreamNet participants. (Task 1.5 and 8.2) -- 6/99
- 4) Provided draft barriers event data. (Task 1.1a) -- 6/99
- 5) Provided Rogue basin distribution data and 282 verifiable distribution data documentation records for anadromous and resident species in the Rogue basin for the DistPresence table. (Task 6.1a) -- 4/99
- 6) Submitted 10 sample juvenile abundance records for Oregon. (Task 1.1c) -- 7/99
- 7) Submitted and updated LLID lookup table and Agency table for Oregon. (Task 2.1) -- 7/99

- 8) Submitted Oregon's Habitat Restoration Projects database containing 2,740 records (Tasks 1.5 and 8.2). -- 8/99
- 9) Submitted thirty-three barrier records for the Barrier table (Task 1.1a, 1.2a, 1.4a, and 6.1a). -- 9/99
- 10) Provided Willamette basin distribution data and 724 verifiable distribution data documentation records for anadromous and resident species for the DistPresence table. Included in this data was some lamprey and Rainbow trout distribution data in the South Santiam River. (Task 1.1a and 1.2a) - - 9/99
- 11) Provided Lower John Day, Lower Deschutes, Trout Creek and Hood River distribution data (Task 1.1a and 1.2 a) -- 9/99
- 12) Provided Redband Trout distribution data for 9 hydrologic units in south central Oregon. (Task 6.1a) -- 9/99
- 13) Provided Tillamook, Necanicum, Nestucca, and Umpqua basin distribution data for anadromous and some resident species. (Task 6.1) -- 9/99
- 14) Submitted 1997 coastal coho Stratified Randomly Sampled spawning survey information -- (Task 7.1a) -- 9/99
- 15) Numerous reference materials were provided to the StreamNet Library. (Tasks 3.1) -- each quarter

StreamNet GIS Data Downloads off the ODFW FTP Server (Oct 98-Sept 99):

GIS Coverages	Number of Files Downloaded	Number of Different Users Downloading Files
Fall Chinook	821	68
Spring Chinook	808	58
Chum	177	32
Coho	815	94
Winter Steelhead	757	73
Summer Steelhead	616	61
Bull Trout	158	59
Cutthroat*	45	25
Oregon Rivers Information System**	541	97
Routed Streams/River Routes	1,186	69
Postscript maps	80	6
Vegetation	65	37
Digital Raster Graphics	25	6
PDF Boundaries***	713	287
PDF – CSRI maps***	204	48
Metadata**	446	118
Coastal Salmon Plan Core Areas	154	30
Misc. other coverages	102	39

- * Data only reported for the 3rd and 4th quarters
- ** Removed from the ODFW website after the 2nd quarter
- *** Data only reported for the 4th quarter.

Pacific States Marine Fisheries Commission

Major Accomplishments in FY1999:

Objective 1: Data Development

- See participating organization sections. Regional efforts are described in Objective 2: Data Management and Delivery.

Objective 2: Data Management and Delivery

Several steps are involved in developing tabular data that can be incorporated into a single regional database which can be queried. These steps are sometimes iterative. First, comparisons of available data sets must be made to determine the types of similar data available for inclusion in the central database. Second, acceptable standards and data formats that can be used by all data providers must be developed. In the case of StreamNet, these standards and formats are documented in a publication called the StreamNet "Data Exchange Format" (DEF), into which new standards are added. Third, data must be compiled and subsequently submitted to the central database. Fourth, the central database must be prepared to accept the data by creating tables and relationships, documenting the new structures, and creating error checking and data manipulation routines. And fifth, the data must be incorporated into the database. Below are the tasks performed by PSMFC regional StreamNet personnel during fiscal year 1999 which relate to steps 1 – 5. Many of these tasks were performed in concert with the other partner agencies.

