Jun 23rd, 4:00 PM - 4:15 PM

Session A6: Five Years Monitoring of the Original "Stairs Pipe" Fish Pass Assess the Complete Reconnection and Natural Function of a Nursery Tributary for its Main River

Etienne Dupont

Five years monitoring

of the original « stairs pipe » fish pass

assess

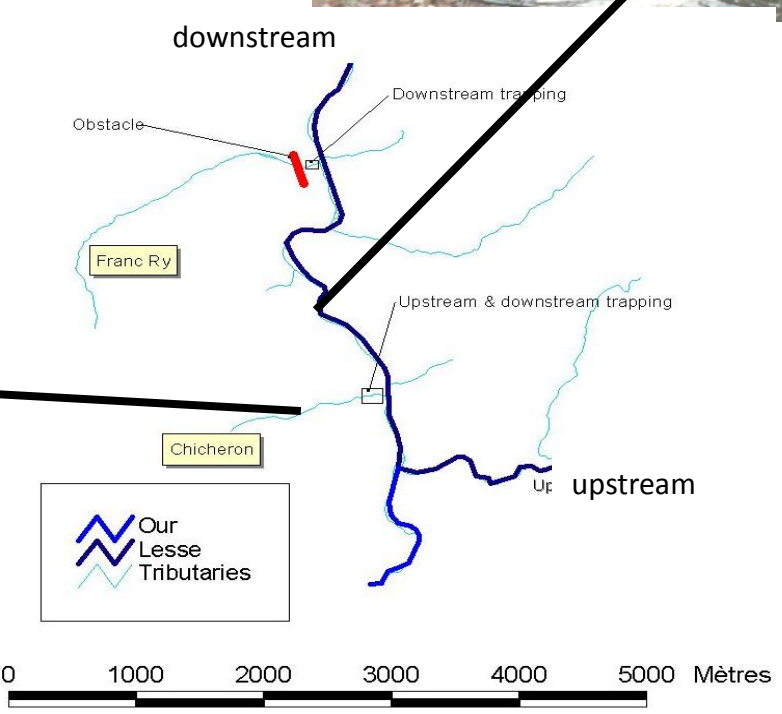
the complete reconnection and natural function

of a nursery tributary with its main river.

- 1 The natural function of a nursery tributary.
- 2 The disturbances created by a tributary disconnection.
- 3 The recovery observed after the reconnection.
- 4 The original « stairs pipe » fish pass allowing this recovery.

