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STREAMNET

October 1, 1999 through September 30, 2000

Annual Report FY 2000

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FY 2000ANNUAL REPORT

StreamNet Project

BPA Project Number 198810804

Oct. 1, 1999 through Sept. 30, 2000

Introduction

The StreamNet Project is a cooperative project that provides basic fishery management data in a consistent format across the Columbia Basin region, with some data from outside the region. Specific categories of data are acquired from the multiple data generating agencies in the Columbia Basin, converted into a standardized data exchange format (DEF) and distributed to fish researchers, managers and decision makers directly or through an on-line data retrieval system (www.streamnet.org). The project is funded by the Bonneville Power Administration (BPA) as part of the Northwest Power Planning Council's (NWPPC) Fish and Wildlife Program.

This cooperative effort is composed of a region-wide project administered by the Pacific States Marine Fisheries Commission (PSMFC) that is responsible for project management, regional data management and data delivery (Region), plus seven contributing projects within the data generating entities: Columbia River Intertribal Fish Commission (CRITFC); Idaho Department of Fish and Game (IDFG); Montana Fish, Wildlife and Parks (MFWP); Oregon Department of Fish and Wildlife (ODFW); Shoshone-Bannock Tribes; U. S. Fish and Wildlife Service (FWS); and Washington Department of Fish and Wildlife (WDFW). The contributing projects are funded through the StreamNet contract but work within their respective agencies and are referred to here as the agency's StreamNet project (for example, 'IDFG StreamNet' for Idaho's project).

The StreamNet Project provides an important link in the chain of data flow in the Columbia Basin, with specific emphasis on data collected routinely over time by management agencies. Basic fish related data are collected in the field by the various state, tribal and federal agencies in the basin for purposes related to each agency's individual mission and responsibility. As a result, there often is a lack of standardization among agencies in field methodology or data management. To be able to utilize data for comparison or analysis over the entire basin from multiple agencies, it is necessary to standardize the data to the degree possible so that like-data are equivalent over jurisdictional lines. Since the data are not collected in a standardized way, StreamNet fulfills that role by acquiring the data sets and converting the data from all agencies into the standardized DEF. Where field methodologies differ to the degree that the data can not be made comparable, the data are presented as different data types. This way, data are converted only once and made available for research, management and administrative purposes instead of forcing each person needing basin wide data to attempt data standardization individually.

The StreamNet Project utilizes a combination of distributed and centralized data management approaches. Agency generated data are maintained in databases distributed among the contributing agencies, where they are managed and available for agency use. The contributing

projects also convert the data into the standardized DEF and convey them to the Regional StreamNet office, where they are entered and managed in a central database for delivery basin wide. Adjustments to these approaches will be made as technology advances or needs change.

A fundamental challenge facing any data management project is the need to fully understand the data. This is essential so that correct decisions can be made during data standardization, the integrity of the data can be maintained, and the nuances for potential uses of the data can be communicated. The process of understanding the data is a large time investment, but it has a long term payoff in terms of the ability to make good decisions on how to manage and use the data appropriately. The effort required to fully understand the data is increased when the data are not consistently documented by the collecting entity, historic data were not collected with the same standards as more recent data, or review determines that data did not meet established standards. Such understanding must be incorporated as the data are included in the database.

How data are managed often needs to change as greater understanding of the nature of the data is gained, as new data are obtained, as existing data must be presented differently, or as database and web technologies change. These changes may highlight a different aspect of the data and allow us to take an extra step toward quality assurance or may reveal more vital information that would have been unseen by the data user. This is an evolving process.

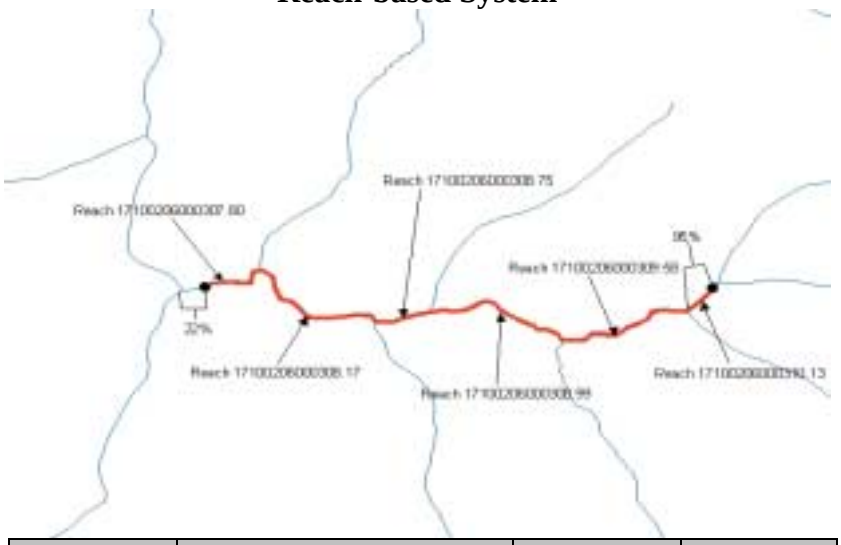
A major change was made in data management during fiscal year (FY) 2000. StreamNet adopted a new location coding system that is more accurate, more detailed, more flexible and that improves our ability to map information. This was a primary accomplishment for the year and required large amounts of work for all project participants. Because this effort affected virtually all other tasks during FY 2000, a brief synopsis of the system follows.

The previous system was based on an enhanced version of the 1:250,00 scale PNW River Reach System and location coding relied on many individual river reach codes. The new system is based on the 1:100,000 scale hydrography (stream network) layer and is referred to as the Longitude-Latitude Identifier (LLID) system. Longitude-Latitude codes, usually coupled with distance measurements along a water body, can be used to locate all or part of a stream; a lake, reservoir or bay; a marine area; a point on land; or an aggregation of locations. This system is simpler, with greater flexibility to code and spatially map every location type (Figure 1).

Within the LLID system there are individual Longitude-Latitude based code types for specific kinds of features. The variable named LLID is the original code type used in this system, referring specifically to locations tied to streams on the 1:100,000 hydrography. There are other types of codes (with separate variable names) for coding other features in this system, such as lakes or points on land. It is important to distinguish between an LLID code and the LLID system. LLID codes are comprised of a single unique code for each stream, usually locating the mouth of the stream. Distance measures from the mouth are used to locate any point or segment on the stream. The single code and distance measures replace the many individual reach codes needed to locate features in the old system (Figure 1).

Converting data in the StreamNet database to the new LLID stream codes and reprogramming the query system to use the new codes was the top priority for the StreamNet Project in FY 2000.

Reach-based System



TrendID	Reach	From(%)	To(%)
5732	17100206000307.80	22	100
5732	17100206000308.17	0	100
5732	17100206000308.75	0	100
5732	17100206000308.99	0	100
5732	17100206000309.58	0	100
5732	17100206000310.13	0	95

LLID-based system

TrendID	LLID	Beginning	To (feet)
5732	1234723442305	24985	38771

Figure 1. Comparison of location coding based on the River Reach system and the new Longitude-Latitude Identifier (LLID) system, demonstrating the coding needed to identify the same river segment under both systems.

Results

StreamNet Project staff encountered major challenges that impacted productivity on all work elements during FY 2000, but significant milestones were achieved. Highlights include:

- We completed hiring to fill out the regional project staff, which had recently experienced nearly complete turnover. During FY 2000 we returned essentially to a full staffing level after some prolonged vacancies.

