British Columbia – Forage Fish Monitoring Dictionary

Purpose: To provide definitions and examples that ease navigation of the forage fish spawning beach monitoring data being produced by the Forage Fish Spawning Beach Monitoring Network.

Dictionary

1. Spreadsheet Tab: **tblBeach**

Column Headers	Definition	Details	Examples or Codes
Beach_ID	*A numeric value that is connected to beach being sampled.*	Numeric value – 1 to infinity.	e.g., 2 – connected to Baker Beach - Station 2
Regional_District_Code	*Regional districts are the regional government that has boundaries that include electoral areas and member municipalities.*	Acronym for the regional district that the sample beach is located in.	e.g., **CRD =** Capital Regional District
Management_Subarea	*Fisheries and Oceans Canada (DFO) fisheries management areas.*	Numeric value	e.g., 14-2
Municipality	*Municipality or electoral area that the beach falls into*	Name of the municipality or electoral area	e.g., North Saanich and/or NS (https://www.civicinfo.bc.ca/municipalities)
Indigenous_Territory01 – Indigenous_Territory07	*Indigenous territory or territories that the beach falls into.*	Territory name. (https://native-land.ca/)	e.g., Qayqayt Musqueam Tsleil-Waututh
Geographical_Landmass	*The geographical landmass that the beach is located on.*	Name of the landmass.	e.g., ● BC Mainland ● Cortes Island ● Vancouver Island
Beach_Name	*The name of the beach.*	Beach name.	e.g., Telegraph Beach
Beach_Aspect	*The aspect of the beach being sampled.*	Compass direction.	e.g., WSW
Beach_Bearing	*The compass bearing value of the sampled beach.*	Numeric value in degrees.	e.g., 265
Fetch_km	*Horizontal distance over which wave-generating winds can blow with little to no disruption.*	Numeric value, 0 to ~9,000 km.	e.g., 12

Exposure_Code	*Wave exposure category is determined according to the defined fetch distance for the beach.*	See **Table 1** for code definitions.	● Very Protected ● Protected ● Semi-Protected ● Semi-Exposed ● Exposed ● Very Exposed
ShoreZone_Habitat_Suitability model	*ShoreZone habitat suitability model indicates shoreline that contains continuous or patchy potential spawning habitat for surf smelt and Pacific sand lance habitat.*	True or false – depends on if the beach is in the shoreline regions highlighted to contain continuous or patchy potential spawning habitat	● TRUE ● FALSE Note - leave blank if unable to access maps
ShoreZone_Phyident	*A unique code determined from the ShoreZone dataset used to identify each shore unit following the format: Region/Area/ PhyUnit/Subunit*	Can be determined by comparing coordinate info of point to ShoreZone dataset. If lat/long are provided. Alternatively, SGDC can calculate	e.g., 05/03/0207/00
Other_Surveys	*Indicates if the beach has been previously surveyed for eggs prior to the organizations first sampling.*	Provide the organization that previously sampled the beach.	e.g., BC Shore Spawners Alliance
Winter_Assessment	*Date of the first sampling that occurred, if in the winter (October to March). Left blank if sampling occurred outside those months.*	yyyy-mm-dd	e.g., 2017-12-15
Site_Suitability_Winter	*Beach contains suitable sand/gravel material to sample for forage fish eggs.*	True or False – indicates if the material at the beach is suitable for winter sampling.	● TRUE ● FALSE
StaffID_Winter_Assessment	*Code of the primary staff or community member that sampled the beach.*	Numeric value accessed from the tblStaff.	e.g., 4 – associated to Jane Doe.
Summer_Assessment	*Date of the first sampling that occurred, if in the summer (April to September). Left blank if sampling occurred outside those months.*	yyyy-mm-dd	e.g., 2018-05-20
Site_Suitability_Summer	*Beach contains suitable sand/gravel material to sample for forage fish eggs.*	True or False – indicates if the material at the beach is suitable for summer sampling	● TRUE ● FALSE Note - if a sample was obtained then leave true

StaffID_Summer_Assessment	*Code of the primary staff or community member that sampled the beach.*	Numeric value accessed from the tblStaff.	e.g., 4 – associated to Jane Doe.