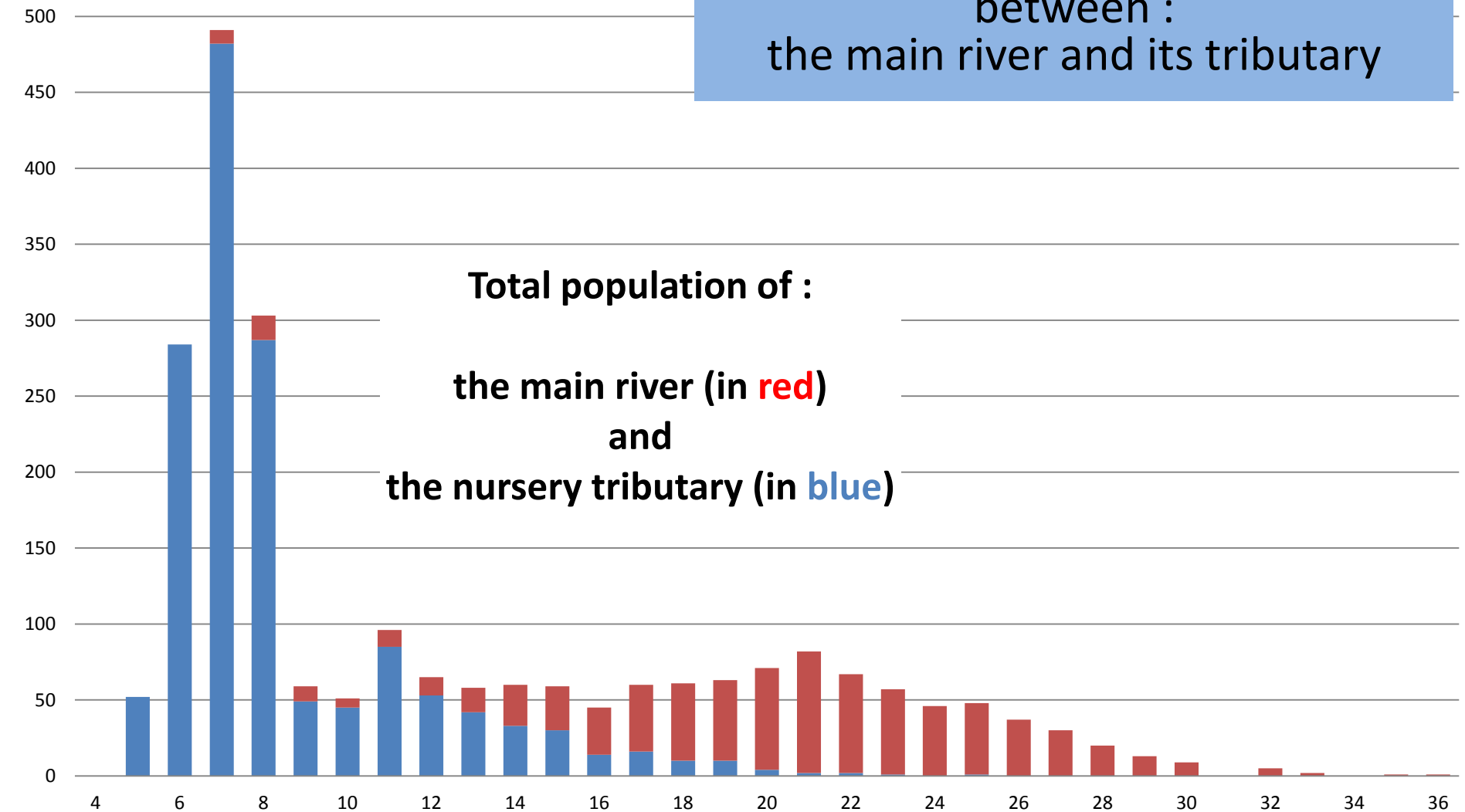
Tributary natural function

The main river and two neighbouring tributaries



Tributary natural function

In the river-tributary system
there is
a trout population splitsing
between :
the main river and its tributary



Total population of :

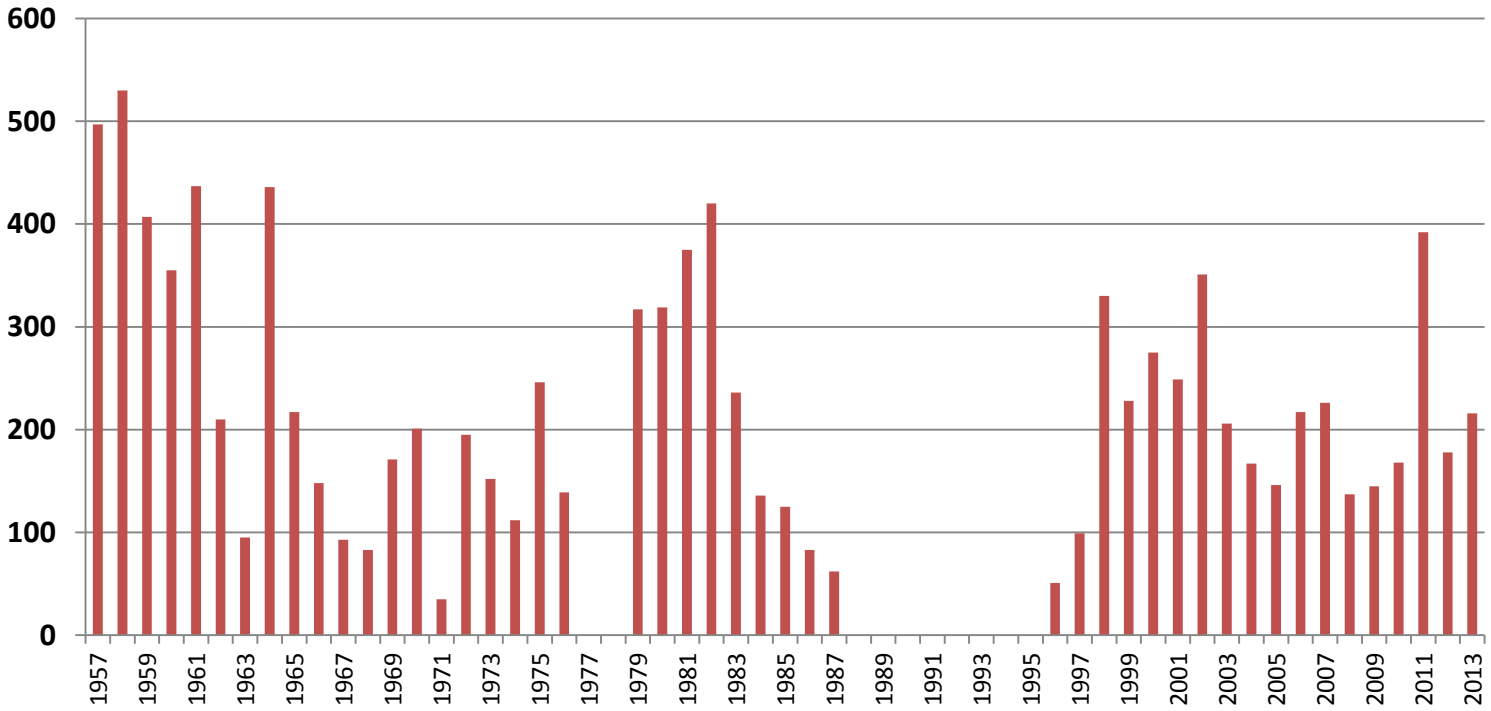
the main river (in red)
and
the nursery tributary (in blue)