- Budget proposals and work plans for FY 2001 were developed, but extra effort and time was required due to uncertainties in the amount of funding available

- The 1:100,000 scale hydrography (stream network) layer is the backbone of the new location coding system. We enhanced the layer for each state in preparation for the greater use that is expected as more data is georeferenced to the hydrography. Then, one multi-state hydrography layer was prepared using the separate state layers.

- We converted the majority of the StreamNet data to the new LLID location coding system.

- We revised the StreamNet on-line query system, DEF, regional database, and the internal data management systems of the contributing projects to support and function with the new LLID system.

Specific tasks for FY 2000 were organized under five objectives as described in the FY 2000 Work Statement: Data development, Data management and delivery, Library/ reference Services, Service to the Fish and Wildlife Program, and Program management / coordination. Accomplishments for FY 2000 are summarized below, by Objective and Task. For more detail on the specific deliverables and actions described in the Work Statement and accomplished during the year, refer to the four quarterly reports for FY 2000.

Objective 1. Data Development

Data Development refers to the original data capture from the agencies that collected them and subsequent data standardization and organization. This function is conducted largely by the contributing projects, with some specific data categories obtained by the Region. Specific activities include acquiring new data types or current data to update existing data sets, and converting these data into a standardized data exchange format (DEF) so that like-data are consistent and comparable across the basin and will fit seamlessly into the regional database. The data development process is complete for a given data category when the data are submitted or “exchanged” to the regional StreamNet database and incorporated in the regional data set.

All project participants converted StreamNet's historic data to the new LLID approach for the active data sets. Active data sets are those that have new data collected annually. Several data sets are fairly static because the data is updated infrequently or based on a one-time publication. These data sets (e. g., Protected Areas and Smolt Density Model data) were not converted this

year and will be addressed later. Data conversion was a primary priority for the year and received a significant amount of effort.

Specific activities related to the various data types in StreamNet's database are discussed below.

Task 1.1 Anadromous Species

Data for anadromous species have been the primary emphasis for the StreamNet Project since its inception, largely because primary funding for the project has come from the anadromous component of the Fish and Wildlife Program and because of the importance of anadromous fish resources from the standpoint of economic and recreational value and growing concern over population status and ESA listing. Anadromous species remained the primary emphasis in FY 2000. Specific efforts are detailed by sub-task, below.

Subtask 1.1.a. Distribution, Life History (use type), and Barriers (anadromous)

Fish distribution and habitat use types constitute a primary data type for the StreamNet Project, remaining the most frequently requested data type in the StreamNet on-line query system. Updates to these were incorporated as the states gathered more information. Quality assurance checks were performed on new and existing data to minimize the error rate. New GIS layers were prepared, along with metadata, for the newly updated distribution information. In addition, the project worked with Umatilla Tribe biologists to assist their creation of a distribution database for Pacific lamprey.

Interest in fish barrier information is growing in the region, and the state StreamNet projects made progress on their respective Barrier data. These data are under development and by the end of the fiscal year were primarily available for the Willamette Basin and North Coast areas of Oregon, with partial information compiled for other areas. Information related to how these areas impact adult fish migration was compiled and submitted by ODFW StreamNet. Barrier data should be delivered in future years to support subbasin planning and planning for restoration projects. During the year we learned that the term "partial barrier" is used in a variety of nonstandard ways. For now, we decided to present textual information on what is meant each time a barrier is listed as 'partial' instead of developing a complex set of definitions for multiple 'partial' types. After we gain experience with these data, we may be able to categorize the meanings and create a more standardized definition for 'partial' barriers.

Subtask 1.1.b Adult Abundance (anadromous)

Adult abundance data (including redd counts, spawner counts, dam/weir counts (counts of fish at a dam or fish weir), population estimates, hatchery returns, etc.) are used as primary means of following population trends. These data types are particularly important for use in determining the viability of populations listed under the Endangered Species Act (ESA). During FY 2000 considerable effort was expended to convert the historical data to the new 1:100,000 scale LLID georeferencing system. The time necessary to complete the conversion caused some delay in updating these data. Data updates for these data will be a primary priority in the next few fiscal years. Future efforts will also include development of a system to track and publicize progress.

Subtask 1.1.c Juvenile Data (anadromous)

Juvenile abundance data were not a priority during the year, particularly given the emphasis placed on data conversion to the LLID system. Some preliminary development work was done.

Subtask 1.1.d Harvest (anadromous)

Harvest data updates were delayed by the effort of converting historical data sets to the LLID system. Some progress was made in individual states.

Subtask 1.1.e Hatchery Production (anadromous)

Hatchery release data have in the past been obtained from the US Fish and Wildlife Service (for federal hatcheries) and from the Coded Wire Tag database. The Regional StreamNet Program at PSMFC georeferenced the data and entered them into the StreamNet database. However, the regional program no longer has a data entry person and the Steering Committee agreed that the data should be managed by the state and FWS projects, which are closer to the data sources. In FY 2000 the FWS continued to provide update information for the federal hatcheries. Regional staff at PSMFC worked with the partner agencies to determine which agencies would assume responsibility for specific hatchery release trends that had previously been entered by PSMFC. Because of these changes and the time expended on the LLID data conversions, updating of anadromous hatchery production data was delayed.

Subtask 1.1.f Natural Production (anadromous)

Estimation of natural production (the number of naturally spawned smolts produced by a particular watershed or stream/river) is a complex undertaking, and is conducted only in scattered locations. At present, there is no consistent reporting of this information by the management agencies. A data exchange format for these data has not yet been developed to allow organization of this information in a consistent format. This data category was included in the FY 2000 work statement with the intent of looking into the availability and locations of these kinds of data and determining how much of this information would be suitable for addition to the StreamNet database. Because of the amount of time required for the conversion of other data sets to the LLID system and the impacts that had on slowing updates to other data sets, little was done during this year in relation to natural production information.

Subtask 1.1.g Age (anadromous)

During FY 2000 progress was made toward updating the age and sex composition data. Age and sex composition data were submitted by FWS and several state projects, including spring chinook age data from Oregon. Other state cooperators progressed on developing such data within their state systems.

Subtask 1.1.h Genetics (anadromous)

The Steering Committee has considered the need for a database of genetics information for several years. During FY 2000 the possibility of adding a category for genetics data was discussed. It was decided that this data type is currently a low priority for the StreamNet project, compared to other data types, based on a low level of expressed interest from data users and agencies. MFWP has genetics data in their agency database and in the future we will use the Montana database as a starting place for design of any StreamNet genetics database if this data category is to be pursued.

Subtask 1.1.i Populations (anadromous)

Populations are defined or categorized in a variety of ways by different agencies and for different purposes. Our intent is to capture the various population descriptions and make them available in a consolidated format. Accomplishments in FY 2000 were delayed by the amount of time required to convert to the LLID system. Preliminary work was carried out by the state projects.

Subtask 1.1.j Historic Range (anadromous)

Work on this task was delayed by the LLID conversion. The MFWP StreamNet project determined that The Nature Conservancy has been developing a database of historic fish distribution, and the Steering Committee agreed that this data set would be a good initial starting point. We requested a copy of the database for the Columbia Basin states when it is available from TNC. ODFW StreamNet processed its existing historic distribution event data and drafted a one page summary report detailing the strengths and weaknesses of the data.