2. Spreadsheet Tab: **tblStaff**

Column Headers	Definition	Details	Examples or Codes
StaffID	*A numeric value that is connected to the staff or community-scientist member doing the beach sampling.*	Numeric value, 1 to infinity.	e.g., 3
First_Name	*First name of the sampler.*	Sampler's name	e.g., Jane
Last_Name	*Last name of the sampler*	Sampler's surname	e.g., Doe
Initials	*Initials of sampler*	Two, or three-letter code representing samplers first and last name.	e.g., JD
Organization	*Organization that the sampler belongs too.*	Community groups name	e.g., Mid-Vancouver Island Habitat Enhancement Society (MVIHES)
Date_Trained	*Date that the individual was first trained in forage fish beach sampling.*	yyyy-dd-mm	e.g., 2012-06-01
Who_Trained	*Name of the individual that trained the sampler.*	Name of the person that trained the samplers	e.g., Haley Tomlin
Where_Trained	*Location that the person was trained.*	Electoral Area or Municipality	e.g., Parksville
Trained_Field_Sampling	*Individuals trained to do field sampling.*	True or False	● TRUE ● FALSE
Trained_Lab_Analysis	*Individual trained to look for eggs under a microscope.*	True or False	● TRUE ● FALSE

3. Spreadsheet Tab: **tblSample**

Note – If there are attributes that are not collected or not applicable, please leave cells blank.

Column Headers	Definition	Details	Examples or Codes
Sample_ID	*Sample ID of the sample collected.*	Alphanumeric code for the beach sample collected. Follows the format: Host Organization Abbreviation / BeachID / T / DateTime See **Table 2** for organization abbreviations.	e.g., MABRRI_24_20231207T1835
Beach_ID	*Associated beach ID from the tblBeach category for the beach being sampled.*	Numeric value – 1 to infinity.	e.g., 6
Field_DateTime	*Date and time of the sampling event.*	yyyy-mm-dd hh:mm Use 24 hr clock format, eliminating the need for AM/PM designation.	e.g., 2020-11-09 18:06
Staff_Field_01 - Staff_Field_10	*Associated Staff ID from the tblStaff category for all samplers involved in field collection.*	Numeric value, 1 to infinity.	e.g., 201
Weather_Conditions	*Description of the weather conditions of the day of sampling. 45 char max.*	Weather condition	e.g., overcast
Air_Temperature_C	*Recorded air temperature on the day of sampling.*	Numeric value, 0 to infinity in °C	e.g., 9
Wind_Direction	*Recorded wind direction on the sampling day.*	Direction of the wind	e.g., NW
Wind_km_hr	*Recorded wind speed on the sampling day.*	Numeric value, 0 to infinity	e.g., 15
Water_Temperature_C	*Recorded water temperature on the sampling day.*	Numeric value, 0 to infinity in °C	e.g., 12
Storm_Event	*Storm event occurred on or 1-week before sampling day.*	True, False, NA, dependent on wind speed. (NA if you did not collect this information)	● TRUE ● FALSE ● NA
Storm_ID	*Recorded value of the storm that occurred from the tblStorm*	Numeric value, 1 to infinity.	e.g., 12

Storm_Comments	*Description of storm instances during/before sampling.*	If there are storm conditions you wish to share, please enter here.	e.g., Atmospheric river 3 days prior to sampling.
Beach_Wrack	*Evidence of beach wrack collection off the beach. Recorded in QEP sampling methodology.*	True, False, NA (NA if you did not collect this information)	● TRUE ● FALSE ● NA
Beach_Slope_Code	*Slope code for the beach determined from the numeric measurement of the slope. Recorded in QEP sampling methodology.*	Numeric. See **Table 2.** Organization Abbreviations **Organization Name** Comox Valley Projec Cowichan Tribes Loon Foundation / F Mount Arrowsmith Pacific Rim National Peninsula Streams S Sunshine Coast Frie Tsleil-Waututh Nati Table 3 for code definitions.	● **1** = Flat (<5°) ● **2** = Inclined (5 – 20°) ● **3** = Steep (>20°)
Calculated_Beach_Slope	*Slope of the beaches 5 m sample width determined by a clinometer. Recorded in QEP sampling methodology.*	Numeric value.	e.g., 4.5
Datetime_HighTide	*Recorded date and time of the most recent high tide event.*	yyyy-mm-dd hh:mm Use 24 hr clock format, eliminating the need for AM/PM designation.	e.g., 2020-11-08 12:12
Elevation_HighTide_m	*Recorded high tide in metres that occurred on the sampling session date.*	Numeric value, 0.0 to infinity in metres.	e.g., 3.3
Datetime_2ndHighTide	*Recorded date and time for the 2nd effective high tide – if a 2nd effective high tide has occurred. If not applicable, leave blank.*	yyyy-mm-dd hh:mm Use 24 hr clock format, eliminating the need for AM/PM designation.	e.g., 2020-11-07 19:54
Elevation_2ndHighTide_m	*Recorded high tide that effectively occurred prior to the last high tide on the sampling day – if a 2nd effective high tide has occurred. If not applicable, leave blank.*	Numeric value, 0.0 to infinity in metres.	e.g., 3.3