Tributary natural function

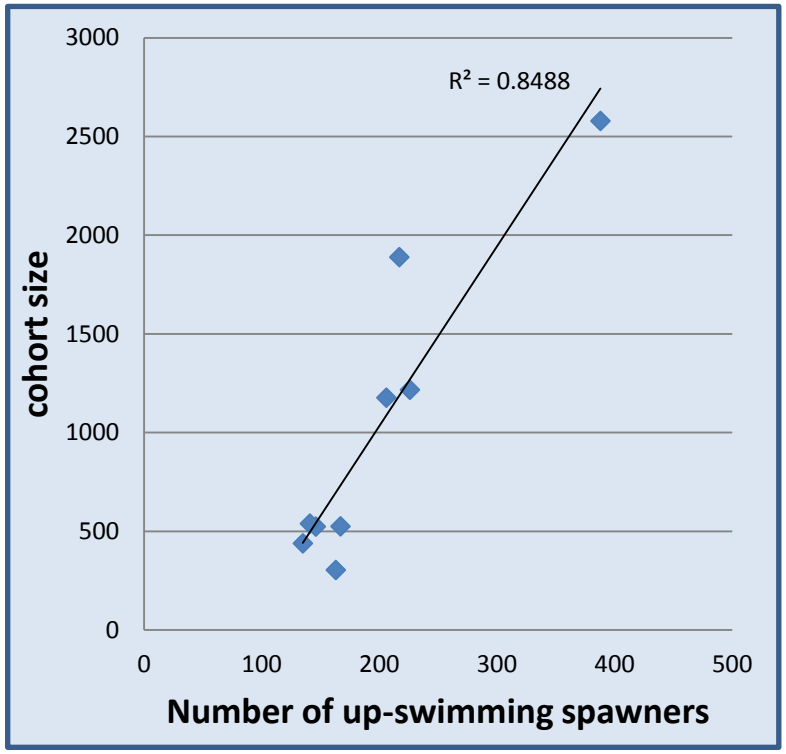
A large number of spawners migrate every winter to the brook to spawn.

They are much more numerous than the brook resident ones which are sometimes completely absent.

Number of up-swimming spawners to the Chicheron brook since 1957 to 2013

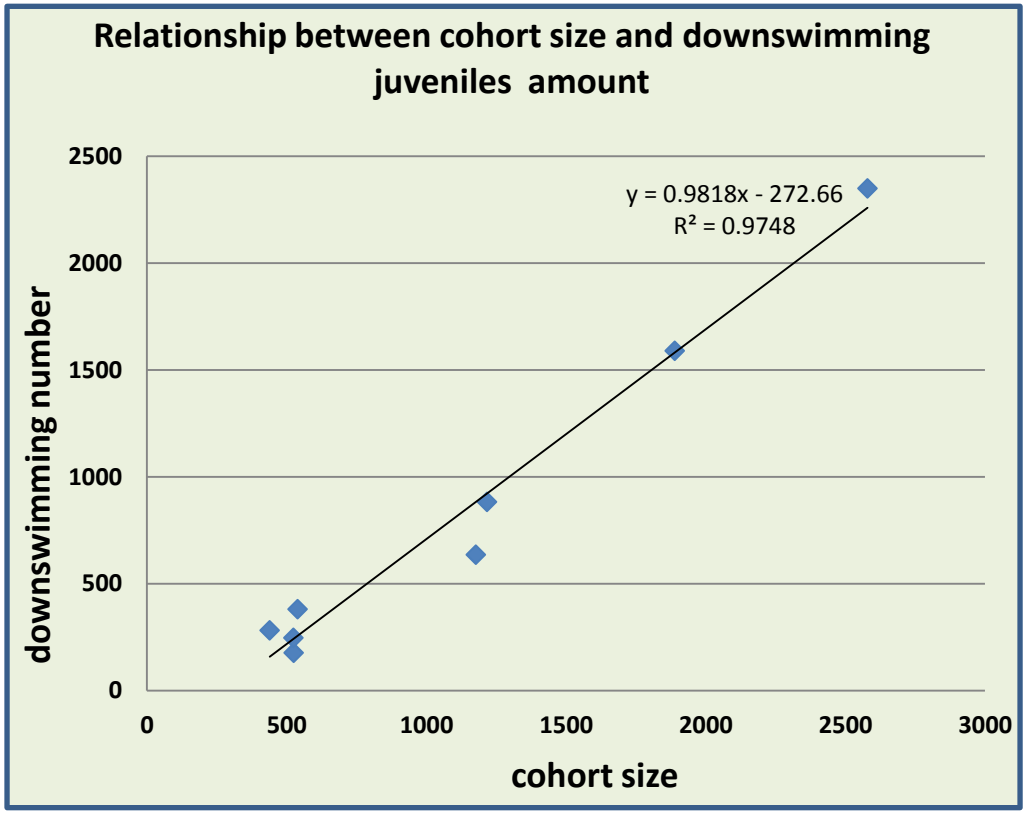


Tributary natural function



The number of migrating spawners determines the juveniles cohort size

The largest is the cohort the more numerous are the downswimming juveniles.