Steps 1 & 2: Creation of new data types

- Developed a Microsoft Access application for tracking Edits to the DEF.
- Prepared a draft version of a temperature data exchange format. Created an Access database for stream water temperature capture and processing. Spoke with Idaho DEQ, IDFG, Washington DOE, US EPA, Washington DNR, Oregon Department of Forestry, and Mr. Stuart McKenzie about data sources and metadata requirements. Received and evaluated the US EPA's STORET water temperature database.
- Worked with agencies to update various coding methods to more usable formats.
- Revised a draft version of a project tracking data exchange format. A final version was created.
- Provided interagency coordination, and help to the agencies, for developing a habitat restoration projects exchange format and database. Compared existing BPA database to StreamNet's exchange format to estimate amount of work required to move existing BPA information into StreamNet.
- A major new version of the data exchange format, version 99.1, was completed to accommodate new data categories. A comparison between this version and its predecessor was completed to document changes. Several errors that were found in version 99.1 were documented in an errata file. All information was made available at the StreamNet web site. This effort included major changes in the exchange format document to ensure that the document's tables, the document's figures, and the actual database files on the SQL servers of

the StreamNet database were all consistent. This effort should greatly improve efficiency of moving data submittals into the StreamNet database in a timely manner. Significant progress was completed toward the next version of the exchange format.

- Compared the structure of all tables in the exchange format to those actually in the MS-SQL server database and in the existing StreamNet data dictionary. We made corrections where necessary to ensure that all database information is consistent. Draft and obsolete tables were identified, archived, and deleted.
- Explored options for improving our species coding strategy. Two new ideas are to adopt either the Integrated Taxonomic Information System's standard coding, or the "element coding" taxonomic coding used by IDFG. Neither was adopted during the fiscal year.
- Initiated efforts to update the StreamNet hatchery facility database. Updated the exchange format for this data type. Server table structures were updated to reflect available data. Created an Access database in the form of the new 99.1 exchange format. This Access database was distributed to the other StreamNet partner agencies, who began updating hatchery data.
- With other PSMFC projects, explored water quality data types that are not currently planned for inclusion in StreamNet, but which could become integrated into the database in the future.
- Assembled state resident fish hatchery release and stocking records. Analyzed these for accuracy and consistency between agencies. Created a draft data exchange format for this data type.
- Drafted resident fish species exchange formats. Data types addressed distribution (final version), habitat use (final version), barriers and passage facilities (final version), and hatchery releases (draft version).

Step 3: Data compilation

Tabular data

- PSMFC provided technical support and coordination to data compilers.
- Created documentation for the StreamNet "trends" data entry form.
- Developed Trend cross reference tables for conversion of the 1:250K River Reach system to LLID and 100K system.
- Continued development of a Trend data user interface, and documented procedures for its use.
- Developed an Access 97 coded wire tag interface and database for joint data development efforts with RMIS.
- Developed Microsoft Access application and routines to better automate conversion of CWT data to StreamNet format.
- Developed a Microsoft Access habitat restoration project data entry interface. Wrote documentation for its use. Assisted ODFW, IDFG, and WDFW in converting habitat restoration projects data into StreamNet format.
- Completed a geographic-based data entry system (COM application) for referencing routes and measures, called the "Event Mapper." The Event Mapper simplifies and speeds up the process of assigning LLID spatial locators to features and data. Tested the application with

the team updating the ODFW fish distribution data. Created enhancements to the EventMapper.

- Created enhancements to the Trend data user interface, as suggested by data compilers.

GIS data

- Prepared a Columbia Basin-wide ecoprovince and subbasin delineation proposal for use by the Fish and Wildlife Program's Framework and M&E initiatives.
- Prepared a 6th field hydrologic coverage including routing.
- Wrote programs and edited Montana hydrography files to prepare for routing and assignment of LLID's. Routed arcs for Montana streams.
- Secured habitat data from the Interior Columbia Basin Environmental Management Plan (ICBEMP). Created a link between ICBEMP habitat data and 6th field HUCs.
- Created event table of White Sturgeon distribution based on state agency data.
- Wrote programs and coordinated with state agencies for conversion of 303d and 305d water quality data into LLID route / event format.
- Maintained contact with the national NHD team. Participated in NHDinARC test project of GIS output from NHD.
- Maintained contact with regional river reach system users including the USFS, BLM, and states, in order to ensure compatibility of efforts. Conducted technical meetings to develop a database design for implementing the 100K/LLID geo-referencing system.
- Used the new 100K PNW Reach System to assess the geographic extent of supercoded trends (those with complex geographic areas). Used Arc/Info to determine all stream LLIDs and measurements where these trends are located. Organized the data with MS-Access.