Task 1.2 Resident Species

Up through FY 2000 there has been less emphasis placed on development of resident fish data, since the project has traditionally been funded from anadromous fish funds. The importance of resident fish species is growing, however, due to the accelerating appearance of resident species on lists of Endangered, Threatened, Sensitive and Candidate Species. The MFWP StreamNet project has made the most progress on these species, since there are no anadromous fish in western Montana. All of the cooperating projects have made some progress toward resident species, but the pace has been slow, particularly this year when so much emphasis was placed on implementing the LLID system.

Subtask 1.2.a Distribution and Life History (Resident)

Interest in and need for distribution information for resident fish has been increasing as a result of ESA listings and candidate status. During FY 2000 the StreamNet project began work on developing a DEF for resident species distribution and use, using MFWP's resident fish data as the starting point.

The MFWP project made significant progress on its resident fish distribution database and initial drafting of a data exchange format for such data. The DEF was not completed or adopted during the year, however, and there are significant differences among the states regarding definitions of use types. No data have been submitted to the regional database yet. All states worked on aspects of resident fish distribution during the year, and distributions for some species, such as bull char, are now available independently from the state StreamNet projects, but no seamless regional coverage has been completed. Work on a resident fish distribution DEF will continue into the next fiscal year. ODFW StreamNet developed and exchanged John Day River basin redband and westslope cutthroat and statewide Lahontan cutthroat distribution data. The regional project completed a distribution coverage for white sturgeon.

Subtask 1.2.b Adult Abundance (Resident)

The MFWP project made progress in developing redd count and trap count data for resident species. These data are not yet available in the regional database, however.

Subtask 1.2.c Angler Use (Resident)

Angler use and harvest data for resident fish received only a small amount of work in FY 2000. None of the information is available in the StreamNet database yet.

Subtask 1.2.d Hatchery Production (Resident)

All of the state contributing projects made progress on organizing hatchery production data, but there is no DEF for these data yet, and none of the state efforts were completed this year.

Subtask 1.2.e Genetics (Resident)

Little work was accomplished on resident fish genetic data except for MFWP, where genetic spatial and tabular components were updated through September 2000 for westslope and Yellowstone cutthroat trout, redband trout and bull char. Westslope cutthroat trout genetic maps by drainage were sent out to state and federal biologists in April 2000 for their use during the field season.

Subtask 1.2.f Population (Resident)

The level of interest in resident fish populations is increasing. The MFWP project updated bull char core areas with the most recent data from MFWP. They produced a map depicting changes and sent it to past requestors. The new coverage was also sent to the StreamNet regional office. A westslope cutthroat trout priority area coverage was created in April 2000 and it was reviewed and finalized. It will be exchanged to the regional office next fiscal year. In Washington, bull char presence/use information was updated. After final review, that information will be synchronized with bull char stock status data.

Subtask 1.2.g Historic Range (Resident)

Work on this subtask in FY 2000 was accomplished primarily in Montana. MFWP submitted arctic grayling and westslope and Yellowstone cutthroat trout historic range coverages to StreamNet in May 2000. They received a historic coverage of Montana's native fish species from a project conducted by TNC. Following review of the coverage, they added existing resident fish distribution data to various HUCs and will further refine it using maps for each species in conjunction with Montana's fish historian.

Subtask 1.2.h Status (Resident)

A regional DEF has not yet been developed for population status data. Therefore, no work was done on this data type this year.

Task 1.3 Habitat

Interest in various kinds of aquatic habitat information is increasing due to growing emphasis on watershed level restoration efforts. However, data development is in its early stages for this type of data and there are no regional standards. There is also no regional agreement on the highest priority parameters for inclusion in a regional habitat database. StreamNet efforts in this area are exploratory in nature and are intended to locate sources of information, and where appropriate, tie them to LLID location identifiers and make them available for use with the fisheries data already contained in the StreamNet database.

Subtask 1.3.a Stream / Watershed Habitat

The Montana project met with MFWP and federal biologists to determine what habitat data are gathered. Most of the habitat data are gathered by federal biologists using several different methods. Montana StreamNet began working on a standardized stream habitat survey form that could potentially facilitate gathering these data in the future. Federal data will be available eventually on a nationwide USFS site. In Washington, the SSHIAP project is the source for these data, but the project work plan was rearranged and data won't be available before January, 2001.

Subtask 1.3.b Water Quality

Water quality data in general are gathered by entities other than fish management agencies. These data are of interest to fish managers, and StreamNet's intent is to acquire relevant data and tie them to fisheries data by location so they can be used in conjunction with fish data for the same areas.

In Montana, MDEQ staff utilized the on-line Montana Rivers Information System (MRIS, partially supported by StreamNet, see Objective 2, Task 2.1) to update the TMDL process. A link has been created by the state's Natural Resources Information System (NRIS) to the DEQ data on-line; an Internet user can get TMDL data and MRIS fisheries data at the Environet

portion of the NRIS web site. The regional StreamNet office georeferenced Idaho Clean Water Act 303(d) impaired streams data to the 1:100,000 scale LLID-based locations. A web page was added to the StreamNet site to distribute this information in an event table format for download. The region also completed georeferencing and a relational data structure for all stream and lake nutrient data from the PSMFC nutrient data set. The data were moved into the relational data format and posted to the StreamNet web site for download as both GIS and tabular data sets.

Subtask 1.3.c Miscellaneous Habitat Data

The MFWP StreamNet project updated the Instream Flow and Water Leasing databases and incorporated them into the MRIS database and on the MRIS web site. There is no DEF for these types of data, so they can not be incorporated into the StreamNet database yet.

Task 1.4 Facilities

The facilities data category includes structures that are important to fish resources, either as obstacles or enhancements. Most work to date has been for dams and fish hatcheries, but there is growing interest in water diversions that require screening or have been screened to prevent entrainment of fish. The intent of these data is to identify where these obstacles or enhancements occur and provide the basic information about the nature of each structure/facility.

Subtask 1.4.a Dams and Fish Passage Facilities

IDFG began development of a dams module in the new IDFG StreamNet database management system. They error checked the relationship of dam locations to LLID measures, and began obtaining code descriptions to enhanced dam data from the Idaho Department of Water Resources. ODFW StreamNet provided new and updated barrier information including information about the purpose and type for many of the dams. WDFW StreamNet provided a copy of the most recent state dams data set from Washington Department of Ecology to the regional StreamNet office at PSMFC, including metadata and file formats. WDFW and ODFW StreamNet provided assistance in clearing up some "mystery dams" in response to regional staff questions. The regional StreamNet staff georeferenced the dams, where sufficient information was given, by longitude/latitude coordinates and integrated this information into the on-line query system. Oregon and Washington dams were georeferenced, where possible with the given information, to 1:100,000 scale stream-based locations (w/ LLIDs) and the information was returned to ODFW and WDFW for verification.

Subtask 1.4.b Hatcheries

Hatchery facility data development was addressed by all projects in FY 2000. Data were current for most cooperating projects by the end of the year. IDFG began developing a hatchery facilities module in the new IDFG StreamNet database management system, and error checked the relationship of hatchery locations to LLID measures. ODFW StreamNet concentrated mainly on updating it's facilities database to the new LLID-based DEF format. In addition, 36 records were updated with new information and submitted to Regional StreamNet. Oregon StreamNet

continued efforts to provide at least one photograph of each Oregon hatchery to the regional database. WDFW took a lead role in improving the StreamNet hatchery facilities DEF. Official action on the latest draft DEF was not taken by the end of the fiscal year, and adoption of the new format will take place with DEF updates in FY 2001. The regional project georeferenced all hatcheries, where possible with the given information, by longitude/latitude coordinates and integrated this information into the on-line query system.

