

Fish Distribution Data Development, Documentation, and Mapping
Oregon Department of Fish and Wildlife
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Natural Resource Information Management Program
April 2000

Overall Project Summary

Digital Distribution Data

The goal of this project is to develop consistent and comprehensive statewide fish distribution data for all salmonid species at a scale of 1:24,000. This distribution data will represent the known or probable presence of all salmonid species throughout the state of Oregon. Known distribution supported by recorded observation data will be distinguished from information that has no supportive observation data (referred to as probable presence information). Probable presence information will be categorized according to the level of confidence of the biologist providing the information. Where available, and as time permits, information will be captured to describe the level of confidence that a particular species does not occur in a given area. However, no attempt will be made to verify species absence.

For anadromous salmonids, distribution will be identified by habitat use-type (spawning and rearing, rearing and migration, or migration only). Resident salmonids will be noted as present - no attempt will be made to distinguish the use of the habitat involved, unless migration corridors are a critical feature of the species' life history.

Fish distribution occurring on streams contained within the 1:100,000 routed stream layer will be displayed as continuous lines on the stream line-work by habitat use-type or presence category. Distribution occurring on 1:24,000 scale streams will be displayed as points on the stream and will represent use-type transition points along a stream, with the furthest upstream point also representing the upper extent of fish distribution. These data points can be used to create continuous lines when a 1:24,000 routed stream layer becomes available.

The results of this project will be fully compatible with current efforts to develop 1:24,000 stream coverages. It is anticipated that once the 1:24,000 stream coverages are available for entire 4th field HUCs, information resulting from this proposal will be incorporated onto the new 1:24,000 map layers as lines rather than points. Until that time, information from both scales will be combined and overlaid onto digital topographic map images called digital raster graphics (DRGs). Upon completion of the project, ODFW will conduct a one-day workshop for all potential end users (e.g., ODEQ, ODF, ODFW, Watershed Councils) to describe the data and demonstrate appropriate uses, along with training on how to access the database.

Documentation

The source for determining the distribution for all streams indicated to have species presence will also be recorded. ODFW District staff, along with biological staff from other cooperating agencies will be asked to assist with identifying physical observation data as their schedules permit and this information will be recorded as it is made available. Either physical observations or the professional judgment of staff biologists will be considered viable documentation and distribution will be recorded based on either source. In some instances, professional judgement of assisting biologists from differing agencies will not

match. Project staff will arbitrate these cases according to established guidelines until a final decision is reached.

Observation data will be categorized based on the specificity of the location information provided (i.e. stream name, stream length along a stream, exact pool location, etc.). Observation data that cannot be linked to a single stream will not be utilized (i.e. a juvenile trap at the mouth of a subbasin). Observation data used to verify fish distribution will be obtained and forwarded to the StreamNet Library in Portland where it can be made available if direct access to the source data is needed.

Ancillary attribute information

Ancillary attribute information will also be captured which will enhance the utility of the fish distribution information. This will include information on the existence of barriers to upstream migration of adult fish. Migration barriers will be categorized according to their influence on the fish (total or partial barrier), by species. Also, information on timing of occurrence by life-stage (spawning, rearing, migration) and genetic and production origin (wild, hatchery - how did the species come to be there originally, and how is it being sustained presently) will be compiled at the 4th, 5th, or 6th field hydrologic unit (HUC) scale depending on the precision of available information.

Long-term maintenance

During the scope of this project, all attributes will be maintained and updated as new information become available. However, once established, distribution information will not be changed or modified without credible proof that a change is necessary. This will prevent the need to re-visit with every area biologist each time a modification is proposed.

Present Condition

At present, most information related to fish distribution is located at individual ODFW field offices as well as several other natural resource agency offices, making it difficult to determine where the various species and their habitat occur within watersheds. This effort will bring together information from various sources into a single database. Existing information will be used as the starting point for making updates. This will ensure that past efforts are not wasted or duplicated. This effort will also ensure that new information is compatible with existing ODFW fish distribution data layers by using established criteria and definitions.

Once available in digital form, this information will represent a permanent, yet easily adaptable information source that will also allow access and use by a variety of resource management agencies involved in all aspects of threatened species protection and recovery. The results of this project will allow all salmonid species to be considered when attempting to prioritize and target areas where standard watershed evaluation, monitoring and assessment activities might take place (e.g. watershed assessments, habitat restoration/improvement, blockage removal, fish abundance surveys, habitat evaluation surveys, fish presence/absence surveys, ESA related activities, etc.) This common source of information should facilitate better coordination of resource management decisions in the future.

Final Products

- 1) 1:100,000 scale routed fish distribution (event) data for all salmonids statewide, including habitat use-type for anadromous species, genetic and production origin, and supporting documentation.
- 2) 1:24,000 scale fish distribution represented by point data (at a minimum), which can be overlaid onto digital topographic images. Efforts will also be made to convert 1:24k point data into line (event) data as routing of 4th field HUCs are completed.
- 3) ODFW will host a workshop on how the data was captured and how it can be accessed for all interested parties
- 4) Point or event data illustrating biologist's level of certainty of species absence (where available and appropriate).
- 5) A database of observation records that documents distribution.
- 6) Copies of literature used to obtain observation records available for viewing from the StreamNet Library in Portland.
- 7) Polygon coverages outlining timing of occurrence by life-stage information.
- 8) Information on the location, and blockage extent (by species) of barriers to adult migration.