Steps 4 & 5: Database management

- Obtained anadromous fish hatchery release data from the Regional Mark Information System (CWT) database, and updated the StreamNet hatchery release data with this new data set.
- Obtained new hatchery facility data from U.S. Fish and Wildlife Service and Montana Fish, Wildlife, and Parks.
- Developed a habitat restoration projects database structure and an MS-Access database version of a habitat restoration projects database. Assisted states with data entry and porting to the StreamNet structure.
- Conducted an inventory of tables in the StreamNet database. Tables which were not in use (draft and test tables) were archived and deleted. Documentation in the form of a data dictionary was created for all tables in use, in terms of the purpose of each table, the purpose of each field in each table, and the relationships between tables. Developed automated procedures and an interface for the StreamNet data dictionary (outputs to printed and online report formats). Documented procedures for use of the data dictionary and report writer applications.
- Updated Annual Implementation Work Plan (AIWP) data from CBFWA and the NWPPC for FY99.
- Incorporated updates to resident fish trends received from IDFG.
- Incorporated updates to anadromous fish trends received from IDFG, ODFW, and WDFW.

- Incorporated major data updates from WDFW into the StreamNet database.
- Incorporated new Oregon hatchery release data into the StreamNet database.
- Incorporated new anadromous distribution coverages including use types for Idaho, Washington, and Oregon into the StreamNet database.
- Developed automated routines and interface for conversion of CRITFC Textbase library database to StreamNet format.
- Documented technical procedures for appending time series data to the StreamNet Trend database.
- Developed an Edit database to track structural and lookup code edits, archived data, data edits, and metadata for data dumps.
- Converted two-digit year values to four-digit values in all tables, in anticipation of the year 2000.
- Performed tests on Microsoft Access to determine the size of files it can efficiently work with. These tests related to collecting and processing water temperature data. (Result: 250-300 MB is the practical limit for an Access database in this instance, though 1 GB is listed as the maximum size.)
- Error checked and revised the 100K river reach system for Idaho, Oregon, and Washington. Coordinated enhancement activities within the states.
- Maintained and revised the StreamNet 100K hydrography web site feature.
- Investigated and addressed potential errors in the tabular database as they were encountered.
- Implemented improvements in the organization of electronic files, and archival of older web pages, database files, and documents.
- Developed strategies for tracking data submissions (data and reference information submission forms, protocols, and a "metadata" entry application).

Hardware/Software Management

- Maintained the StreamNet Internet server hardware, software, and files, including:
- Daily back-up of files.
- Worked with SQL Server technical support staff to resolve database technical issues.
- Resolved computer systems issues (system failures and installing new software).
- Evaluated and tested SQL Server 7.0 software.

Data Delivery

- Prepared a proposal for developing an online version of the Fish and Wildlife Program Annual Implementation Work Plan. Created and implemented the web-based queryable database for the FY 2000 Fish and Wildlife Program Annual Implementation Work Plan.
- Attended and gave presentations at two Multi-species Framework workshops. Prepared a list of available habitat datasets for potential use by the Framework's ecological workgroup's analysis.
- Attended and made a presentation at the Resident Fish Caucus meeting.
- Attended and made a presentation at a CRITFC-sponsored watershed conference.
- Arranged and facilitated a meeting for the Artificial Production Review's Science Review Team regarding the availability and adequacy of existing hatchery production data.