Subtask 1.4.c Diversion/screening

A low priority was assigned to this data category due to the time required for the LLID data conversion. A DEF for these data may be developed in the future. ODFW StreamNet partnered with the ODFW Fish Screening and Passage Program to develop a database to store screening data that is currently maintained in paper files. This database development effort could serve as the starting point for developing a StreamNet DEF in the future.

Task 1.5 Habitat Restoration/Improvement Projects

Interest in habitat restoration and improvement projects is growing, due to the increasing number of projects being conducted, increasing emphasis on restoration planning at the watershed or subbasin level, and the need to track and evaluate project implementation and effectiveness. The intent of developing this information for the StreamNet website is to locate and organize project information from the many funding entities, link the data to the streams for easy comparison with fisheries data, assist watershed/subbasin planners with identifying where work has been done, and assist monitoring and evaluation of project effectiveness. With the proliferation of activity, it is important to provide a means of identifying where efforts are taking place, what kinds of restoration/improvements are being implemented, and how much restoration activity is being expended by location and by funding source.

This data type is still being developed, and a variety of different activities were undertaken by the cooperating StreamNet projects. Some data development work was also done on funding from outside the StreamNet Project. Initial contacts were made with a number of agencies and funding entities at the state (Washington Interagency Committee for Outdoor Recreation (IAC), Oregon Watershed Enhancement Board (OWEB), Idaho Conservation Data Center (ICDC), MFWP, etc.) and regional (USDA Forest Service Regional Ecosystem Office (REO), USFWS, BPA, etc.) levels to explore availability of data and consistency of records being kept. By the end of the fiscal year, there were 3,327 projects in the StreamNet habitat project database, with approximately 2,500 of those in Oregon.

All state StreamNet projects initiated efforts to develop these data. ODFW StreamNet worked with the Oregon Watershed Enhancement Board (OWEB), assisted them with design of their project database and acquired updated data and provided it to the regional database. IDFG StreamNet worked with the Idaho Conservation Data Center's (ICDC) Managed Area database and acquired a preliminary set of data which was submitted to the region as a test of the interface, and also worked with other entities to locate data. MFWP StreamNet worked with MFWP biologists on data acquisition, began data entry, and began creating a conversion

program between MFWP data and the StreamNet DEF. Washington worked with IAC's PRISM database toward developing access to state project data and determining how to convert it for use in StreamNet.

ODFW StreamNet also initiated development of a database to capture carcass placement activities as part of the state's nutrient enrichment efforts. They also initiated and completed the development of a database to capture and organize information associated with Oregon's Riparian Land Tax Incentive program. These database development efforts could serve as the starting point for developing related StreamNet DEFs in the future.

Task 1.6. Provide data for Sub-basin Planning

Subbasin planning was adopted this fiscal year by NWPPC as a major focus of the Fish and Wildlife Program. Initial efforts focused on a three year Rolling Provincial Review process and associated subbasin summaries, but actual subbasin planning did not formally get underway this fiscal year. StreamNet began work to anticipate what data may be needed by subbasin planners and what data might be created in the planning process.

In FY 2000 we estimated which data products could be immediately useful to subbasin planning. Regional staff developed an inventory of data holdings by subbasin and provided it to the initial Rolling Provincial Reviews of the Columbia Gorge and Intermountain Provinces. The WDFW and ODFW StreamNet projects provided data and maps for the subbasins in the Columbia Gorge Provincial Review. MFWP StreamNet provided maps of several data types for planning in the Kootenai and Flathead drainages. CRITFC StreamNet summarized available anadromous fish habitat quality ratings by subbasin, species, subspecies, and use type. This collection of information was posted on the StreamNet web site for the lead subbasin reviewers to use in their process or contribute to support planning discussions.

CRITFC StreamNet, in collaboration with tribal staff, began scoping the new data sources and the workload that may be involved in capturing new subbasin planning data. They developed a draft set of standard tables for fish population data, based on the Stock Summary Reports. These tables are being tested as prototypes by the Yakima Nation during the Rolling Provincial Review process and use of the tables was discussed with tribal staff and contractors working on the subbasin summaries under the rolling review process.

Once subbasin planning is fully underway, StreamNet will focus on assisting the effort by capturing relevant data developed within the plans and making them widely available as part of this objective, Data Development. In the future, other efforts to provide data to the planning process will be reported under Objective 4, Service to the Fish and Wildlife Program.

Objective 2. Data Management and Delivery

Data management and delivery include all activities related to acquiring, organizing, storing, controlling quality, sorting, and delivering data. Once data are developed (acquired from original sources, quality checked, standardized and formatted) under Objective 1, they are exchanged to the regional database and included in the StreamNet database for delivery to data users. The Region manages the master database and handles content updates from the contributing projects, DEF preparation, and internal distribution of the database and DEF. They also manage the hardware and software needed to make the data available to users via the on-line query system and provide data directly to users. The contributing projects assist the region and manage their programs to collect, standardize and exchange data with the regional database and also deliver data to local users. Each project maintains its own data management system to develop data prior to submission to the regional project at PSMFC and to allow inclusion of additional details that are relevant and available to their own agency's programs.

Task 2.1 Database Management

The Regional StreamNet project and each of the contributing projects maintained its computerized database management system. The primary accomplishment during FY 2000 was converting data in the databases from the enhanced 1:250,000 scale River Reach Number (RRN) location coding system to the 1:100,000 scale LLID codes, wherever possible. This effort constituted a large portion of the activities accomplished during the year by all StreamNet participants as described previously. After conversion of the data to this new standard, the query system was reprogrammed by Regional StreamNet to use the new location identifier codes in sorting and delivering data. Specific accomplishments in addition to the LLID data conversion are detailed below for each of the contributing projects.

CRITFC StreamNet and regional staff collaborated to post the Smolt Density Model data on the StreamNet web site in spreadsheet form in order to make them easier to interpret. Results obtained from the StreamNet query were affected by poor design of this data set and were sometimes difficult to interpret.

IDFG StreamNet continued development of stream survey modules in the IDFG StreamNet database management system. This effort relates to a variety of other tasks because it will be the foundation of how much of the data for StreamNet is compiled in the future. Staff coordinated with the IDFG Fishery Bureau and began incorporation of a lakes module at their request. The project supported the IDFG Fishery Bureau in its use of the Reference/Collecting Permit module as they actively entered data.

IDFG StreamNet made structural changes to the IDFG StreamNet database management system to maintain consistency with StreamNet DEF 2000.2 once it was adopted, and carried out database design activities for adding new information to the system. They coordinated with IDFG Fisheries Bureau staff on data requirements and database design. Migration of existing data sets to the updated database management system was begun, including not only the 1998 and 1999 field season data, but also previously existing data.

MFWP StreamNet completed the MFWP Fisheries Stream Classification System, replacing the stream assessment values generated in the original Montana Rivers Study, part of the Northwest Rivers Study of 1985. Staff provided maps and tabular reports to all state and federal fisheries biologists, managers and administrators and made them available through the Montana Rivers Information System (MRIS) query program. MRIS (http://nris.state.mt.us/scripts/esrimap.dll?name=MRIS2&Cmd=INST) was developed partially by MFWP StreamNet and went on line in November, hosted by the Natural Resource Information System (NRIS) website. The website includes MRIS data on fish distribution, genetic samples, trend surveys, references at the stream level, fisheries classification values, and protected areas. Data can be viewed as a report or mapped on-line. The site averaged over 4,000 "hits" each month for November and December.