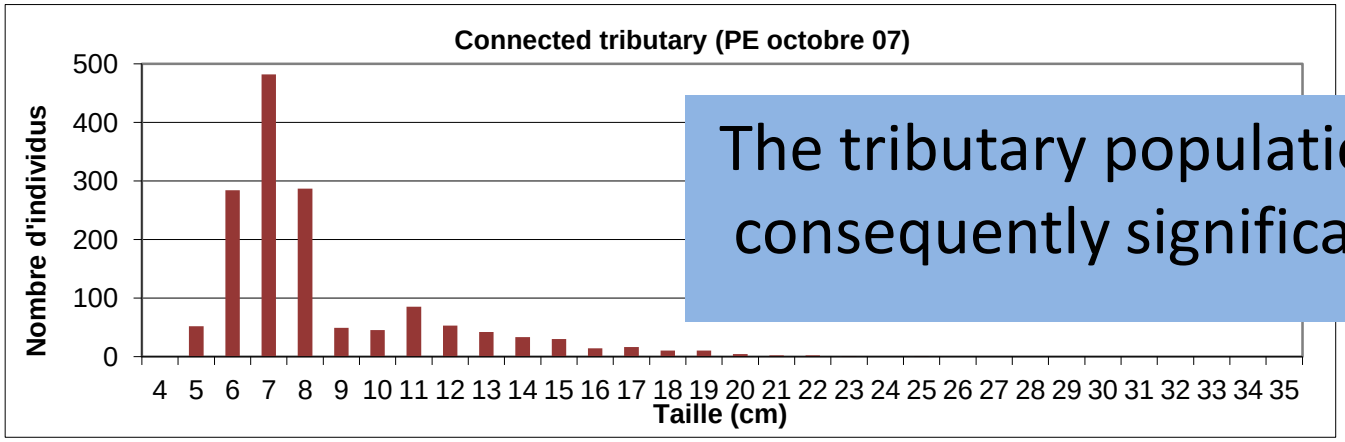


Disturbances due to the tributary disconnection

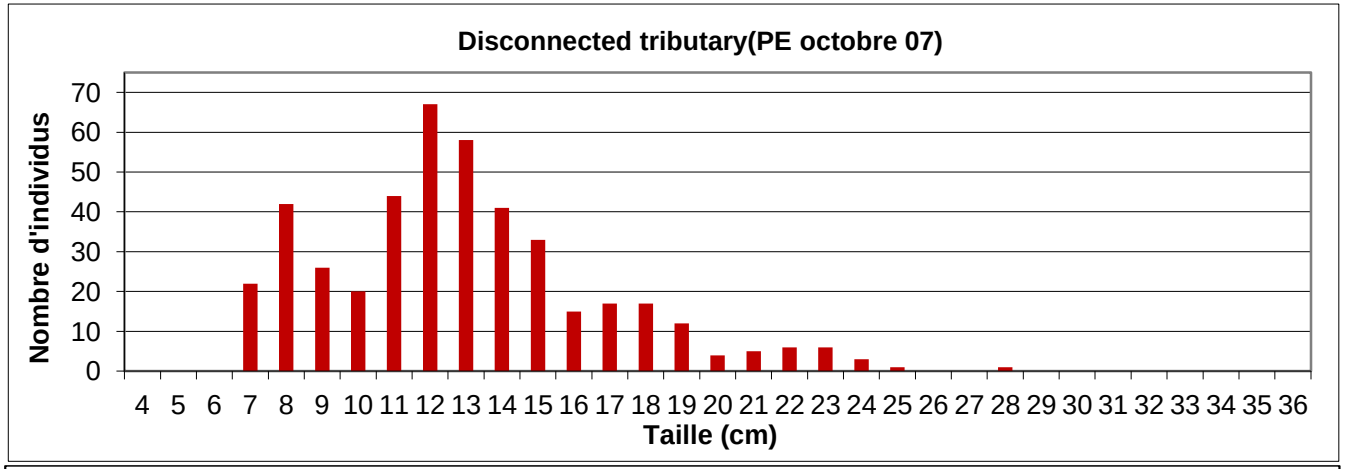
The first result of the disconnection is the absolute impossibility of any run for the main river spawners.