- Introduced the updated version of the StreamNet online query system, including mapping and tabular reporting capabilities. Incorporated an online data holdings feature. The query system was tested and made available on the StreamNet web site.
- Prepared a list of available habitat datasets for potential use by the federal "4H" process.
- Wrote technical documentation for StreamNet's on-line data category report writer application.
- Web site management as needed (new web pages, layout and design changes, coordination with others).
- Revised the StreamNet data holdings document.
- Maintained and enhanced test versions of the data query and reference system.
- Enhanced the education portion of the StreamNet home page by adding links to environmental education, scientific, and fisheries management sites
- Maintained and revised the project management section to the home page, principally by posting new project documents as these were produced.
- Monitored use of the StreamNet web site.
- Developed automated routines and interface for StreamNet data dumps to Access 97 and ASCII format.
- Developed an automated online report system for StreamNet data category information.
- Redesigned the StreamNet online data site, including updating the online help system.
- Revised a list of StreamNet home page enhancement ideas and identified priorities for future home page improvements.
- Researched new strategies for accessing StreamNet data (Active Server Pages, Cold Fusion, COM, and DCOM).
- Updated the on-line report writer's data category information (database structure information and entity diagrams).
- Took first steps toward development of a StreamNet user survey. Also began development of "Help for First Time User's" pages to help new users learn how to use the StreamNet query system.
- Resolved technical issues associated with the query system (map, reference, and browser specific errors).
- Redesigned the on-line map section of the StreamNet web site.
- Created two new means to query on-line for Annual Implementation Work Plan subbasin projects and work plans: (1) created a subbasin map with internet bit mapping; (2) added a Java script function to select subbasins. Implemented these on the AIWP 2000 web site and managed related files.
- Monitored use of the StreamNet web site. User visits for the past 12 months were as shown in the table below. The summertime dip in unique visits and query sessions probably corresponds to biologists' field season and to students' school break; dips were also seen during summer months in 1996, 1997, and 1998.

Year / Month	Number of Unique Visits	Estimated Number of Query Sessions
FY 1998 (data before 1/98 not currently available)		
1998 January	4112	436
1998 February	5454	786
1998 March	8039	1004
1998 April	6800	940
1998 May	6987	868
1998 June	7216	864
1998 July	5830	606
1998 August	6182	542
1998 September	7202	682
FY 1999		
1998 October	8115	912
1998 November	8556	898
1998 December	7819	746
1999 January	10458	793
1999 February	12008	881
1999 March	12188	993
1999 April	11827	941
1999 May	10642	873
1999 June	9304	654
1999 July	11221	683
1999 August	11944	780
1999 September	13816	726

- Approximately 73 requests, which originated via email or telephone, were addressed from March 11 to September 30, 1999. Number of requests before this timeframe are not available. Responses generally occurred within 24 hours. Many of the requests are now met via the on-line system located at: www.streamnet.org
- Prepared a revised 100K river reach system web product, including new data, narratives, and graphics.
- Introduced the updated version of the StreamNet online query system, including mapping and tabular reporting capabilities. Incorporated an online data holdings feature.
- Maintained and enhanced test versions of the data query system.
- Maintained and revised the project management section to the home page, principally by posting new project documents as these were produced.
- Introduced the updated version of the StreamNet online query system, including mapping and tabular reporting capabilities. Tested its operations to examine usability, performance, and intuitiveness, and to look for bugs. Incorporated an online data holdings feature. Added the ability to query the database by "wild" vs. "hatchery" fish; this will be available at the next update of the StreamNet system. Began work on improving the web site layout and design.

Objective 3: Library/Reference Services

During FY99 the regional StreamNet office accomplished the following activities and products in regards to StreamNet library and reference services:

- Regional StreamNet staff assisted CRITFC in the hiring of a new StreamNet librarian and library technician by reviewing resumes and participating in interviews, and providing recommendations on whom to hire. Both positions were successfully filled with qualified individuals.
- Maintained and enhanced test versions of the reference system.
- Consulted with CRITFC librarian staff regarding journal acquisition priorities, staffing, and work priorities.
- Updated CRITFC Reference data in the central StreamNet database.
- Planned for, redesigned and implemented a new Library section of the StreamNet web site.
- Edited a new version of the StreamNet Library pamphlet produced by CRITFC.
- Updated protocols documentation for submitting references to StreamNet.