Project objectives, tasks, and timeline

(Note: some objectives and/or tasks will be conducted concurrently. It is anticipated that Objectives 1-6 will be completed within 2 years of project initiation)

Objective 1: Develop tabular data structures to capture target information. (2-4 months)

- Task 1: Create a data structure to capture observation data reference information, including a spatial component that relates to the fish distribution it verifies.
- Task 2: Create a data structure to capture information that describes fish passage barriers
- Task 3: Develop standard definitions for genetic (how the species originated in an area) and production (how is the species being maintained in an area) origin categories and create a data structure to capture origin related information.
- Task 4: In consultation with DEQ staff, create a data structure to capture timing information by life-stage.
- Task 5: Create a data structure/form (paper and/or electronic) that allows an efficient method of capturing comments and updates from field staff.
- Task 6: Develop a tracking procedure that includes a statewide status map and make it available online to allow others to track the progress of this project.

Objective 2: Capture readily available observation data documentation (1-3 months)

- Task 1: Review existing StreamNet tabular data, and other readily available observation data.
- Task 2: Conduct a literature review for new observation references via StreamNet, ODFW, and public Library resources.
- Task 3: Review any raw data or gray literature submitted prior to draft map production from ODFW district offices or other participating agencies.
- Task 4: Submit original or copied versions of all references to the StreamNet Library for cataloging and shelving.
- Task 5: Populate the documentation data structure where documentation is found.

Task 6: Send revised documentation data structure to the GIS staff for inclusion on with 1:24,000 fish distribution maps.

Task 7: Verify that all references are assigned appropriate StreamNet catalog numbers.

Objective 3: Compile fish distribution data onto the 1:100k routed stream layer and the 1:24k digital topographic maps. (6-11 months)

- Task 1: Compile all (internal and external) existing electronic 1:100,000 and 1:24,000 species distributions layers and produce comparative maps by species delineating the information by source.
- Task 2: Print the existing ODFW 1:100,000 and 1:24,000 species distributions and verification information onto individual 1:24,000 scale maps by species and provide to project field staff.
- Task 3: Project staff visually examines each map and documentation record to ensure proper placement, avoid overlapping information, and ensure the proper documentation category has been assigned. Update maps as needed.
- Task 4: Once maps are ready, project staff visits each ODFW district, regional, and field office in the state.
 - a) Compile information on the known and/or suspected spawning, rearing, and migration distribution for anadromous species and known and/or suspected presence distribution resident salmonid species onto the previously described 1:24, 000 scale quad maps;
 - b) Identify and catalog the most recent written documentation of the existence of a particular species in a given area. This work would be consistent with previously determined criteria and definitions.
- Task 5: Visit other federal and state land-management agency offices.
 - a) Compile information that differs from that provided by ODFW staff on the known and/or suspected spawning, rearing, and migration distribution for anadromous species and known and/or suspected presence distribution resident salmonid species onto the previously described 1:24, 000 scale quad maps;
 - b) Identify and catalog the most recent written documentation of the existence of a particular species in a given area if it differs from or provides more recent information from that provided by ODFW staff. This work would be consistent with previously determined criteria and definitions.
- Task 6: After all available information is compiled, rectify any discrepancies or disagreements using documented information. If discrepancies or disagreements exist in areas where no observation data exists, project staff will arbitrate the situation according to established guidelines until a final decision is reached.
- Task 7: Incorporate additional verification data provided during map review into the documentation data structure and perform Objective 2: Tasks 4-7.
- Task 8: Return maps to GIS staff.

Objective 4: Incorporate compiled data into electronic format (6-12 months)

- Task 1: Receive revised maps and data forms from field staff.
- Task 2: Using established procedures, capture compiled 1:100,000-scale fish distribution information into existing ODFW distribution datasets.
- Task 3: Using a 'heads-up' digitizing technique, capture compiled 1:24,000 fish distribution information as point data.

- Task 4: Update the tabular data structures with observation data verification information, genetic and production origin information and life-stage timing information obtained from field offices.
- Task 5: Print both the 1:100,000 and 1:24,000 scale fish distribution along with the verification information onto digital raster graphics (DRGs) for biologist's review.
- Task 6: Print separate 1:100,000 scale fish distribution maps reflecting genetic origin, production origin, and life-stage timing information for final review.

Objective 5: Complete the final review of the distribution maps (2-4 months)

- Task 1: Project staff will review the distribution maps and data forms for obvious omissions or errors and contact field biologists via phone to resolve discrepancies.
- Task 2: For discrepancies that cannot be resolved via a phone call, redistribute maps to appropriate field offices for review, and modification (some in-person visits may be necessary).
- Task 3: Biologists rectify distribution and verification data discrepancies and return information to project field staff.
- Task 4: Maps without rectification issues will be marked "final" and staff will proceed to Objective 6, Task 2.
- Task 5: Maps with rectification issues will be resubmitted to GIS staff for final modifications.
- Task 6: Correct all remaining rectification issues, and mark maps as "final".

Objective 6: Make final distribution and ancillary information available (2-3 months)

- Task 1: Finalize metadata for all distribution, and ancillary information developed by this effort.
- Task 2: Develop 8-1/2x11 images of each 4th field HUC for online downloading and make available on via the web.
- Task 3: Create zipped coverage and shape files and make them available via the web
- Task 4: Notify state and federal agencies, tribes, watershed councils and other interested parties of the availability of the information, along with instructions on how to access it.
- Task 5: Convene a 1-day information workshop to describe the development process, highlight available data features, outline strengths and weaknesses of the data, and provide instructions on how to access the data.

Objective 7: Maintain and update distribution data layers, as new information becomes available. (3-6 months, depending on budgetary constraints)

- Task 1: Create and test a procedure for field staff to follow for notifying GIS staff of new information that warrants modifying existing distribution layers.
- Task 2: Develop an automated process for converting point data along 1:24k streams into line (event) data and (as time permits) do the conversion, as entire 4th fields HUCs are completed and available.
- Task 3: Evaluate all new information against established modification criteria and where appropriate, modify existing information.
- Task 4: Update information available via the web and revise update dates to reflect the latest version.