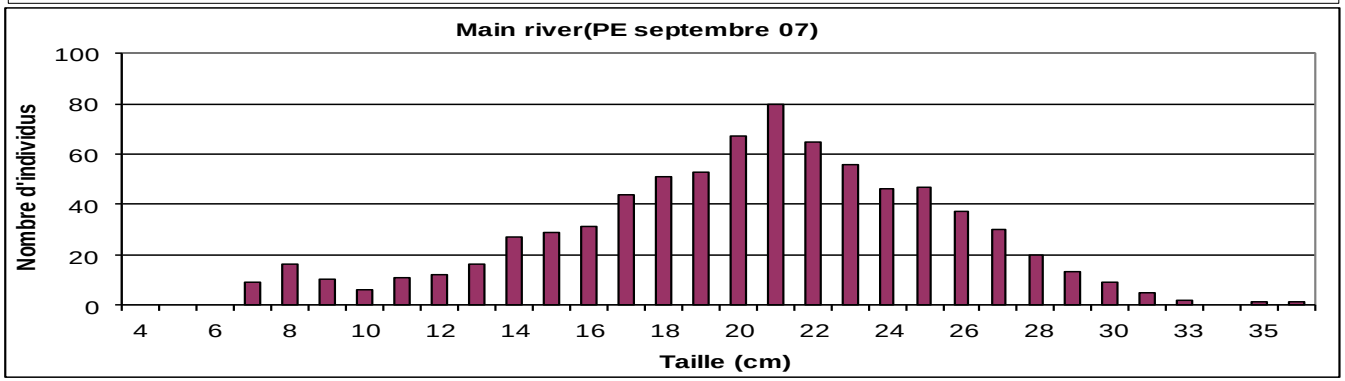
0.6m fall
+
8% sloped culvert
=
Run obstacle