Lat	*Recorded latitude coordinate of the sample location.*	Numeric value xx.xxxxxx decimal degrees.	e.g., 48.569941
Long	*Recorded longitude coordinate of the sample location.*	Numeric value - xxx.xxxxxx decimal degrees.	e.g., -124.405752
Sediment_Description	*Description of the sediment along the transect line.*	Description of the sediments observed during the sampling session.	e.g., Combination of sand and pea gravel.
Primary_Sediment_Code	*Code that indicates the dominant substrate character on the beach.*	Numeric. See **Table** 4 for code definitions.	● **0** = mud/silt ● **1** = sand ● **2** = pea pebble ● **3** = pebble gravel ● **4** = cobble gravel ● **5 =** boulder gravel ● **6** = boulders ● **7 =** gravel to boulders ● **8 =** bedrock ● **10** = organics
Secondary_Sediment_Code	*Code that indicates a secondary substrate character on the beach.*	Numeric. See **Table** 4 for code definitions.	● **0** = mud/silt ● **1** = sand ● **2** = pea pebble ● **3** = pebble gravel ● **4** = cobble gravel ● **5 =** boulder gravel ● **6** = boulders ● **7 =** gravel to boulders ● **8 =** bedrock ● **10** = organics
Backshore_Description	*Description of the backshore integrity.*	Description of the backshore around the sampling location.	e.g., Campground runs parallel to the sample site.
Backshore_Code	*Code that indicates the integrity of the backshore.*	Numeric. See **Table 5** for code definitions.	● **1** = natural ● **2** = 25% impacted ● **3** = 50% impacted ● **4** = 75% impacted ● **5** = 100% impacted
Width_m	*Recorded width of the potential spawning substrate band from the highest tide mark (determined by wrack line) down to the area that the sediment notably changes. If uniform sediment this value will only extend a few metres in elevation.*	Numeric value, 0 to infinity.	e.g., 6

Length_m	*Recorded length of the beach with similar substrate. If citizen scientist, it is recorded as less than (<) or greater than (>) 100 m.*	Numeric value, 1 to infinity in metres, if measured, or less than (<) or greater than (>) 100 m.	e.g., >100
Sampling_Comments	*Additional comments made during sampling that are noteworthy. Indicate if sample was collected by Community Scientists.*		e.g., Landmark measured to 10 m mark,0m at N end. Data collected by community scientists, not all attributes recorded. Lots of dog presence on beach.
Landmark	*Description of the landmark object that helps to measure the sample zone distance.*	Description of the landmark object.	e.g., Public beach access pole.
Landmark_Distance_m	*Recorded measurement from the centre of the transect line to the landmark object. Used to be able to repeat the sampling location during another sampling session.*	Numeric value, 0 to infinity (in 0.5) in metres.	e.g., 30
Tidal_Elevation_m	*Recorded tidal elevation in metres. Recorded in QEP sampling methodology.*	Numeric value, 0 to infinity in metres.	e.g., 4.5
Shading	*Code that indicates the level of shading experienced at the sampling location.*	Numeric. See **Table 6** for code definitions.	● **1** = fully exposed ● **2** = 25% shaded ● **3** = 50% shaded ● **4** = 75% shaded ● **5** = 100% shaded
Sample_Type	*Code that indicates the type of sample collected at the beach.*	Bulk or scoop. Note: scoop only taken if eggs clearly visible.	● **B** = bulk ● **S** = scoop ● **E =** eDNA ● **B & E** = bulk & eDNA ● **S & E** = scoop & eDNA
Smelt_Spawning	*Recorded if surf smelt spawning was evidently observed the beach and eggs observed within the sediment.*	Coded value. See **Table 7** for code definitions.	● **0 =** No eggs visible ● **H =** Heavy, broadly abundant ● **L** = Light, but apparent ● **M =** Medium, readily visible ● **W** = Eggs visible in winnow
SandLance_Spawning	*Recorded if Pacific sand lance spawning was evidently observed the beach and eggs observed within the sediment.*	Coded value. See **Table 7** for code definitions.	● **0** = No eggs visibile ● **H =** Heavy, broadly abundant ● **L** = Light, but apparent ● **M =** Medium,

