Resources related to Aquatic restoration and fish passage. Download the latest version from
https://github.com/NewGraphEnvironment/dff-2022/raw/main/docs/Aquatic_restoration_and_fish_passage_resources.pdf

Resource	URL	Details
bcfishpass	https://github.com/smnorris/bcfishpass	Maintain an aquatic connectivity / fish passage database for British Columbia to track known barriers to fish passage, model potential barriers to fish passage, model passability/accessibility of streams based on species swimming ability, model streams with potential for spawning and rearing activity, etc
fpr	https://github.com/NewGraphEnvironment/fpr	R package used for cleaning, transforming and extracting data to build interactive reports related to fish passage planning including fish passage assessments and habitat confirmation assessments at road-stream crossings
dff-2022	https://github.com/NewGraphEnvironment/dff-2022	Building digital field forms, mobile QGIS projects and processing data collected using standardized provincial data layer and data collection templates. Utilizes open source software including R, python, bash and QGIS and others.
Restoring Fish Passage in the Peace Region 2023	https://newgraphenvironment.github.io/fish_passage_peace_2023_reporting/	NOT YET LIVE (20231031). Interactive reporting for 2023 fish passage restoration planning activities in the Parsnip, Carp and Crooked Watershed Groups north of Prince George in the Peace Region. Designs completed for two crossings in the Table River watershed (Parsnip River watershed group) and materials purchased for remediation. Phase 1 and Phase 2 assessments in Carp and Crooked watershed groups. Fish sampling with PIT tagging conducted in Parsnip River watershed group. Aerial imagery collected by drone.
Restoring Fish Passage in the Peace Region 2022	https://newgraphenvironment.github.io/fish_passage_peace_2022_reporting/	Interactive reporting for 2022 fish passage restoration planning activities in the Parsnip, Carp and Crooked Watershed Groups north of Prince George in the Peace Region. Includes interactive planning dashboard. Crossing in Missinka watershed replaced and design done for site on Chuchinka-Arctic FSR. Fish sampling with PIT tagging conducted. Aerial imagery collected by drone.
Restoring Fish Passage in the Peace Region 2021	https://newgraphenvironment.github.io/fish_passage_parsnip_2021_reporting/	Interactive reporting for 2021 fish passage restoration planning activities in the Parsnip Watershed Group north of Prince George in the Peace Region. Includes interactive planning dashboard and webmapping.
Parsnip_Fish_Passage	https://newgraphenvironment.github.io/Parsnip_Fish_Passage/	Interactive reporting for 2019 fish confirmation assessments in the Parsnip Watershed Group north of Prince George in the Peace Region. Fish sampling conducted. Aerial imagery collected by drone.
Skeena Fish Passage Restoration Planning 2022	https://newgraphenvironment.github.io/fish_passage_skeena_2022_reporting	Interactive reporting for Fish passage and habitat confirmation assessments in the Morice River, Zymoetz River and Kispiox River watershed groups. Fish sampling conducted.
Bulkley River Watershed Group Fish Passage Restoration Planning 2022	https://newgraphenvironment.github.io/fish_passage_bulkley_2022_reporting/	Interactive reporting for fish passage assessments and habitat confirmation assessments at sites in the Bulkley River watershed group. Fish sampling with PIT tagging conducted.

