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**Ed Schriever**  
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Montana

**Mike Milburn**  
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## Northwest **Power** and **Conservation** Council

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August 15, 2023

### **MEMORANDUM**

**TO: Fish and Wildlife Committee**

**FROM: Kris Homel**

**SUBJECT: Update on StreamNet Program: supporting the Fish and Wildlife Program's information needs since 1988**

### **BACKGROUND:**

**Presenter:** Dr. Nancy Leonard, Program Manager for StreamNet through the Pacific States Marine Fisheries Commission, and Co-Lead on the Coordinated Assessments Project

**Summary:** The Fish and Wildlife Committee will hear a presentation on the resources available to the region through StreamNet, a project of the Pacific States Marine Fisheries Commission. The presentation will include information on how StreamNet resources relate to the Council's Fish and Wildlife Program and how they are accessed and shared, along with a discussion of emerging tools or innovations.

**Relevance:** Regional data and information-management projects are critical to supporting the Program's data management, analysis, access, and communication functions. As part of the Mainstem and Program Support Project Review in 2019, the Council formulated a programmatic issue to address the importance of these projects. The programmatic emphasized the need to identify which resources house information derived from Program funded projects and how those resources can be accessed by the public. Over the course of this year, the staff will invite all seven of the data management projects included in the Mainstem and Program Support Review to share similar presentations. The Committee has heard from three projects so far- the Columbia Basin Fish and Wildlife Library, the Inter-tribal Monitoring Data project, and Data Access in Real Time. In

August, the committee will hear from the fourth project- StreamNet, which is administered by Pacific States Marine Fisheries Commission under Project # 1988-108-04.

Background: A large amount of data is collected throughout the basin by many different projects and having access to that information is critical. This is the role filled by data management projects- they support the Program's data management, analysis, access, and communication functions. Each project is a little different and each fits different needs for their organizations.

The seven data management projects were reviewed in the 2019 Mainstem and Program Support Project Review. In this review, the ISRP highlighted, and the Council agreed with, the importance of supporting regional and sub-regional data management, storage, and dissemination of information necessary for Program implementation and assessment (please see [Programmatic Issue #2](#), pages 8 and 9). In particular, intentional planning for, and dedication of funding is necessary for (1) sharing information that informs decisions and (2) keeping pace with new technologies and knowledge through workshops and other learning experiences. This requires balancing investments in data collection with investments for data processing (data management, analysis, data steward expertise/support) and communication of information.

In an effort to address the Council recommendation and to advance the Council's efforts in the assessment of program performance, there is a need to better understand the information and data sharing resources in the basin, which provide the Council and region with critical Program data and information. In the decision document from the 2019 review, the Council recommended that a subcommittee of the Regional Coordination Forum be convened. The tasks of this subcommittee would be to (1) communicate the role of the regional and sub-regional databases/repositories in providing public access to information derived from Program funded projects, (2) identify the primary regional databases/repositories that house information supporting the Program, and (3) address efficient flow of information between regional and subregional databases/repositories, and projects collecting and analyzing data.

Toward this end, the Council has organized a series of presentations on data and information management projects for this and upcoming Fish and Wildlife Committee meetings. The Council developed a set of questions to better understand the specific work each data management project is doing, how they relate to each other, and how they relate to the Council's Program. Some of these questions are asked of every project during their presentation, and others are specific to individual projects. The presentation on StreamNet will provide answers to questions 1-7.

The required questions are:

1. Describe the data and resources that you provide to the region.
2. How do these data and resources relate to the Council's Fish and Wildlife Program?
3. How are these resources accessed and/ or shared among organizations?

The additional questions are:

4. What kind of collaborations or relationships exist between your data/repositories/organization, and other data management projects/organizations in the basin (not just within the Program)?
5. As the basin and program continue changing and other information needs arise or change, what opportunities do you have to adapt to these different needs?
6. What do we need to be aware of in the future to continue providing data management for the full suite of work implemented under the program?
7. Are there emerging tools or technologies we should be aware of? New data management needs? Innovations to share?

Through these presentations, we hope to highlight the resources that are available from these projects as they relate to the Program both to better understand the accomplishments of the Program, and to inform the region. Following the series of presentations, the Council will develop a summary of the answers each project provided to their specific questions.