			readily visible ● **W** = Eggs visible in winnow
Photos	*Indicates if photos were taken or not at the sample site.*	True or False	● TRUE ● FALSE
Staff_Vortex_01 - Staff_Vortex_10	*Associated Staff ID from the tblStaff category for all samplers involved in processing.*	Numeric value, 1 to infinity.	e.g., 301
Percent_Sample>4mm	*Rough estimate percentage of the sample material retained in the >4mm sieve. Recorded only in the QEP methodology.*	Numeric value, 0 to 100	e.g., 40
Percent_Sample>2mm	*Rough estimate percentage of the sample material retained in the >2mm sieve. QEP methodology.*	Numeric value, 0 to 100	e.g., 40
Percent_Sample>05mm	*Rough estimate percentage of the sample material retained in the >0.5mm sieve. QEP methodology.*	Numeric value, 0 to 100	e.g., 15
Percent_Sample<05mm	*Rough estimate percentage of the sample material retained in the <0.5mm sieve. QEP methodology*	Numeric value, 0 to 100	e.g., 5
Vortex_comments	*Comments from the processing session, if necessary.*		e.g., Sample extra silty/sandy, vortex 3 times. One full 500mL jar to analyze.
Staff_Lab_01 – Staff_Lab_06	*Associated Staff ID from the tblStaff category for all samplers involved in lab analysis.*	Numeric value, 1 to infinity.	e.g., 401
LabAnalysis_Comments	*Comments from the sample for the analysis.*		e.g., sample was kept in preservative; lots of organic debris and algae present. Minimal shell hash present.
Eggs_Observed	*Eggs were observed in the lab analysis.*	Species observed.	● Pacific sand lance ● Surf smelt ● Pacific herring ● PSL & SS ● Other ● Unknown ● None

4. Spreadsheet Tab: **tblSpeciesSample**

Column Headers	Definition	Details	Examples or Codes
Sample_ID	*Associated sample ID that has a positive embryo detection.*	Alphanumeric code for the sample.	e.g., MABRRI_24_20231207T1836
Species	*Forage fish species eggs that were detected.*	Species identified in the lab analysis. If more than one species detected in sample, create same number of entries. If species is not represented but known, list species type in Notes and select 'Other'.	● Pacific sand lance ● Surf smelt ● Pacific herring ● Other ● Unknown
Developmental_Stage	*Development stage if able to determine.*	Stage identified during the lab analysis provided in the methodology.	● > 1.5 coils ● 0.5 to 1 coil ● 1 cell to morula ● 1 coil ● Blastula ● Dead ● Gastrula ● Late eyed ● Stage unknown
Number	*Count of eggs found in the sample.*	Numeric value.	e.g., 55
Notes	*Additional notes to include in the sample if necessary. Can be utilized to indicate various stages.*		e.g., 10 alive and 7 shells. 2 Unknown species.

Appendix

Table 1. Exposure Definitions

Name	Definition
Very Protected	Effective fetch range: <1 km
Protected	Effective fetch range: 1-10 km
Semi-Protected	Effective fetch range: 10-50 km
Semi-Exposed	Effective fetch range: 50-500 km
Exposed	Effective fetch range: 500-1000 km
Very Exposed	Effective fetch range: >1000 km

Table 2. Organization Abbreviations

Organization Name	Abbreviation
Comox Valley Project Watershed Society	CVPWS
Cowichan Tribes	CT
Loon Foundation / Pender Harbour Ocean Discovery Station	PODS
Mount Arrowsmith Biosphere Region Research Institute	MABRRI
Pacific Rim National Park Reserve	NRNPR
Peninsula Streams Society	PSS
Sunshine Coast Friends of Forage Fish	SCFOFF
Tsleil-Waututh Nation	TWN

Table 3. Beach Slope Codes

Code	Name	Definition
1	Flat	<5°
2	Inclined	5°-20°
3	Steep	>20°

Table 4. Beach Sediment Codes

Code	Name	Definition
0	Mud/silt	Mud/silt (particles < 0.063 mm, feels 'slimy')
1	Sand	Sand (0.063 – 2.0 mm, feels 'gritty')
2	Pea gravel	Pea gravel (2.0 – 4.0 mm, 'fine gravel') with sand base
3	Pebble gravel	Pebble gravel (4.0 – 64.0 mm) with sand base
4	Cobble gravel	Cobble gravel (6.4 – 25.6 cm) with sand base
5	Boulder gravel	Boulder gravel (25.6 cm – 4.0 m) with sand base
6	Boulders	Boulders (> 4.0 m) with sand base
7	Gravel to boulders	Gravel to boulders, no sand base
8	Bedrock	Bedrock, no habitat
10	Organics	Organics (shell hash, drift vegetation)

Table 5. Backshore Codes

Code	Name	Definition
1	Natural	Natural, 0% impacted
2	25% impacted	25% impacted (75 m)
3	50% impacted	50% impacted (150 m)
4	75% impacted	75% impacted (225 m)
5	100% impacted	100% impacted (300 m)

Table 6. Shading Codes

Code	Name	Definition
1	Natural	Fully exposed
2	25% impacted	25% shaded (75 m length overhang)
3	50% impacted	50% shaded (150 m length overhang)
4	75% impacted	75% shaded (225 m length overhang)
5	100% impacted	100% shaded (300 m length overhang)

Table 7. Smelt Spawning and Pacific Sand Lance Spawning

Code	Definition
0	No eggs visible
L	Light, but apparent
M	Medium, readily visible
H	Heavy, broadly abundant
W	Eggs observed in winnow