ODFW StreamNet developed two database structures to capture fish observation data that often go unreported and to capture fish presence/absence survey results. These will ultimately enhance project fish distribution data. Actual sighting data will enhance documented presence for population status reviews and the presence/absence survey data will help establish the upper extent of fish use by stream.

The project engaged in numerous efforts to modify user interfaces that aid in converting Oregon data to StreamNet format, thus creating easier data entry processes and correcting problems that were corrupting data prior to their being exchanged. They also created a dictionary to ensure consistency across the various data development projects Oregon is involved in.

Staff reviewed and commented on several regional coordination documents including the reference submission protocol, the data submission protocol, and numerous proposed DEF changes, as well as worked with Regional StreamNet staff to resolve issues with the EventMapper Tool and the abundance data user interface tool. They completed a review of the pros and cons of a centralized vs. a decentralized approach to database management to improve response to database management strategy questions.

USFWS StreamNet prepared and sent hatchery facility and water source data to StreamNet. Preparations were also made to transform hatchery return and age omposition data from internal USFWS formats into the StreamNet DEF.

WDFW StreamNet staff laid more groundwork to compile and exchange data efficiently. They developed better procedures and tools to track data that are exchanged or rejected due to errors, and continually reassign all available identification codes (i.e. TrendID codes). They also built templates to ease the response time to data requests for data not yet in final form (notably historical hatchery release data). Project staff attended MS Access training classes to broaden their technical skills and use the best tool for a given task. To broaden their proofing routines, they also spent time learning about StreamNet's TrendUI data entry and proofing tool, which was created at PSMFC in FY 1999.

WDFW StreamNet staff participated in several technical level discussions to adopt formats for new data categories or improve the existing exchange formats so the data is reflected accurately. WDFW's investments in scoping and documenting their data translated into their ability to engage in the DEF discussion and internally standardize their data (i.e. hatchery returns).

The Regional StreamNet program at PSMFC developed metadata for all spatial data sets posted to the StreamNet GIS Web page and updated existing metadata when updates to the related spatial data sets occurred. All current distribution metadata were converted to an FGDC format for enhanced usability and compliance with federal metadata standards. The region also wrote three internal documents to guide management of data: an Edit Interface document (for editing and archiving data), a Data Dump document (for updating new data to the web site), and a Naming Convention document (for naming and identification of internal files).
Database errors that were discovered during the year were reported to the appropriate StreamNet contributing project as they were discovered and fixed in the StreamNet database as necessary. Regional personnel also updated several data entry tools used by the StreamNet partners. This effort was designed to assist the StreamNet contributing projects in their efforts on Tasks 1.1.b, 1.1.d, 1.1.e, 1.2.b, 1.2.c, 1.2.d, and 1.5.a.

Task 2 Data Plan

The FY 2000 Work Statement was written to provide more specific detail on data development than had been the case in previous years, reducing the need for a separate data plan. During the year we developed an inventory of all data in the StreamNet on-line database by species and by Province / Subbasin. The data inventory was provided to the teams developing Subbasin Summaries for the Columbia Gorge and Inter-Mountain Provinces as part of the Rolling Provincial Review process. The CRITFC StreamNet project leader kept the Steering Committee apprised of regional data needs that arose from his involvement with various committees and work efforts and through discussions with NWPPC contractors. The Steering Committee held initial discussions about future data planning at its July meeting. Expectations for future data development are likely to be tied to data specifically supporting the Council's sub-basin assessment process, so further detailed discussions were postponed until next fiscal period when more details on data needs for subbasin assessment could be obtained.

Task 2.3 Data Exchange Standards

All of the cooperating projects contributed to development and review of two revised DEFs, which were adopted by the Steering Committee in FY 2000. DEF version 2000.1 was a major revision that incorporated the significant changes and improvements to the location coding system. DEF version 2000.2 quickly followed to address some remaining details. DEF version 2000.2 established a stable format that should only need adjustments to specific data categories as data representation and standardization conflicts are revealed or as new data types are added to the StreamNet database.

Task 2.4 GIS Data System

Each of the state StreamNet projects and the Regional project at PSMFC maintained GIS systems during FY 2000. The conversion of data to the LLID location codes was a significant step forward in making information from the StreamNet database available for use in the GIS.

Now, all data tied to the 1:100,000 hydrography by an LLID can be easily represented on a map and compared with other data on a spatial basis. Specific accomplishments by the project components are described below and under Task 2.6.

IDFG StreamNet continued to maintain, enhance and utilize their GIS system. The new IDFG StreamNet database management system, while itself in SQL Server, directly links to the GIS. The GIS system was used to answer many information requests and to provide GIS services to the fisheries staff (See Task 2.7). They developed maps for public display of Cutthroat Trout distribution in Idaho and general parr monitoring sites in the Middle Fork Salmon River basin. They also posted GIS data to a new file server (purchased by IDFG) for access by the entire IDFG headquarters staff.

ODFW StreamNet continued general maintenance activities associated with their GIS data system. They processed the 1:100,000 scale PNW Banks coverage to derive lakes and reservoirs, then combined it with the GNIS data set to assign names to approximately 1,200 Oregon lakes and reservoirs. They coordinated with the Oregon Geographic Information Committee Hydro Subcommittee, the Oregon / Washington Hydrography Framework group and Regional StreamNet staff regarding 100K / 24K hydro & National Hydrologic Dataset compatibility issues. Updated FGDC compliant metadata.for the 100K hydrography were submitted. Functionality of both Arc Info / Access and Arcview / Access were tested in relation to meeting future data development needs and improving data development efficiency.

WDFW StreamNet generated and provided FGDC-compliant metadata for the 100K hydrography layer to the regional StreamNet office. WDFW hosted the second annual technical meeting for StreamNet GIS workers in September, where several decisions were made regarding exchange format issues related to spatial data. Progress was made toward developing a set of standards for referencing spatial data sets through the StreamNet Library. WDFW staff began generating a contacts database to ultimately create a series of memos-to-files to document participants in fish presence and use determinations.

Regional StreamNet staff at PSMFC maintained the StreamNet GIS and enhanced it by installing and incorporating new software (Arc/Info version 8). They created a regional (Pacific Northwest) GIS coverage and metadata for lakes and reservoirs by combining GIS coverages from Washington, Oregon, and Idaho and posted the coverage on the StreamNet website. Lake and reservoir data in the StreamNet database were georeferenced for use with this coverage by the on-line query system, making the on-line query system capable of simultaneously searching for data tied to lotic and lentic water bodies, upland points and polygons, and the Pacific Ocean.

Regional staff prepared GIS data and map products from StreamNet data for internal project needs and in response to requests (58) from the public. Requests were from a variety of sources including government agencies, private citizens, non-profit entities, environmental consulting firms, educators, and students. More detailed map products were prepared for requests from the NWPPC and associates for use in reports, presentations, etc. Examples included maps of species distribution, historic and current anadromous fish habitat, and BPA-funded hatchery projects

The GIS system was integrated with the StreamNet fisheries and habitat database. Cross tables of LLID stream locations by county, subbasin, hydrologic cataloging unit, state, and region were created to support the on-line query system. Staff created queriable GIS coverages of updated fish distribution, dams, and hatcheries for the StreamNet web interface. Tributary relationships were determined and posted for approximately 90% of the 1:100,000 scale Northwest streams to identify to which water bodies individual streams drain, helping users know which drainage a particular stream (named stream or LLID code) belongs to. Previously designed subbasin base maps were added to the map catalog so they are available via the on-line database query system.