Disturbances due to the tributary disconnection

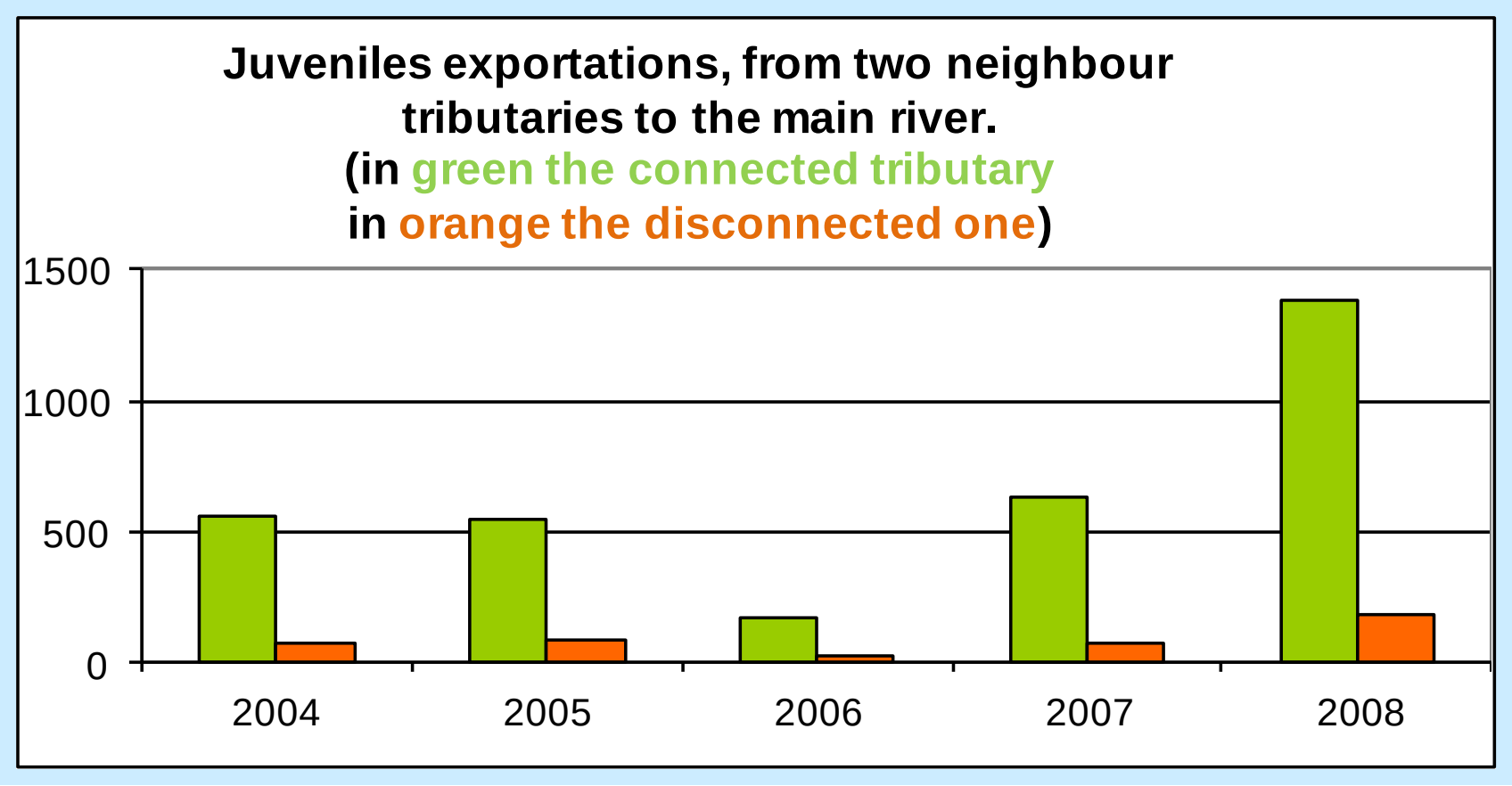


The tributary population structure is consequently significantly modified



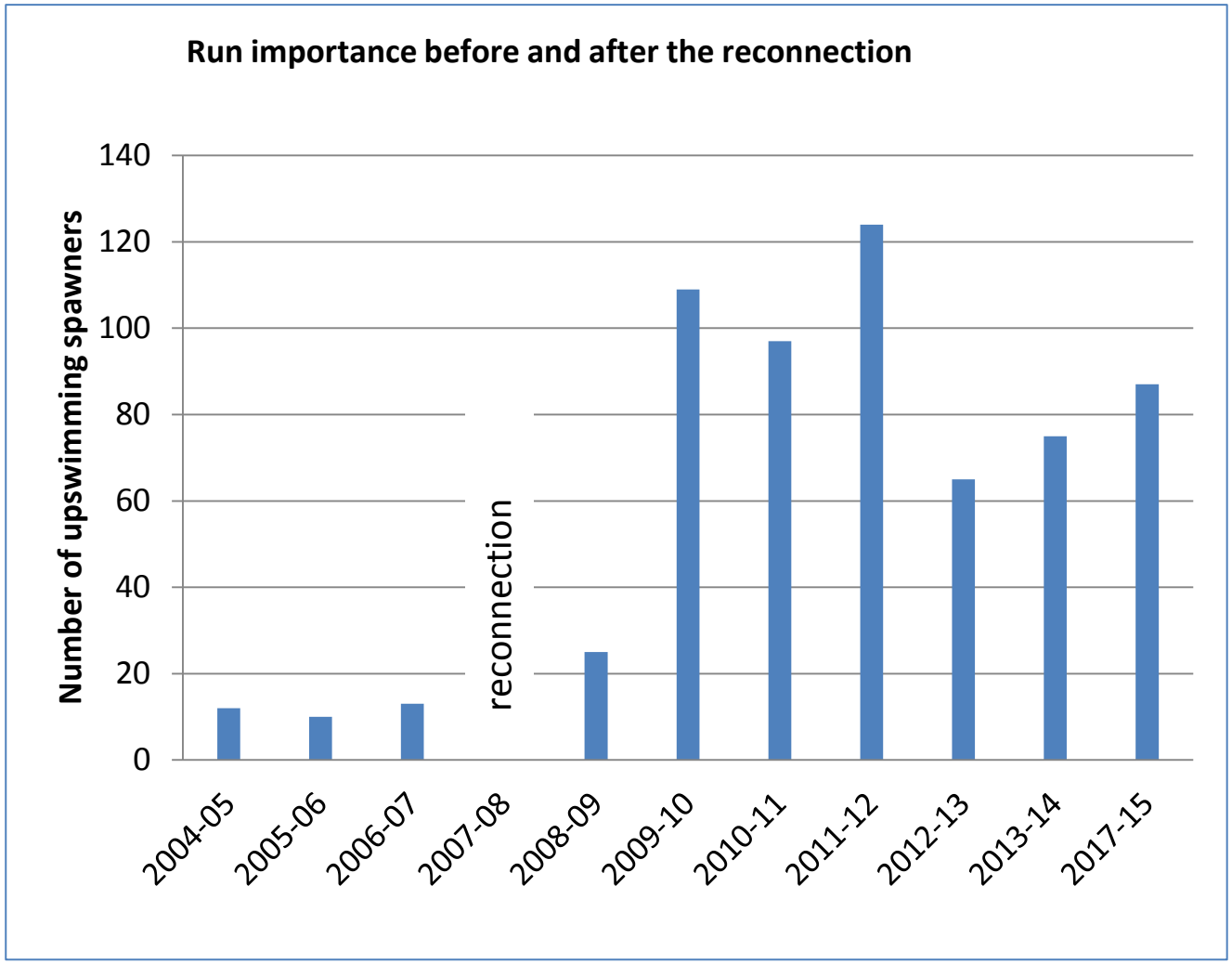


The tributary contribution to the recruitment in the main river is strongly reduced.