Objective 4: Fish and Wildlife Program Activities

- Prepared a chart identifying and comparing data needs for a variety of emerging regional analysis initiatives. Presented this information at a Framework/NMFS coordination meeting.
- Prepared a Columbia Basin-wide ecoprovince and subbasin delineation proposal for use by the Fish and Wildlife Program's Framework and M&E initiatives.
- Prepared a list of available habitat datasets for potential use by the Framework's ecological workgroup's analysis. Assisted in design and implementation of NWPPC Multi-Species Framework modeling efforts and database. Collected and assembled variety of GIS and tabular data layers in Access database.
- Attended and gave presentations at two Multi-species Framework workshops.
- Prepared a proposal for development of an online version of the Fish and Wildlife Program Annual Implementation Work Plan.
- Prepared a Columbia Basin-wide ecoprovince and subbasin delineation proposal for use by the Fish and Wildlife Program's Framework and M&E initiatives.
- Updated Annual Implementation Plan data from CBFWA and NPPC for FY99. Completed development of the Annual Implementation Work Plan database, and integrated its information into the StreamNet query system.
- Developed Annual Implementation Work Plan home page for fiscal year 2000, which is available at <http://www.streamnet.org/f&wprogram.html>.

Objective 5: Project Management and Coordination

- Planned for, facilitated/attended, and followed up on StreamNet Steering Committee Meetings held in Boise, Portland and Gladstone (dates, agendas, meeting minutes available upon request).

- Planned for, facilitated/attended, and followed up on several “technical” meetings involving data exchange on resident fish (Portland), coordination of GIS projects among the four Northwest states (Olympia) (dates, agendas, meeting minutes available upon request).
- Responded to significant personnel changes during FY1999 in the regional StreamNet office.
 1. Hired David Graves to fill the GIS/Data Technician position in the Gladstone office.
 2. Created a position description for StreamNet Program Manager position, and advertised the position after Drew Parkin left the position in July 1999. Recruited for a new StreamNet Program Manager, and interviewed five candidates (9/16/99). Bruce Schmidt accepted the position in Fall 1999. Stan Allen assumed temporary Program Manger responsibilities in the interim period.
 3. The Regional Data Manager position was advertised after Bruce Schmidt was hired as Program Manager. Doug Burch returned to California for personal reasons and continued assisting StreamNet in this position until a replacement could be found. Bill Kinney started in this position on January 3, 2000.
- Prepared the FY 2000 project proposal including background, proposed tasks, and proposed budget. Submitted FY2000 Workplan and Budgets to PSMFC Administration and BPA.
- Prepared sub-contracts for seven participating partner agencies (CRITFC, ODFW, IDFG, MDFWP, WDFW, SBT, USFWS).
- Prepared and revised an FY1999 project "quick" plan that summarized the more detailed work statement.
- Prepared a revised project implementation and data development plan for FY1999.
- Coordinated, communicated and worked with StreamNet Steering Committee and BPA COTR's (Alan Ruger & John Piccininni).
- Prepared, compiled and submitted 4 Quarterly Progress Reports (available upon request).
- Prepared and submitted FY1998 Annual Progress Report.

Shoshone-Bannock Tribes

Objective 2. Data Management and Delivery

Responded to several basic requests for data/information (i.e redd count data) by reporters from the Tribal and local newspapers.

Objective 5. Project Management

Attended and participated in Steering Committee meetings and activities, including a considerable amount of time addressing project management issues and the future of the project.

Attended quarterly Steering Committee meeting.

Reviewed project products including review of: the data exchange formats for invertebrates and resident fish hatcheries; web products.

Monitored applications/issues for StreamNet in the Fish and Wildlife Program as identified in the CBFWA project evaluation process.

Educated new Department employees about StreamNet and instructed them how to access the data on their own.

Prepared for the next round of ISRP project reviews (how it will relate to StreamNet?).

U.S. Fish and Wildlife Service

Objective 1. Data Development

Coded-wire tag release, recovery, and catch - sample information for calendar year 1998 were completed and submitted to the USFWS Western Washington Office, from which it will be sent to PSMFC.

A hatchery facility database of National Fish Hatcheries on the West Coast was completed and submitted to StreamNet. The corresponding water source database for those hatcheries has been nearly completed.

Hatchery return and age composition information was partially transformed to the StreamNet exchange standard.

Objective 5. Project Management

Attended and participated in Steering Committee meetings and activities.