Regional staff also researched and wrote two reports for the StreamNet steering committee regarding GIS topics: (1) An assessment and comparison of available Internet mapping software packages with a recommendation for future use, and (2) An examination of alternatives to ESRI for GIS analysis and management software.

Task 2.5 Maintain, Enhance and Improve StreamNet Internet Site

The StreamNet Internet site remained the primary means of distributing data from the StreamNet database. Significant improvements were made to the site, including revision of the on-line query system to accommodate the use of the LLID location coding system. All GIS files available for download (shape files and event tables) were compressed for quicker access, and help links were added to provide information on GIS formats. The StreamNet contributing projects assisted refinement of the web site by reviewing and testing the various versions of the site before changes were implemented.

Use of the StreamNet website is anonymous, making it impossible to know specifically what data users need and how well the site is meeting those needs. Because of this difficulty, we designed and implemented an on-line user survey. People accessing the database query system were asked to take a voluntary survey designed to tell us what data were most in demand and how well the site functioned in filling their needs. Unfortunately, in the 59 days the survey was active, very few people chose to fill out the survey (only 25 responses compared with 771 and 850 hits on the query system in August and September, 2000, respectively). The results were few, inconsistent, and of little help in evaluating the website or project performance.

The StreamNet website was updated periodically throughout the year, with input from CRITFC, the state projects and the regional staff. A decision was made to focus on meeting data users needs and improve the ease of use of the web site. A gradual review of the entire site was initiated, with improvements and additions (such as additional explanatory material) added to the site as appropriate. In addition, we began developing a new organization and layout for the site that will be better organized and more aesthetic for users. This will be completed in the next fiscal year.

Task 2.6. 1:100,000-scale Hydrography

The project continued to maintain and update the Pacific Northwest 1:100,000 hydrography, which has now been routed with the LLID system, with input and help from all project cooperators. A semi-automated procedure for updating all PNW hydrography to the StreamNet website for distribution in multiple formats was instituted. A regional web version of the 1:100,000 scale PNW hydrography was posted on the StreamNet website (see http://www.streamnet.org/pnwr/pnwrhome.html).

The project (regional and contributing projects) provided regional hydrographic data to and conducted a review of the PNW portion of the National Hydrographic Dataset (NHD). We also developed a procedure to transfer the LLID-based stream routes to the NHD. Preliminary routing of all watersheds in western Montana was completed, now allowing fish data to be georeferenced to the 1:100,000 hydrography there. IDFG, ODFW and WDFW StreamNet worked on integrating lakes and dams data into the 1:100:000 scale hydrography. Idaho completed its effort. These base data will be necessary for future work with resident fish data. Work will continue into next fiscal year.

Task 2.7. Data Requests

Estimated use of the StreamNet website remained high throughout FY 2000 (Table 1), with a 7.2% increase from FY 1999. Gauging the amount and kinds of use is made difficult by the anonymity of the Internet, making interpretation of the numbers in Table 1 imprecise. The number of unique visits includes 'hits' by search engines as well as people needing information. The number of query sessions may be more indicative of our primary users locating data, but each query session might range from someone running multiple queries and downloading multiple data sets to people accessing the system and then leavomg without actually using it.

Table 1. Estimates of monthly use of the StreamNet website, FY 1999 and FY 2000.

	Unique visits to StreamNet		Number of Query Sessions	
Month	FY1999	FY 2000	FY1999	FY 2000
October	8,115	18,419	912	923
November	8,556	15,281	898	983
December	7,819	15,950	746	772
January	10,458	12,802	793	815
February	12,008	16,210	881	1,065
March	12,188	23,715	993	1,038
April	11,827	19,389	941	933
May	10,642	19,289	873	931
June	9,304	17,315	654	772
July	11,221	17,257	683	739
August	11,944	16,071	780	771
September	13,816	15,192	726	850
Total	127,898	206,890	9,880	10,592

Regional staff members responded to a large number of direct data requests, including 58 specific requests for GIS data / map products and 168 specific requests for tabular data. Staff of the contributing projects responded to a large number of specific data requests, as follows:

IDFG StreamNet filled direct requests for information as summarized in Table 2.

Table 2. Summary of data requests filled by the IDFG StreamNet Project during FY 2000.

Request Origin	Tabular Data	Map Requests / GIS
Private Individual	14	0
State Agency	6	11
Federal Agency	32	0
Other	11	0
Unknown	156	0
Total	219	11

MFWP StreamNet filled 90 direct GIS requests specific to fish data during the fiscal year; ranging from 1 map to all the HUCs in Montana showing genetic purity.

ODFW StreamNet answered a total of 40 data, 10 map/GIS related, and 28 'other' direct requests during the year. Indirect requests for information provided through the ODFW FTP site are summarized in Table 3.

Table 3: Summary of data fully or partially sponsored by StreamNet that were downloaded from the ODFW FTP site during FY 2000.

Data	**Total Downloads**	**Number of Users**
Bull Trout	307	121
Fall Chinook	544	114
Spring Chinook	450	106
Chum	178	71
Coho	464	121
River Routes	1388	89
Summer Steelhead	427	101
Winter Steelhead	562	101
PDF – CSRI maps	620	258
PDF – 8.5 x 11 distribution maps	1585	293
Metadata	1527	514
Core Areas	115	48
Cutthroat	129	80
Barriers	106	48
Hatcheries	63	44
Redband	112	10
Snapshot images	993	335
Total Downloads	9,570	

WDFW StreamNet provided hundreds of maps and digital data sets to users representing state, tribal, local, and federal government; consultants; neighborhood associations; university students; and interested members of the public. They anticipate growth in this area of work as more of the people involved with salmon recovery recognize the need to view disparate data sets in spatial context. This will require additional investments in spatially-enabling data that have been maintained solely in tabular digital form up until now.

Objective 3. Library and Reference Services

Library / Reference Services are performed primarily by the StreamNet Library, which is administered by CRITFC and physically located at the CRITFC office in Portland, OR. The library's web-site address is http://www.fishlib.org/. The StreamNet Library houses references that are submitted by the other contributing projects for all data in the StreamNet database. The library also houses a major collection of fish and wildlife agency in-house 'gray' literature, NWPPC documents and CRITFC documents, and provides full service library functions for fish and wildlife managers throughout the region. The ODFW Library, through a cooperative relationship with the StreamNet Library, provides additional support and library service, primarily related to ODFW and other state-level documents, duplicate exchange, and interlibrary loan requests.

Task 3.1. Collection Development

At least 370 publications from Bonneville Power Administration (BPA) were added to the catalog in FY 2000. Over 600 StreamNet reference document records were added or updated in the catalog. Other new materials received in FY 2000 still must be processed, but many were integrated with the collection. The StreamNet Library accepted responsibility for housing reports and other materials of the NWPPC Fish and Wildlife Program, and received approximately 40 boxes of materials, which were added to the collection. Also added were 2,639 new records for documents to the library catalog. The library received and sent extra documents through Duplicate Exchange to various libraries, including locations such as Belgium, Brazil and Italy. Addresses were updated. The library was added to various mailing lists to receive reports and documents from Natural Resources organizations, which will be made available to library users.