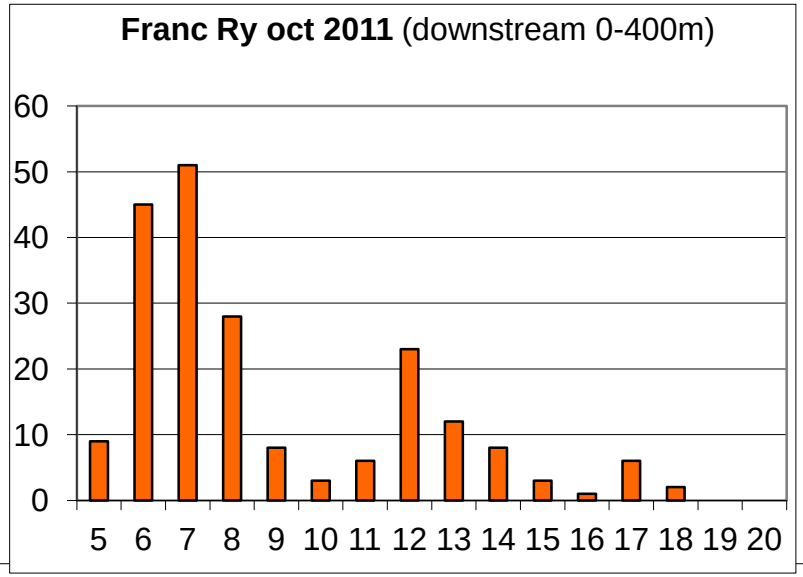


Recovery after the reconnection

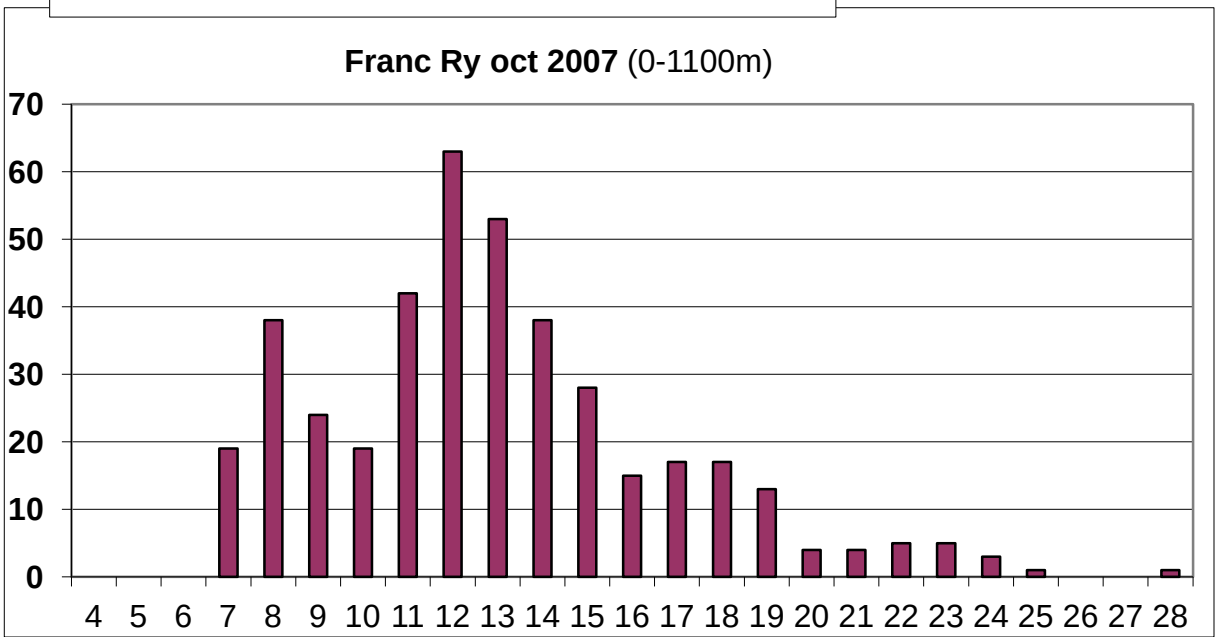
Direct impact on the run : number of spawners trapped at the outlet of the fish pass