Washington Department of Fish and Wildlife

WDFW StreamNet Staff, FY99

Project Leads:	Dick O'Connor, Bill Kinney
Tabular Systems Manager:	Larry Brown
Spatial Data and Systems Manager:	Martin Hudson
Tabular Data Manager:	Leslie Sikora
Tabular Data Compilers:	Bob Woodard, Sarah Nielsen, Tom Connor
Spatial Data Compiler:	Cindy Burns

Objective 1 - Data Development

WDFW StreamNet staff compiled and standardized salmonid hatchery returns, natural returns, and harvest data to provide annual updates to the Regional Data Center at PSMFC. New directions included work on hatchery facilities data, historical hatchery release and returns data, and fish presence data for resident stocks.

Partly in response to a request from the resident fish interests on the Artificial Production Committee, WDFW undertook a statewide review of spatial and tabular datasets that contain information about Washington fish cultural facilities. We found three spatial layers and 2 tabular datasets, each reflecting the specific focus of the original data compilers. We spent significant time integrating these layers by first developing a single verified spatial layer, then working to complete and update the attribute fields found in the multiple tabular datasets. The goal is a single tabular dataset linked to the spatial layer of points digitized over the 1:100,000 scale streams coverage, and we are currently 85% there.

We continued the work begun last year on reviewing and standardizing the historical resident fish stocking information we keyed in, in order to be able to integrate these 40 years of critical data with our "modern-era" dataset (1981-present). We were able to locate and digitize historical fish presence records for westslope cutthroat trout, to support an agency response to the USFWS ESA listing decision. Additionally, we have begun to bolster our adult datasets with the discovery and entry of historical adult returns data for some of our anadromous stocks. Often, the key to understanding the impacts of artificial fish culture on indigenous stocks is to review the complete historical record of what cultured fish have been stocked, in which waters, and when. Where we locate such data, we are setting a high priority on transferring it into electronic data files to facilitate access by those who need to conduct such reviews.

Objective 2 - Data Management and Delivery

One of the key data management challenges we faced this year was in starting the conversion of stream location codes from PNW River Reach codes to the LLID coding

system established by IRICC. LLID stream codes have been defined for all Washington, Oregon, and Idaho streams that appear at the 1:100,000 scale of resolution. WDFW uses at least three different coding systems for streams, depending on the nature of the data being collected and which of the former (WDF, WDW) agencies the data came from. In order to perform a migration to use of the LLID system, cross-reference tables needed to be built for both for our own (multiple) codes as well as for the StreamNet standard River Reach codes. Duane Anderson of Montana Fish, Wildlife, and Parks created an initial cross-reference table for River Reach--LLID conversions, based on codes in data that already existed in StreamNet. Our work involves reviewing Duane's assignments, dealing with the complex code assignments his table doesn't deal with, and creating conversions for data from streams that haven't been exchanged with StreamNet's Regional Data Center yet.

Our GIS staff spent significant time updating programs for digitizing points, converting arc data to points data, maintaining spatial layers, and building a user-friendly menu system for both data entry and data/map requests. WDFW replaced several Unix machines with a larger ArcInfo server in June, which forced a massive process of migration, recompilation, pathname updates, and testing of each individual component to assure each would work on the newer, faster machine. Staff also continued to work on improving both the spatial and the tabular sides of our lakes coverage, in order to have standard, verified locations for anadromous and resident fish stocking and presence data.

Data services are a major part of the job for WDFW staff, both StreamNet-funded and others. This past year, staff from the WDFW Fish, Wildlife, and Habitat Programs responded to hundreds of data requests that required StreamNet data, GIS layers or data delivery systems. Most requests came from engineering and consulting firms, county planning and parks agencies, tribes, state transportation and resource agencies (including WDFW), and federal resource agencies (including NMFS, USFS and USFWS).

Typical services provided included lists of PHS (Priority Habitats and Species) and Heritage species and their locations, hatchery release, harvest, and returns data, and maps showing hydrology, roads, public land survey, facilities, migration barriers and presence/use of watershed areas by certain fish species. These data and maps were used to support biological reviews for land development proposals, perform stock assessments related to potential ESA listings, meet SEPA/NEPA requirements, and prepare for general roadway or facilities improvement work near fish-bearing bodies of water.