More Info: <https://www.streamnet.org/>



**StreamNet**  
Fish Data for the Northwest

# StreamNet Program

Supporting the Fish & Wildlife Program's Information Needs Since 1988

*BPA Project # 1988-108-04*



A FISHERIES DATA PROJECT OF  
THE PACIFIC STATES MARINE FISHERIES COMMISSION

# Today's Topics

- What is StreamNet
- Resources and data
- Supporting the Council's F&W Program
- Relationships with other data projects
- Adapting to changes and future needs
- *Preview: new in 2023 and beyond*





# StreamNet

[www.streamnet.org](http://www.streamnet.org)

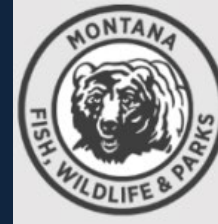
A cooperative data management and dissemination project

Focused on fisheries and aquatic data and data-related services for the Pacific Northwest, with a Columbia River Basin emphasis



# StreamNet Committee Members

## States



## Tribes & Tribal Consortium

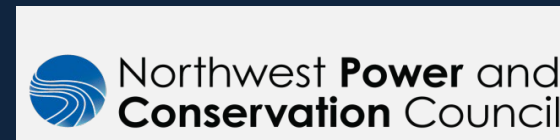


## Government



US Geological Survey

## Interstate Compacts



# StreamNet's Structure for Success



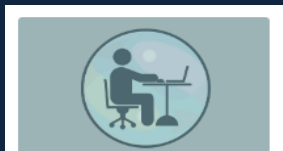
StreamNet Executive Committee

Policy-level guidance and decision-making  
*(added per 2012/2013 NPCC recommendation)*



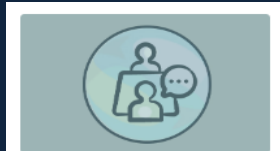
StreamNet Steering Committee

Implementation support and guidance



StreamNet Technical Team

Technical aspects of data exchange



StreamNet DES Development Team

Standards for data sharing time series and public query



CAP DES Development Team

Standards for data sharing CAP Fish HLIs and public queries



CAP Core Team  
Coordination among Coordinated Assessments Partnership projects

Coordination and facilitation  
*(proposals, workshops, newsletters)*

*Teams include representation from non-StreamNet member organizations*





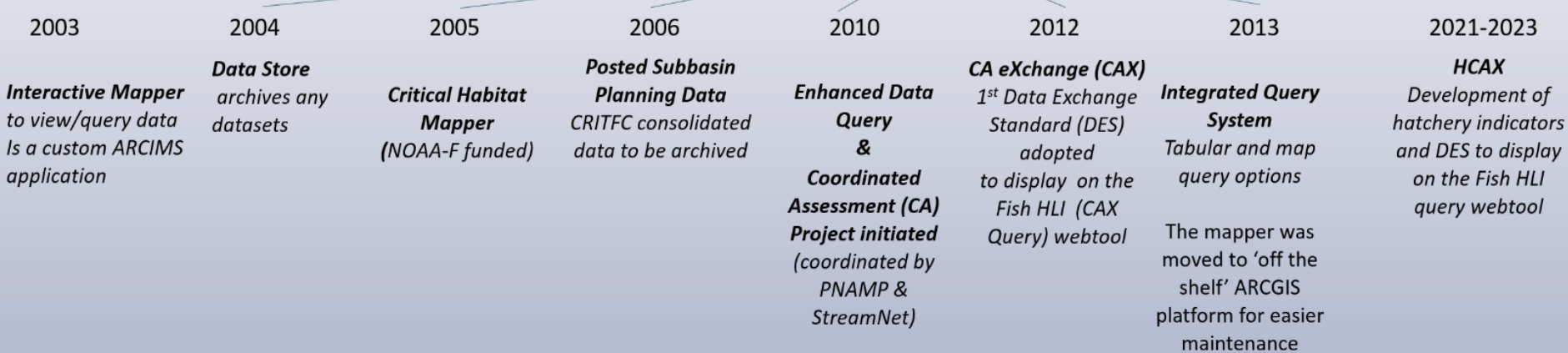
# StreamNet is Dynamic

## Evolving with the Region and the Fish and Wildlife Program

### Genesis of StreamNet



### StreamNet (Internet; '98-present)



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# Resources and Data

Assist partners with building sharing capacity to exchange with StreamNet



## StreamNet Supports Data Management and Sharing Capacity

Infrastructure at PSMFC, agencies and tribes  
Assisting with personnel, hardware, software, and data systems



# Resources and Data

## Content and Access

**StreamNet**  
Fish Data for the Northwest

Data & Maps ▾ CAP ▾ Committees ▾ Resources ▾ About ▾ 🔍

### Responding to Regional Data Priorities

StreamNet helps partners adapt to changing data management and data-sharing priorities as directed by tribal, state, and federal fish and wildlife managers, National Oceanic and Atmospheric Administration-Fisheries, Bonneville Power Administration, and Northwest Power and Conservation Council.

StreamNet Supports | River Health Index Reporting Overview 2015 | StreamNet Tool Facts

StreamNet is a cooperative information management and data dissemination project focused on fisheries and aquatic data and data-related services in the Pacific Northwest, with a focus on the Columbia River Basin.