The contributing projects maintained and updated library reference materials in their own systems and also provided reference data to the StreamNet Library for new data developed under Objective 1. ODFW StreamNet compiled functional requirements, investigated and purchased library software to allow better tracking of information requests, to catalog ODFW StreamNet Library holdings, to improve the ability to do key word searches, and to increase compatibility with the StreamNet Library. They also received 52 donations ranging in size from a single document to several boxes during FY 2000. These donations came from a number of different sources including state, federal and private donors.

Task 3.2. Provide Access to Collection

The materials received from BPA were added to the catalog and were made available to library users. About half of the StreamNet collection was integrated into the subject classification system, with work continuing into FY 2001. Approximately 75% of the NPPC collection (including new materials) remains to be integrated. This work will be completed in FY 2001.

The ODFW StreamNet Library investigated, purchased and installed library software that allows for better tracking of library holdings, as well as more compatible electronic communication with other libraries and an improved ability to track library requests. Some information was migrated from the existing database into the new system. This effort was delayed due to a key staff vacancy during the latter part of FY 2000. Data migration is expect to be completed during FY 2001.

Task 3.3 was incorporated into Task 2 this fiscal year.

Task 3.4. Library Services

The StreamNet Library updated and distributed its Access Guide, a brochure informing patrons on how to locate and access the library and describing the services that are available. The guide is updated on an as-needed basis. During FY 2000 there were over 300 service requests from various agencies and organizations. Patrons initiated 641 interlibrary loans that were accommodated, and the library lent 140 items to other libraries. Planning was initiated for developing the electronic library, and testing was begun on how best to scan documents for electronic access. Actual development of the electronic capabilities will take place in FY 2001.

During FY 2000, the ODFW StreamNet library provided library services to almost 400 users, including providing over 1,300 documents to patrons. Information requests were received in the library and forwarded to appropriate responders in the state. The library facility itself was often used as a meeting place for several Columbia River research and management meetings. ODFW StreamNet also initiated development of a website to provide direct access to electronic documents available from ODFW.

Task 3.5. Interlibrary Coordination

During FY 2000 the StreamNet Library planned a needs assessment and developed a mailing list. The needs assessment will be mailed during the first quarter of FY 2001. Outreach to other libraries and groups with libraries proceeded well this year. Several contacts were made and the intent is to extend this service in FY 2001. The library maintained memberships in various professional organizations, continuing acquisition of associated journals and publications. They continued as Cascadelink Environmental web page coordinator and developed salmon web pages for the Fort Vancouver Regional Library. Library staff attended various meetings with other librarians on topics ranging from marketing to cataloging websites to digitizing the library, etc.

Objective 4. Service to the Fish and Wildlife Program

As part of the Fish and Wildlife Program of the Northwest Power Planning Council, the StreamNet Project places specific emphasis on developing and providing data and services that are needed by other components of the Fish and Wildlife Program. Specific actions taken during FY 2000 are detailed below.

Task 4.1. Project Tracking

After discussions with the Columbia Basin Fish and Wildlife Authority (CBFWA), this task was dropped from the StreamNet work plan in the third quarter because CBFWA took responsibility for this task. No work was performed on this task during FY 2000 other than these discussions.

Task 4.2. Monitoring and Evaluation

The CRITFC StreamNet project leader chaired a CBFWA work group to develop M & E guidelines. A final report was produced in May, 2000, and was provided to and discussed with Council and NMFS staffs. CRITFC StreamNet staff also reviewed and provided comments on the Monitoring section of the draft NMFS Biological Opinion (BiOp) on the federal hydropower system. While the BiOp section contains less detail than the CBFWA report, both documents call for a systematic stratified sampling approach for monitoring key parameters basin-wide. Primary agencies (resource managers, NWPPC, and NMFS) did not agree on key monitoring parameters for the Columbia Basin. Consequently, identification of specific data products for M&E and evaluation of the StreamNet data system were premature. The necessary discussions are expected to occur next fiscal year.

The state StreamNet projects provided various data and maps to support monitoring efforts, including native species management, genetic sampling, native cutthroat priority areas, bull trout distributions, etc., within their respective states.

Task 4.3. Watershed Projects

Regional staff met at various times with staff from BPA, the USFS Regional Ecosystem Office, ODFW, OWEB, and USFWS and discussed cooperating in the capture and housing of habitat restoration project data. We found potential for collaboration, but further discussions will be necessary to determine roles, capabilities, and coordination of data capture. Initial efforts will likely focus on using OWEB data as the template for capturing this kind of information.

Since Subbasin Planning did not get officially underway in FY 2000, CRITFC StreamNet staff worked with tribal staffs involved in the NWPPC Rolling Provincial Review process to identify and capture key data elements regarding fish productivity. The effort was only partly successful in the first provincial review (Columbia Gorge), in that new data were not assembled, but lessons learned will make the effort more productive for future provincial reviews next fiscal year.

Regional StreamNet staff developed an inventory of all fish related data in the StreamNet database, organized by subbasin, and presented it to the Columbia Gorge and Inter-Mountain Provincial Review meetings. The intent was to make it easier for people writing subbasin summaries to locate and obtain data descriptive of fishery resources in the respective subbasins.

Montana StreamNet provided hard copy maps of fish and wildlife resources for the Flathead and Kootenai river drainages at the request of the Montana CBFWA representative.

Task 4.4. Stock Assessment Projects

WDFW project staff actively participated in 3 steering committee meetings of the Joint Stock Assessment Project (JSAP), a resident fish project in the Columbia River System above Chief Joseph Dam. They provided examples of StreamNet-formatted spatial and tabular data to guide discussions on their own internal and exchange data formats. JSAP staff are currently focused on field data collection and sampling protocols, but the discussions about data will be tested next fiscal period with some pilot work on fish sightings and water quality data.

Task 4.5. Services to Other Fish and Wildlife Program Projects

StreamNet Project participants provided data and other services to a number of entities associated with the Fish and Wildlife Program during the year.

CRITFC StreamNet staff maintained regular communication with NWPPC staff and contractors regarding subbasin assessment efforts. They: participated on a team which identified and evaluated habitat assessment tools and produced an assessment template identifying data and analytical steps necessary to produce an acceptable habitat assessment; produced database tools to document steps in the EDT analysis; and, consulted periodically on data needs and methods.

IDFG StreamNet staff coordinated with IDFG Fisheries Bureau and various FWP projects, especially Idaho Supplementation Studies.

MFWP StreamNet worked with regional staff on Montana's fish distribution, bull trout core and nodal areas, Wild and Scenic Rivers coverage, wildlife data, and hunting district data to fill a NWPPC data request.

ODFW StreamNet provided information support to nine Columbia River Compact Hearings and provided wildlife distribution information in response to a request from the NWPPC. Staff attended the Columbia River Gorge Provincial Review meeting and provided direction and input related to information management and access. Staff researched and provided hatchery release information available through an ODFW legacy system for the Hood and Fifteenmile Creek subbasin summaries, and participated in a meeting with NWPPC staff to discuss subbasin planning data management needs and how StreamNet could help.

WDFW StreamNet staff coordinated with related Columbia Basin efforts and worked with staff needing data for EDT modeling, sub-basin reviews, and other projects.

Regional StreamNet created a preliminary list of subbasins and their geographic extents to create a subbasin coverage in the GIS. The coverage is necessary for determining which water bodies are in which subbasin, a necessary step in providing data to subbasin planners. They discussed data needs for subbasin summaries/assessments and the need for specific actions to develop the needed information with NWPPC staff. Regional, ODFW and WDFW StreamNet staff members also met with NMFS NW Science Center staff and the NWPPC data contractor to discuss data needed by the Technical Review Teams under ESA recovery planning and Viable Salmon Population (VSP) assessments, and how these efforts correspond with subbasin planners' needs.