WDFW StreamNet-funded staff responded directly to over 60 data requests, ranging from a request for a small table of data records to one involving over 250 custom-drawn maps to support statewide data compilation for Salmon Limiting Factors Analysis. The total number of maps generated just by StreamNet staff is over 300; major requests by user and type are summarized in the table below.

User category	Data Requests	Map Requests
WDFW	14	12
Other Washington government agencies	10	5
Other Washington entities	11	8
Federal or outside Washington state	5	2

Objective 4 - Services to Fish and Wildlife Program Activities

Previously separate initiatives by the Columbia Basin Artificial Production Review team and NMFS staff working on hatchery-related ESA issues have come together, as the groups have worked to develop Hatchery/Genetic Management Plans (HGMPs). Completion of HGMPs will soon be required for agencies to continue to operate fish culture facilities in areas where ESA-listed stocks reside. The data needs for HGMPs are complex and extensive, and feature significant overlap with the data needed to conduct reviews of large artificial production programs. WDFW staff have met with individuals from both groups and hosted a meeting in September to bring together data experts from various fish management agencies to discuss their data needs and their questions about the NMFS HGMP requirements. We feel our best contribution to this effort is to influence policy-makers to seek solutions that leverage data for multiple uses, rather than building separate, parallel data systems that double the workload for providers without doubling the value to users.

Objective 5 - Project Management

The unique challenges of managing the WDFW StreamNet Project this year centered around changes in both BPA COTR and StreamNet Project Manager. In addition to the standard quarterly reports on progress, the StreamNet Regional Spatial Data Manager initiated a semi-annual GIS work update, reflecting the growing complexity and need for standardization of our GIS work with that of the other StreamNet agencies.

We attempted to leverage StreamNet information in other forums this year as well, delivering a paper on developing spatial fish presence layers at the First International Symposium on GIS in Fisheries Management, supporting the Washington Conservation Commission's Limiting Factors and CREP projects with maps and spatial data expertise, and beginning work with the Northwest Indian Fisheries Commission to integrate the detailed spatial habitat and fish data they have developed as part of the SSHIAP project into our WDFW-StreamNet event table approach.

Next Steps

Next year will bring increased need for coordination with parallel activities, as the system/process for monitoring salmon restoration projects in Washington (PRISM) become more firmly established. WDFW StreamNet staff regularly participate in PRISM data and format planning meetings, so that the spatial references they use and the data their projects eventually generate will be compatible with StreamNet standards. This will

further allow us to share these data with other regional entities such as the federal Regional Ecosystem Office and the Washington state Hydro Framework Partners.

Tabular data activities will focus on hatchery returns, resident fish releases, and natural returns, along with updates to harvest and hatchery facilities tables. Barriers information (including dams and diversions) and integration of multiple lake attribute tables will also command high priority. Spatial data activities will include work on layers linked to lakes, dams and facilities data, as well as integration of data from local projects such as SSHIAP and SaSI.

User need for data and services will continue to increase. We look for growth in desktop tools such as the EventMapper to help users deal with the complexities of the hydro system (and its coding structure) in order to access the data they need for their work. We also anticipate contributing to a Basin-wide review of data products and services as part of the Fish and Wildlife Program amendment process. StreamNet staff have brought new data capabilities to Basin users, and have useful experience to offer this review.

StreamNet FY 99 Quick Plan (BPA Contract)



Note: The StreamNet Quick Plan is an abbreviated form of the Statement of Work. The quick plan lists all tasks but does not include explanations, deadlines, etc.

Objective 1 - Data Development. *Increase the knowledge base concerning the region's fish and wildlife resources through the acquisition of new information that responds to emerging needs as well as the updating and enhancement of production and survival trends and other existing information.*

Task 1.1 Anadromous Fish.

- a) Freshwater range, life history, barriers
- b) Adult abundance (escapement, redd counts, trap counts, dam counts)
- c) Juvenile data
- d) Harvest (in-river, terminal, other as available)
- e) Natural production (survival, production factors, spawner recruit)
- f) Hatchery production (releases, returns, disposition, straying)
- g) Age/sex composition for returning adults
- h) Genetics (data availability)
- i) Population delineation (as determined by others)
- j) Historic range (general, reach specific where available)

Task 1.2 Resident Fish.