- Data & Maps
- CAP
- Committees
- Resources

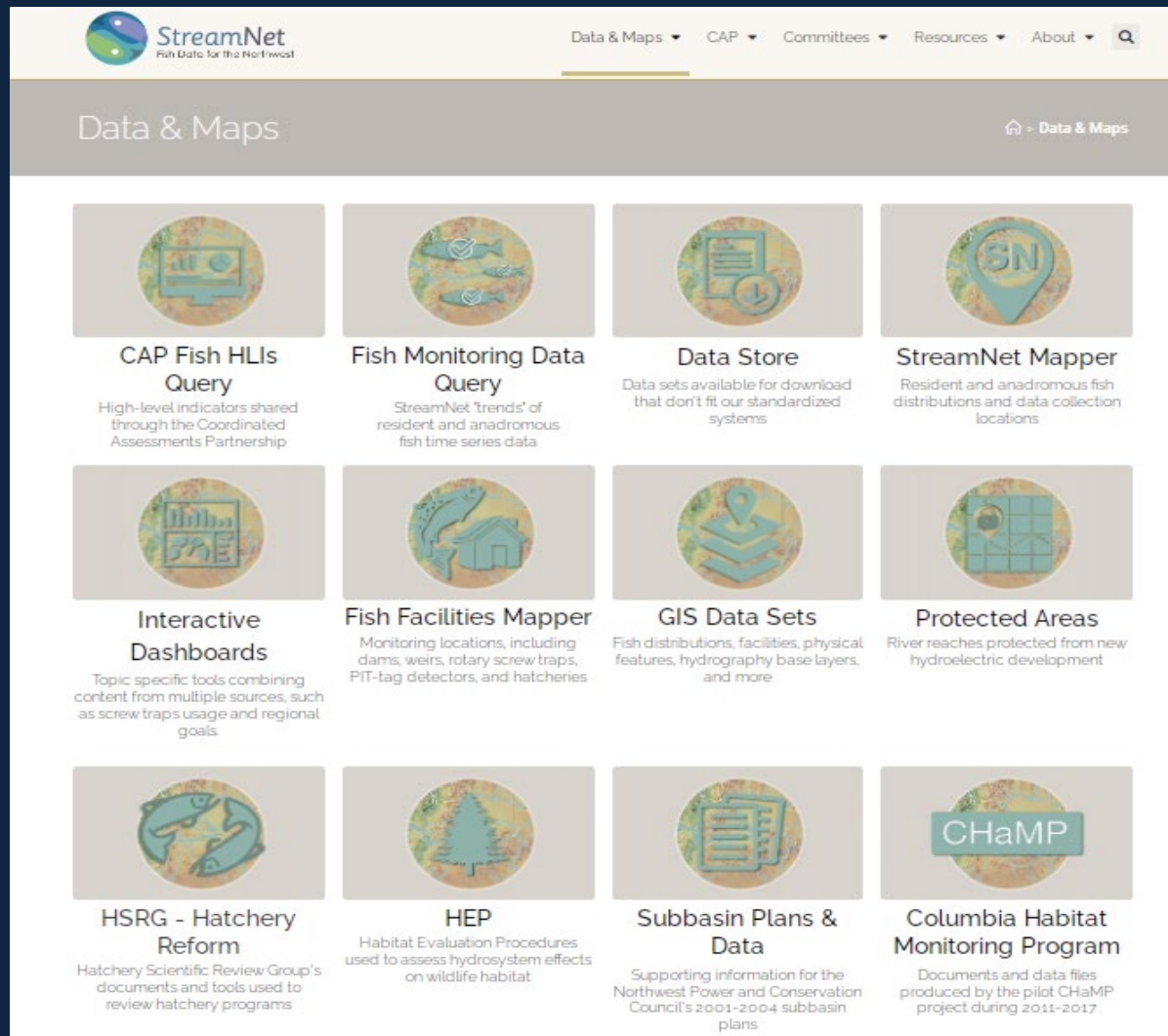
### News

- COORDINATED ASSESSMENTS PARTNERSHIP Fish and Habitat Data Exchange NEWSLETTER Winter 2023 Join us for 2023 Workshops
- NEWSLETTER Summer 2022 HOAX Update
- COORDINATED ASSESSMENTS PARTNERSHIP NEWSLETTER December 2021 Upcoming Changes to CAP Fish HLI Data Display
- COORDINATED ASSESSMENTS PARTNERSHIP NEWSLETTER June 2021 Progress Update CAP Membership Indicators



# Resources and Data

## Content and Access



The screenshot shows the StreamNet website interface. At the top left is the StreamNet logo with the tagline 'Fish Data for the Northwest'. To the right is a navigation menu with links for 'Data & Maps', 'CAP', 'Committees', 'Resources', and 'About', along with a search icon. Below the navigation is a header for the 'Data & Maps' section. The main content area features a grid of 12 resource cards, each with a circular icon, a title, and a brief description.