Task 4.6. Protected Areas

Protected Areas data are contained as a static data subset in the StreamNet database, and these are maintained as a permanent component of the data. During the year we explored the possibility of converting these data from the RRN system to the LLID location coding system, but found that the locations listed in this database are often ill-defined. As a result, no conversion occurred this year. That effort may be pursued next year.

Task 4.7. Basin Data Needs

The StreamNet Project provided assistance and input to a variety of regional entities regarding data needed for a variety of purposes within the Columbia Basin. Examples include participation by the CRITFC StreamNet project leader on various regional efforts like the M&E guidelines report, and regional project staff meeting with Council, CBFWA, and NMFS staff regarding data needs and data management.

During the year we developed a draft white paper on data management needs and issues in the basin. The draft paper was used as the basis for input to the Independent Scientific Review Panel regarding data management and as the basis for recommendations for amendment of the NWPPC Fish and Wildlife Program.

The Statement of Work initially called for StreamNet to organize a regional workshop to define basin data needs. However, the process of amending the NWPPC Fish and Wildlife Program and other workloads required significant time from most regional data generating and data using entities, and the workshop was not held. Instead, we used the amendment process as a means of recommending actions related to data gathering and management. We also adopted a strategy of inviting broader participation to StreamNet Steering Committee meetings so that agency data needs can be discussed and included in future work statements.

Objective 5. Project Management / Coordination

Project Management / Coordination involves oversight of the StreamNet Project by the regional component of the project, and management of the individual cooperating projects by their staff.

Task 5.1 Manage Project Activities

Project activities were managed at two levels. Broad project direction was managed through four quarterly meetings of the StreamNet Steering Committee, where strategic direction was provided to the project and technical issues were resolved. All contributing projects participated in Steering Committee meetings

Routine project management was conducted at the regional and contributing project levels, where project leaders exercised supervision over personnel, developed annual budgets, tracked expenditures and inventory, developed and carried out the annual Statement of Work, prepared reports, and coordinated routinely among the project components via phone, email and meetings.

Task 5.2 Participate in Fish and Wildlife Program Development Activities

All project components contributed to supporting Fish and Wildlife Program development. The CRITFC StreamNet project leader is a formal member of a NWPPC ad hoc work group on information management, who maintained regular contact with NWPPC and NMFS staffs and contractors to discuss and coordinate information management issues. State project staffs worked with their respective CBFWA representatives. The regional StreamNet Project Leader met with each of the state project leaders and their respective fish chiefs and CBFWA representatives to discuss how the project can best contribute to program success.

Task 5.3 Coordinate with Other Related Activities

Coordination occurred at multiple levels. CRITFC StreamNet staff maintained coordination with the Council and other regional groups. The StreamNet Library brochure was updated once during FY 2000, with future updates annually. Library staff attended regional and national conferences and training.

IDFG StreamNet developed a plan and budget for an enhancement for an Idaho Fish and Wildlife Information System that would build upon and enhance IDFG StreamNet's capabilities to manage and distribute fish and wildlife data. The enhancement is in the IDFG 2002 budget request and has also been proposed directly to the Governor's office for funding.

Montana StreamNet staff worked closely with the Montana Natural Resource Information System staff, helping guide query system enhancements, serving on the selection committee for NRIS Director, and representing MFWP and StreamNet on the NRIS Advisory council and on the Montana Geographic Information Council.

ODFW StreamNet staff represented ODFW and StreamNet on the Oregon Geographic Information Council, coordinated and partnered with the Oregon Natural Heritage Foundation on fish distribution and mapping development efforts, and coordinated with numerous other state and federal agencies on a variety of StreamNet related topics. They also participated in restoration data integration meetings with the Regional Ecosystem Office, BLM, USFS, and OWEB and reviewed and commented on a draft white paper outlining these restoration data integration efforts. This effort is expected to continue into FY 2001. Staff also regularly attended Oregon Plan monitoring team meetings and contributed when needed or requested.

Washington StreamNet staff continued to work closely with Department of Natural Resources staff, and their participation in the DNR "GIS Day" with a StreamNet spatial data demonstration was well-received.

Regional StreamNet staff met regularly with regional groups developing standard data formats for habitat restoration projects, stream habitat measures and macroinvertebrates in order to standardize as many data sets as possible into a single format for the region. Regional staff reviewed an Idaho DEQ proposal for water temperature data collection standards, and also met with ODFW and WDFW staff regarding availability of run reconstruction data.

Task 5.4 Public Communication

The project maintained communications with the public and other entities through participation in various technical and agency meetings and through development of presentations and materials for public distribution.

Idaho StreamNet developed several maps with StreamNet data for public display in IDFG headquarters. The Idaho project leader participated in the 2000 NW GIS User's Conference in Skamania, WA, will be the 2001 conference chair, and was elected President Elect.

Montana StreamNet attended the Montana/Idaho GIS User's Group Conference in Kalispell and conducted workshops on ArcView tips and tricks, Access and ArcInfo.

ODFW StreamNet completed the *Columbia River Fish Runs and Fisheries Status Report, 1938-1998*. They had planned to author a series of informational articles for ODFW's internal publication Inside Tracks, but this venture was not initiated due to staff vacancies and a reduced ability to meet other StreamNet deliverable deadlines. Staff attended the Oregon Plan Monitoring Review and Workshop, the ESRI User's Conference in San Diego (where they presented an Oregon Salmon Distribution Poster), ODEQ's Willamette River Basin Water Quality Data Summit, the Organization of Fish and Wildlife Information Managers annual conference and several training courses for professional development purposes. Oregon StreamNet staff also attended ODFW's annual Fish Biologist's meeting and gave a slide presentation summarizing upcoming data management related efforts.

The StreamNet Library brochure was updated in FY 2000, with annual updates planned in future years. Library staff participated in various meetings with other libraries to publicize StreamNet Library holdings as well as coordinate acquisition of materials.

Regional StreamNet staff participated with representatives of multiple agencies during several meetings at the Forest Service Regional Ecosystem Office to discuss availability and formats of fish habitat project data, to coordinate efforts, and to discuss potential for a regional database of such information. Staff participated in an IRICC meeting regarding data collection standards for aquatic habitat measurement and characterization, and water temperature and stream classification standards were updated.

Regional staff reviewed the existing project brochure in preparation for updating it next fiscal year. A major review of the StreamNet website was begun, with the intent of improving clarity and usability for experienced data users and the general public alike. Initial recommendations were made, and significant changes will be implemented next fiscal year.

Future Directions

Maintenance and annual updates to active data sets will be a primary objective for future work. In addition, we expect an increase in data requests and new data needs resulting from a number of activities and processes going on in the basin, including population analyses for ESA assessments and recovery planning, growing watershed level planning and restoration activities, development and implementation of a monitoring and evaluation program, subbasin summaries under the Rolling Provincial Review process, and subbasin scale planning. We will address these growing needs under ongoing activities under Objective 2, Data Management and Delivery, and particularly under Objective 4, Services to the Fish and Wildlife Program. As demands for data and services grow, we will accommodate the needs and requests to the degree possible under current staffing levels. It may be necessary to pursue increased funding opportunities if demands continue to increase, however.