- a) Freshwater range, life history, barriers (salmonids, sensitive natives, competitors)
- b) Adult abundance (escapement, redd counts, trap counts, dam counts)
- c) Angler use (fishing pressure, creel census)
- d) Hatchery production (releases, out-plants)
- e) Genetics (data availability)
- f) Population delineation (as determined by others)
- g) Historic range (general, reach specific where available)
- h) Status (stable, declining, etc.)

Task 1.3 Aquatic Habitat.

- a) Habitat data from ICBEMP
- b) Other appropriate data layers from the ICBEMP
- c) Water quality (303(d))
- d) Stream survey data linked to the StreamNet data system (for prototype watershed planning projects)
- e) Other appropriate information compiled by others

Task 1.4 Facilities.

- a) Dams and fish passage facilities
- b) Hatcheries (including resident fish)
- c) Diversion/screening (for prototype watershed planning projects)

Task 1.5 Environmental Improvement Projects.

- a) Fish and Wildlife Program projects
- b) MOA, state, and federal land manager projects (initiate)
- c) Other state, tribal, and private projects

Objective 2 - Data Management and Delivery. *Provide high quality data management services, with specific emphasis on the creation of regionally consistent data sets and the timely delivery of data to users in formats that meets their policy, planning, and management needs.*

Task 2.1 Database Management.

Task 2.2 Data Plan.

Task 2.2 Data Exchange Standards.

Task 2.3 GIS Data System.

Task 2.4 StreamNet Internet Site.

Task 2.5 1:100,000-scale Hydrography.

Task 2.6 Data Requests.

Objective 3 - Library / Reference Services. *Provide professional library services targeted to meeting the needs of the region's fish and wildlife decision-makers, planners, and managers. This includes continuing to acquire and catalog StreamNet data source materials and other critical documents and providing open and efficient access to these materials.*

Task 3.1 Collection Development.

Task 3.2 Access to Collection.

Task 3.3 Catalog and Index Materials.

Task 3.4 Library Services.

Task 3.5 Inter-library Coordination.

Objective 4 - Services to Fish and Wildlife Program Activities. *Provide substantive technical data services to Fish and Wildlife Program decision-makers and appropriate Fish and Wildlife Program projects.*

Task 4.1 Project Tracking.

- a) Current year AIWP data base (cooperator)
- b) Internet version of FY 1999 AIWP
- c) Internet version of FY 2000 AIWP

Task 4.2 Monitoring and Evaluation.

- a) Participate in and/or monitor FWP monitoring and evaluation work groups.
- b) StreamNet data plan consistency with M&E needs.
- c) Data reports and other products in support of M&E activities.

Task 4.3. Watershed Projects.

- a) Watershed orientation data
- b) Project tracking
- c) Technical support to projects
- d) Compile regionally-consistent watershed data
- e) Internet delivery of watershed data and information
- f) Long-term data storage and access
- g) Assistance to watershed M&E activities

Task 4.4 Stock Assessment Projects.

- a) Region-wide data exchange standards
- b) Technical assistance
- c) Internet access

Task 4.5 Service to Fish and Wildlife Program Projects and Activities

- a) Analysis Projects (custom data reports and GIS products, data archive and access)
- b) Research Projects (library services, custom data reports and GIS products, data archive and access)
- c) Special Projects (as identified in the final AIWP)
- d) Policy Reports and Plans (custom products for FWP reports and plans)

Task 4.6 Internet Access.

StreamNet will provide Internet access for information about, and data from, select FWP projects and activities.

Task 4.7 Protected Areas.

- a) Maintain the official version of the Council's Protected Areas dataset.
- b) Archive official version as a historic record.
- c) Respond to requests for information concerning Protected Areas.

Objective 5 - Project Management. *Provide effective leadership that ensures the production of high quality products targeted at critical applications and the development of these products in a timely, cost-effective manner.*

Task 5.1 Manage Project Activities.

- a) Work statement
- b) Personnel
- c) Finances
- d) Project reporting

Task 5.2 Participate in Fish and Wildlife Program Development Activities.

Task 5.3 Prepare Public Information Materials.

Task 5.4 Coordinate With Related Activities.