Resource Name	Description
CAP Fish HLI Query	High-level indicators shared through the Coordinated Assessments Partnership
Fish Monitoring Data Query	StreamNet 'trends' of resident and anadromous fish time series data
Data Store	Data sets available for download that don't fit our standardized systems
StreamNet Mapper	Resident and anadromous fish distributions and data collection locations
Interactive Dashboards	Topic specific tools combining content from multiple sources, such as screw traps usage and regional goals
Fish Facilities Mapper	Monitoring locations, including dams, weirs, rotary screw traps, PIT-tag detectors, and hatcheries
GIS Data Sets	Fish distributions, facilities, physical features, hydrography base layers, and more
Protected Areas	River reaches protected from new hydroelectric development
HSRG - Hatchery Reform	Hatchery Scientific Review Group's documents and tools used to review hatchery programs
HEP	Habitat Evaluation Procedures used to assess hydrosystem effects on wildlife habitat
Subbasin Plans & Data	Supporting information for the Northwest Power and Conservation Council's 2001-2004 subbasin plans
Columbia Habitat Monitoring Program	Documents and data files produced by the pilot CHaMP project during 2011-2017



# Resources and Data

## Data Content in Actively Updated Data Systems

### FISH MONITORING DATA

**13,055**  
TIME SERIES DATA SETS  
(1894 - CURRENT)

**61**  
ANADROMOUS  
AND RESIDENT  
FISH SPECIES

**9**  
DATA  
CATEGORIES  
(FISH COUNTS,  
HARVEST, HATCHERY  
RETURNS)

**10**  
DATA  
PROVIDING  
ORGANIZATIONS  
(TRIBES, STATES,  
FEDERAL)

### DATA STORE

**187**  
DATA SETS  
FISH, HABITAT, BARRIERS, GENETICS, MACROINVERTS, ETC.  
(1800-2020)

**119**  
DATA SETS  
ANNUALLY UPDATED

**42**  
BPA  
PROJECTS  
NPCC FW PROGRAM

**23**  
DATA  
PROVIDERS  
ORGANIZATIONS

### CAP FISH HLIs

Columbia River Basin & Oregon Coast  
Populations and Superpopulations

High-Level  
Indicator (HLI)  
Records

**15,802**  
(1938 - CURRENT)

Salmon and  
Steelhead  
Populations\*

**250**

HLI  
Categories

**6**

Populations\* with  
Natural Origin  
Spawner  
Abundance HLI

**238**

Populations\* with  
Juvenile Outmigrant  
HLI

**79**

Data Providing  
Organizations

**11**

# Resources and Data

Accessed by Agencies, Tribes, Public others  
(2022 usage example)

## STREAMNET GIS & QUERIES

**533K**

REQUESTS MADE TO  
THE API

**4,524**

STREAMNET & FISH  
FACILITIES MAPPERS  
(UNIQUE VIEWS)

**399**

GIS  
DOWNLOADS

**10k**

WEBSITE  
VISITORS  
(UNIQUE)



# Resources and Data

*New:* NOAA staff using CAP Fish HLI webservice to automate review analysis

## StreamNet Informs Fish Assessments, Recovery, and Mitigation

Sharing and access to standardized indicators informing:

- NOAA status reviews and BiOps
- NPCC Program Tracker
- BPA Decision Tools , BA and EIS reports





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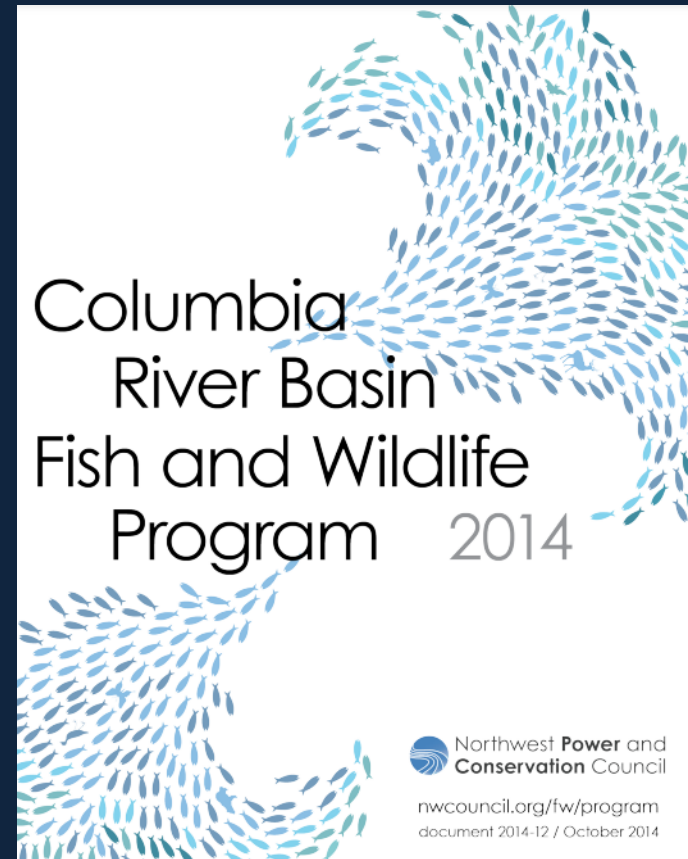


# Support the Council's F&W Program

2014/2020 Program: Adaptive Management Section – Data Management Principles

## StreamNet follows these principles

- Public accessibility, search-ability, and usability of data in consistent formats to all interested parties.
- Program reporting relies on data sharing systems that provide access to data from federal and state agencies and tribes, and other entities.
- Coordinated data management systems guided by program evaluation and reporting needs.