Resource	URL	Details
Bulkley River and Morice River Watershed Groups Fish Passage Restoration Planning 2021	https://newgraphenvironment.github.io/fish_passage_skeena_2021_reporting/	Interactive reporting for Fish passage assessments and habitat confirmation assessments in the Bulkley River and Morice River watershed groups. Fish sampling conducted.
Bulkley River and Morice River Watershed Groups Fish Passage Restoration Planning 2020	https://newgraphenvironment.github.io/fish_passage_bulkley_2020_reporting/	Interactive reporting for fish passage assessments and habitat confirmation assessments in the Bulkley River and Morice River watershed groups. Fish sampling conducted.
Elk River Watershed Group Fish Passage Restoration Planning 2022	https://newgraphenvironment.github.io/fish_passage_elk_2022_reporting/	Interactive reporting for fish passage assessments and habitat confirmation assessments in the Elk River watershed group. Fish sampling, fish habitat assessment procedures, temperature monitoring and stream discharge measurements were conducted.
Elk River Watershed Group Fish Passage Restoration Planning 2021	https://newgraphenvironment.github.io/fish_passage_elk_2022_reporting/	Interactive reporting for fish passage assessments and habitat confirmation assessments in the Elk River watershed group. Fish sampling, fish habitat assessment procedures and temperature monitoring were conducted.
Elk River Watershed Group Fish Passage Restoration Planning 2021	https://newgraphenvironment.github.io/fish_passage_elk_2021_reporting/	Interactive reporting for fish passage assessments and habitat confirmation assessments in the Elk River watershed group. Fish sampling conducted.
Elk River Watershed Group Fish Passage Restoration Planning 2020	https://newgraphenvironment.github.io/fish_passage_elk_2021_reporting/	Interactive reporting for fish passage assessments and habitat confirmation assessments in the Elk River watershed group. Fish sampling conducted.
Richfield Creek Riparian Restoration 2022	https://github.com/NewGraphEnvironment/fish_passage_bulkley_2022_reporting/raw/main/docs/SERN_Richfield_Fencing_2022_Final%20Report.pdf	Leveraging other investments in the watershed by Morice Watershed Monitoring Trust (streambank stabilization and riparian planting at four locations) and A Rocha Canada, we supported installation of 840m of cattle exclusion fence on previously unfenced areas of rangeland adjacent to high fisheries values in Richfield Creek. Installation of live cuttings in four distinct polygons covering 866m^2 of riparian area. Use of drone to gather Lidar and temperature data to help inform future process-based restoration actions in the Upper Bulkley Watershed.
Richfield Creek Riparian Fencing 2021	https://github.com/NewGraphEnvironment/fish_passage_skeena_2021_reporting/raw/master/docs/Attachment_4.pdf	Leveraging other investments in the watershed by Morice Watershed Monitoring Trust (streambank stabilization and riparian planting at four locations) we supported the installation of 1100 m of fencing on the west of Richfield Creek in in the Upper Bulkley Watershed.
fish-passage-22	https://github.com/poissonconsulting/fish-passage-22	Mapping stream discharge and temperature causal effects pathways to focus aquatic restoration actions in areas of highest potential for positive impacts on fisheries values
fissr-explore	https://github.com/NewGraphEnvironment/fissr_explore	Exploratory analysis of provincial fish sampling dataset to explore utility for building evidence based approach to the parameters used to model the best habitat for individual fish species to help make decisions around where to invest in aquatic restoration activities

Resource	URL	Details
fissr-explore-21	https://www.poissonconsulting.ca/f/1386346791	Analysis of relationships between rainbow trout density (from province wide electrofishing dataset), channel width and gradient
channel-width-21b	https://www.poissonconsulting.ca/f/859859031	Modelled estimate of channel width based on watershed area and mean annual precipitation. Used to help estimate rearing and spawning suitability of streams for fish use by numerous species in bcfishpass.
bcdata	https://github.com/smnorris/bcdata	Simplifies downloads of BC geographic data (https://catalogue.data.gov.bc.ca/) and DEMs. Integrates with postgres databases using schema and table names identical to those of the province. Allows real-time updates of datasets and collaborative sharing of scripts/workflows.
fwapg	https://github.com/smnorris/fwapg	Extends British Columbia's Freshwater Atlas (FWA) with PostgreSQL/PostGIS to enable speedy upstream/downstream queries throughout BC, quickly and cleanly generate watershed boundaries upstream of arbitrary locations, enable quickly serving FWA features as vector tiles, etc.
bcfishobs	https://github.com/smnorris/bcfishobs	Locate up to date fish observation points as linear referencing events on the Freshwater Atlas.
roadintegrator	https://github.com/smnorris/roadintegrator	Merge multiple BC road datasets into a single layer for Cumulative Effects analysis
designatedlands	https://github.com/smnorris/designatedlands	Combine spatial data for 40+ designations that contribute to land management to create a single 'Designated Lands' layer for British Columbia
Fish Passage Maps	https://hillcrestgeo.ca/outgoing/fishpassage/projects/	Georeferenced maps for all Skeena watershed groups, Elk River as well as the Parsnip River, Crooked, and Carp River watershed groups in the Peace Region. Can be imported to phone or table for navigation real-time in Avenza Maps.