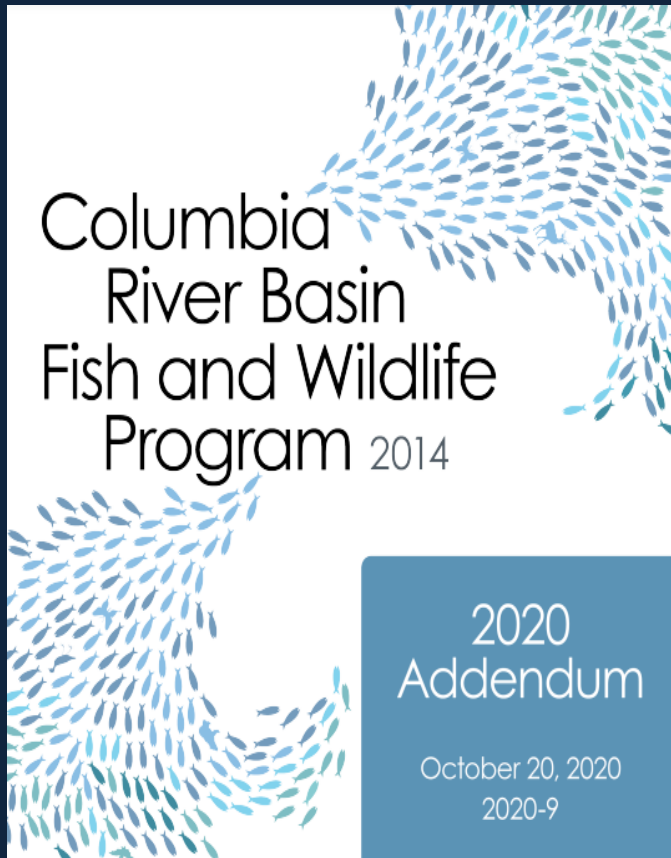


# Support the Council's F&W Program

## 2020 Addendum

### Part 1: Strategy Performance Indicators (SPI)

### Part 2 B. Assessing, Monitoring, and Reporting



### StreamNet currently provides:

- Data for Strategy Performance Indicators
- Public access through centralized databases
- Data for reporting program goals, objectives, strategy performance indicators, and other
- Collaborative development and use of standards to improve access to data
- Maintenance of historical and current program data in a structured manner that facilitates public access.

# Support the Council's F&W Program

## Resources and Data

**Archiving Program foundational resources and programmatic data**

**Protected Areas**  
River reaches protected from new hydroelectric development

**Protected Areas Documentation**

**Protected Areas Mapper**

**Protected Areas Database**

**HSRG - Hatchery Reform**  
Hatchery Scientific Review Group's documents and tools used to review hatchery programs

**HEP**  
Habitat Evaluation Procedures used to assess hydrosystem effects on wildlife habitat

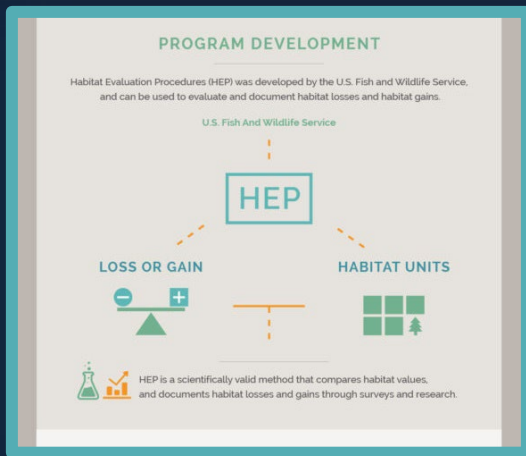
**Subbasin Plans & Data**  
Supporting information for the Northwest Power and Conservation Council's 2001-2004 subbasin plans

**CHaMP**  
Columbia Habitat Monitoring Program  
Documents and data files produced by the pilot CHaMP project during 2011-2017

**Protected Areas Mapper**  
Supporting the NPCC

**Legend**

- Columbia Basin Watershed Boundary
- NPCC Protected Areas
- NPCC Protected Areas/Streams
- Anadromous Only
- Anadromous and Resident Fish and Wildlife
- Protected Under other Federal or State Action
- Resident Fish Only
- Resident Fish and Wildlife
- Wildlife Only
- Unprotected



**Subbasin Planning EDT Data**

- Explanatory document
- Registered populations
- Unregistered populations

**Subbasin Planning Data**

Data are presented by subbasin. Select a subbasin from the list below or the [subbasin map](#). Materials provided to subbasin planners are found in "StreamNet\_Info", while materials produced during or after subbasin planning are found under "SubPlanning\_Info." In addition to the subbasin sets, several basin-wide datasets are also available:

- Master spreadsheet created June 25, 2001, contains
- Master spreadsheet - updated February 8, 2003, contains
- Water temperature data contains compilation of water temperature data

**Planning Data by Subbasin, Organized by Columbia River Basin Province**

- Blue Mountain Province
- Columbia Cascade Province
- Columbia Gorge Province
- Columbia Plateau Province

**NPCC Subbasin Information Webpages**

- Subbasin Plans, 2004 documents (NPCC)
- Subbasin Dashboard tools (NPCC)
- Subbasin Interactive mapping tool (NPCC)

**CRITFC**

- Subbasin Planning QHA, EDT, and other Models Geodatabase (maintained by CRITFC)

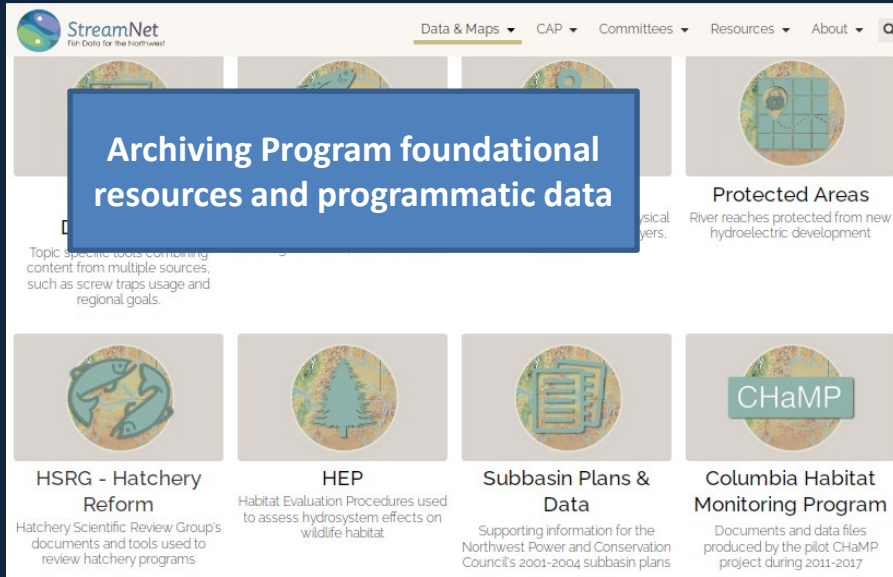
**Columbia River Basin Subbasins**

Click a subbasin on the map to access StreamNet data and maps for that subbasin.



# Support the Council's F&W Program

## Resources and Data



StreamNet  
Fish Data for the Northwest

Data & Maps | CAP | Committees | Resources | About

**Archiving Program foundational resources and programmatic data**

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StreamNet  
Fish Data for the Pacific Northwest

**STREAMNET DATA STORE**

**Secure public repository for BPA, or others, project data**

Add Your Data Set

Search the Data Store

All data sets (180)

Title	Date	Data Categories	Location
1) Prototype water temperature database. 2) Water temperature data sources.	2/9/2005	instantaneous stream water temperature	Oregon, Washington, Idaho. Data mainly from mainstem Columbia and Snake rivers, from near mouths of their tribs, and also from Wallovia-Whitman, Nez Perce, and Payette National Forest water temperature databases.
1998 Independent Hatchery Operations Team (IHOT) hatchery evaluation summary reports.	04-16-2013	Hatchery facility operations Hatchery facility descriptions	Hatcheries within the Columbia River basin in Idaho, Oregon, and Washington.



Fish HLIs: Coordinated Assessments Indicators of Fish Population Health

Species: Chinook salmon  
Run: Spring

**Coordinated Assessments Populations**

American River  
Status: Not listed | HLIs: 38

Asotin Creek  
Status: Threatened

Bear Valley  
Status: Threatened

Big Creek  
Status: Threatened

Big Shovel  
Status: Threatened

Calapoosh  
Status: Threatened

**Chinook salmon - Spring run**

Map showing Chinook salmon populations in the Pacific Northwest region.

**Annually updated by partners  
Natural Origin Salmon Abundance Estimates  
"NOSA" informs region and Program's SPI**

Data Availability:  
No HLI data available  
HLI data available



# Support the Council's F&W Program

## Program Strategy Performance Indicators & Program Tracker

**PROGRAM TRACKER**

Strategy Performance Indicators [Report data errors](#)

Wild Fish

Wild Fish [Show Splash Screen](#) [Show All](#)

- Total Bonneville Dam, Lower Granite Dam and Willamette Falls adult counts. S1-5 ([Show Data](#))
- Progress toward the following regionally agreed-upon adult abundance escapement targets for natural-origin salmon and steelhead. These targets were developed by the NOAA Marine Fisheries Advisory Committee's (MAFAC) Columbia Basin Partnership Task Force. For the complete details on these targets and supporting information go to A Vision for Salmon and Steelhead, Goals and Pathways for Restoring Thriving Salmon and Steelhead to the Columbia River Basin. Phase 2 Report of the Columbia Basin Partnership Task Force to the NOAA Fisheries Marine Fisheries Advisory Committee, July 16, 2020 version. See Objective S1 above for the relationship of these targets to the program. S1-3, S5-1 (In Development)
- Abundance of populations tracked as identified through Coordinated Assessments Partnership. S1-4 ([Hide Data](#))

Information on wild fish population abundance can be viewed on StreamNet's CAP Fish HLIs (CAX) Query website. (<https://www.streamnet.org/home/data-maps/fish-hlis/>)

Resident Fish

- Bull Trout population abundance by subbasin. R1-1 ([Hide Data](#))

State:  Subbasin:  Stream:  [Display Graph](#)

**Bull Trout**  
Montana - Clark Fork - Carpp Creek

Year	Bull Trout (fish)
1984	5
1985	8
1986	15
1987	5
1988	42
1989	28
1990	32
1991	25
1992	20
1993	15
1994	12
1995	10
1996	42
1997	5
1998	18
1999	15
2000	10
2001	15
2002	5
2003	15
2004	5
2005	2
2006	5
2007	2
2008	2
2009	2
2010	2
2011	2
2012	2
2013	2
2014	2
2015	2
2016	2
2017	2
2018	2
2019	2
2020	2

Notes:  
1. For many streams, sampling locations, techniques, and frequencies may not be consistent from year to year. Also, some locations are not surveyed annually.

[Context, Metadata, and Sources](#) Data as of 11/21/2022

## Data Currently Accessed via StreamNet

- Wild fish
- Resident fish



# Support the Council's F&W Program

## Program's Topic-Specific Storymaps



### Resource Tools & Maps



### Hatcheries Columbia River Basin

Committed to supporting a common vision that supports abundant, healthy wild fish and effective fish hatcheries in the basin

Northwest Power and Conservation Council's Informal Hatchery Workgroup

Hatchery  
Overview

Stories and  
Handouts

2023 Assessment  
Reports & Data

Other  
Information

### StreamNet Hatchery CAX data available in 2024

- Hatchery fish data standards
- Salmon, steelhead, and others
- Number of fish released annually

### Exploring future SPI data in 2024 and beyond

- White sturgeon
- Non-native and invasive species
- Predator management
- Pacific lamprey
- Eulachon

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# Relationship to Other Projects

Data Partners and Participants of Teams (includes committee member organizations)

## States



## Tribes



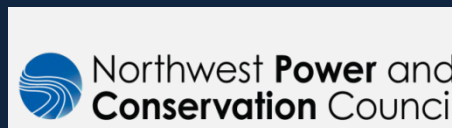
## Federal



Bonneville Power Administration



## Interstate Compacts





# Relationship to Other Projects

Connecting Human & Data Through a Shared Forum

## Uniting Experts to Inform CAP and StreamNet Products

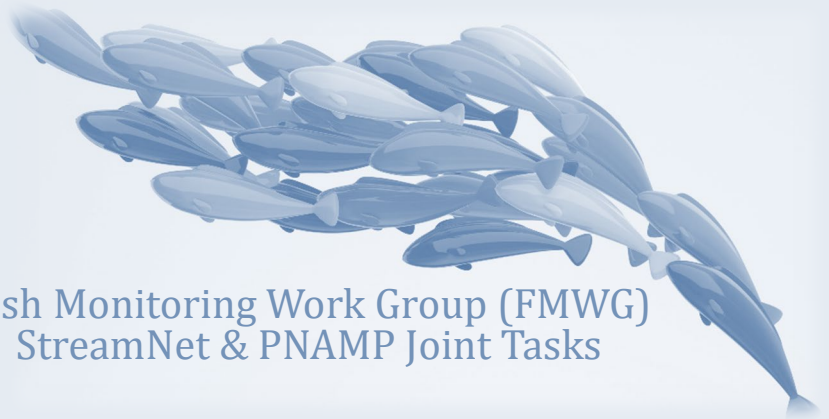
Standardized Vocabulary and Data Fields

- Juvenile Density (Snorkel & Electrofishing)
- Rotary Screw Trap Data Collection

Standardized Approach for Map Queries

- Fish Management Units Boundaries

Fish Monitoring Work Group (FMWG)  
StreamNet & PNAMP Joint Tasks



## From Stream to Screen-Monitoring and Data Management Technology

- Learn about the latest technologies in aquatic monitoring for data collection, data management, and data visualization.
- Network with other monitoring professionals implementing technologies in new ways.
- Next event in 2025



pacific northwest aquatic  
monitoring partnership

US Geological Survey

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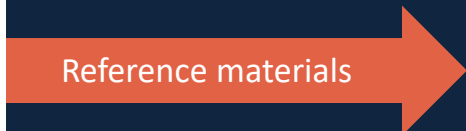
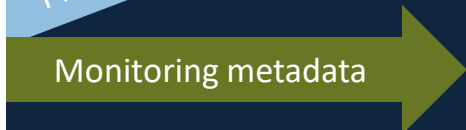


# Adapting to changes and future needs

Connect to Leverage Existing Content and Expertise

## Working Together

to secure investments, reduce redundancies,  
and meet FAIR principles



**Pisces Web at CBFish.org**

- Proposals
- Contracts/SOW
- Annual reports



**MonitoringResources.org**

- Study plans
- Sample designs
- Protocols
- Methods



**StreamNet**


- Local trends
- CAX
- Archived data



StreamNet  
Fish Data for the Pacific Northwest

**CBF&W Library**

- Reports
- Gray literature
- Books
- Access to journals



# Adapting to changes and future needs

Update Technology and Approach for Efficient Access and Maintenance



# Adapting to changes and future needs

Support Open Data by Implementing FAIR and Awareness of CARE Principles



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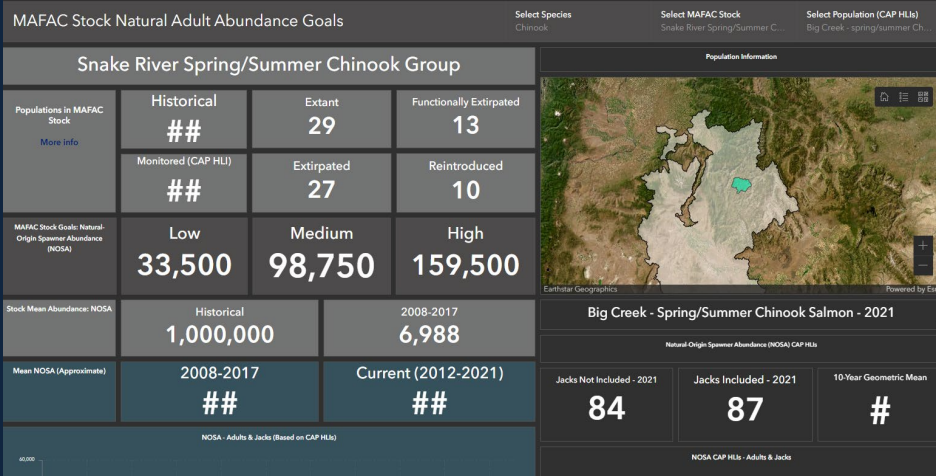


# New in 2023 and Beyond

## 2023

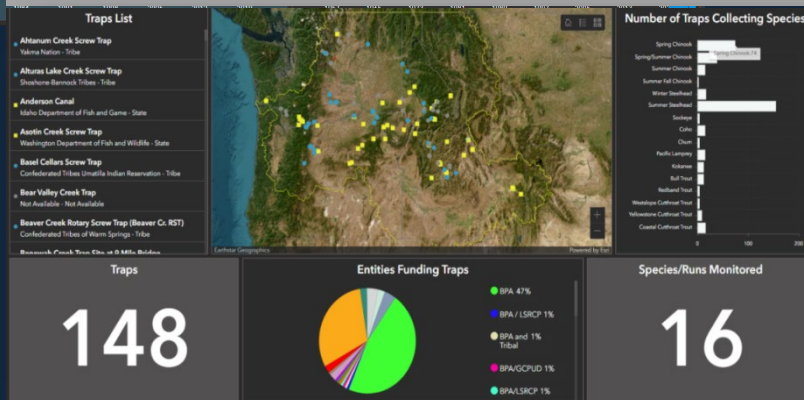
## 2024

### MAFAC Stock Natural Abundance Goals and Available CAP Fish HLIs data



Hatchery CAX

### Columbia River Basin Screw Traps



- SALTWATER
- TRANSITIONAL
- FRESHWATER





# StreamNet

[www.streamnet.org](http://www.streamnet.org)

## Acknowledgement

Numerous biologists, data managers, data stewards, data consumers, and developers

- Participants of StreamNet committees and teams
- CAP teams and workshop participants
- PNAMP Fish Monitoring Work Group participants and leads
- CRITFC Library
- CRITFC ITMD project
- States, Tribes, and Federal agencies

## Funding

### Primary Funder

- Bonneville Power Administration

### Other Funding Sources

- PSMFC IJFA
- EPA Exchange Network
- NOAA

### In-Kind

States, Tribes, and Federal agencies



A FISHERIES DATA PROJECT OF  
THE PACIFIC STATES MARINE FISHERIES COMMISSION



**North Santiam, Packsaddle Park, Oregon**

**Contact StreamNet Program PSMFC Team**  
[project@streamnet.org](mailto:project@streamnet.org)

Nancy Leonard, Program Manager

Mike Banach, Database Administrator

Greg Wilke, Software Application Programmer

Mari Williams, Data Management Specialist / Fishery Biologist

Van Hare, PSMFC GIS Manager

Stan Allen, Senior Program Manager