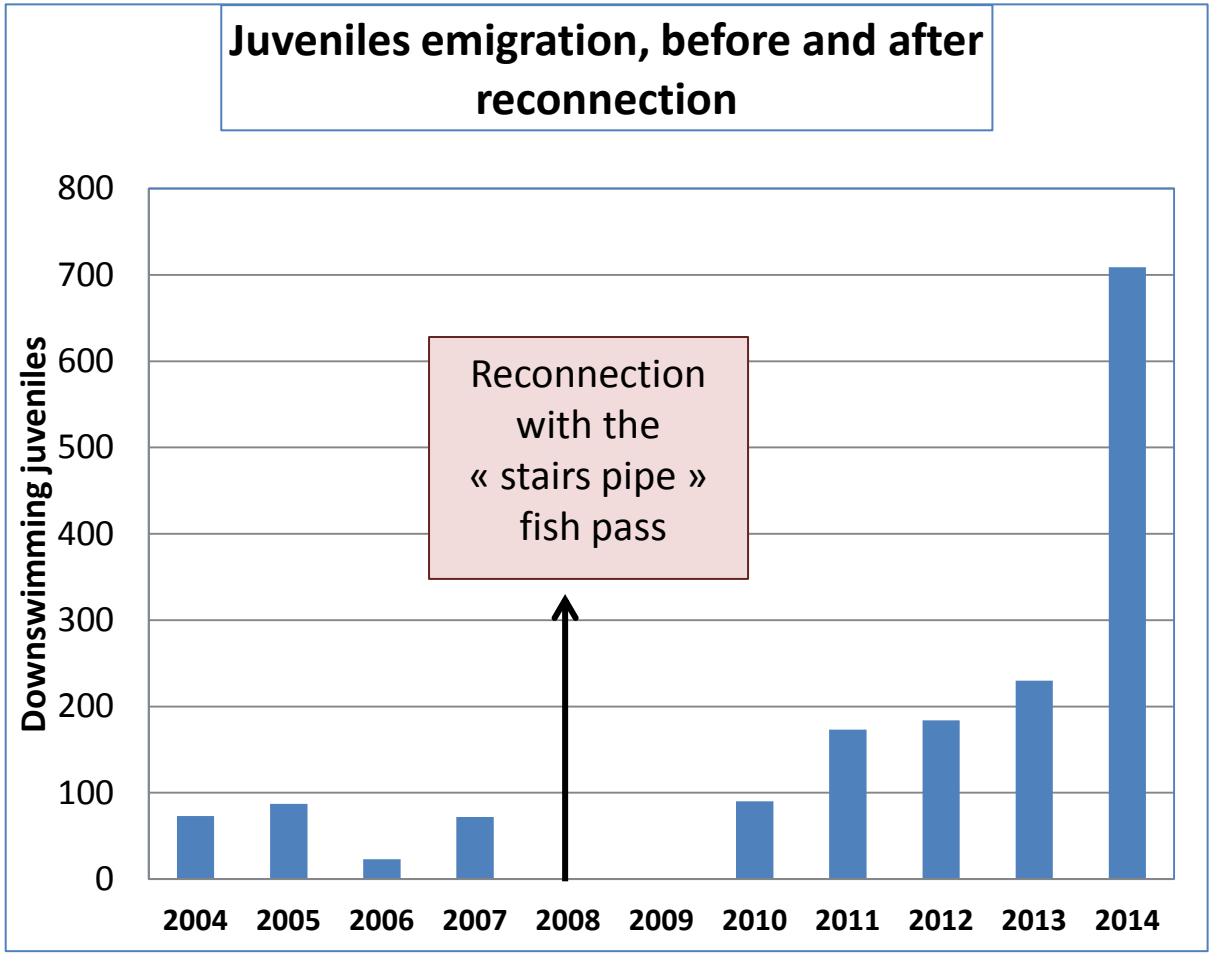
Recovery after the reconnection



The population structure
turns back to
a nursery brook population structure



Recovery after the reconnection



The tributary contribution to the main river recruitment increased immediately and is still increasing five years later

the STAIRS PIPE

A new concept of fish pass

Conceived by the Walloon Region (Belgium)
Department for the agricultural and natural environment studies

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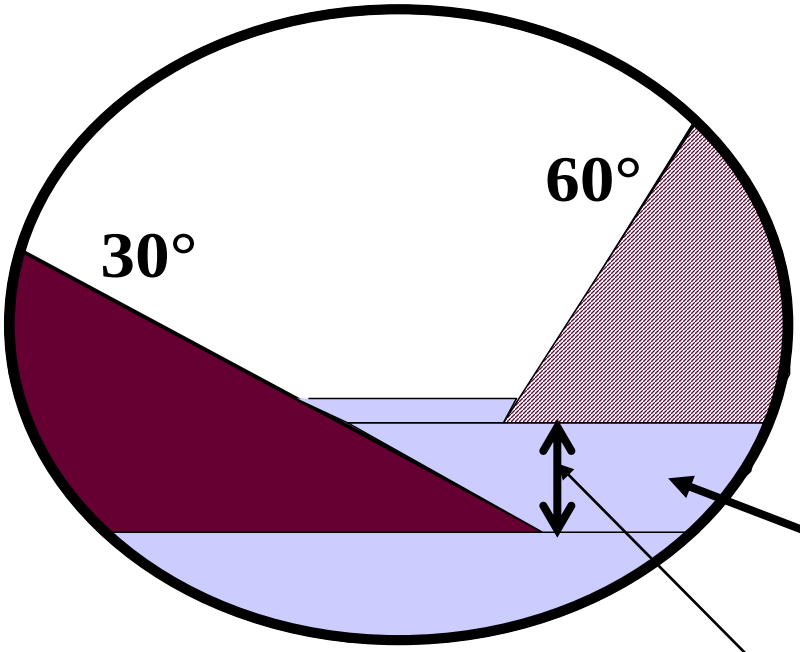
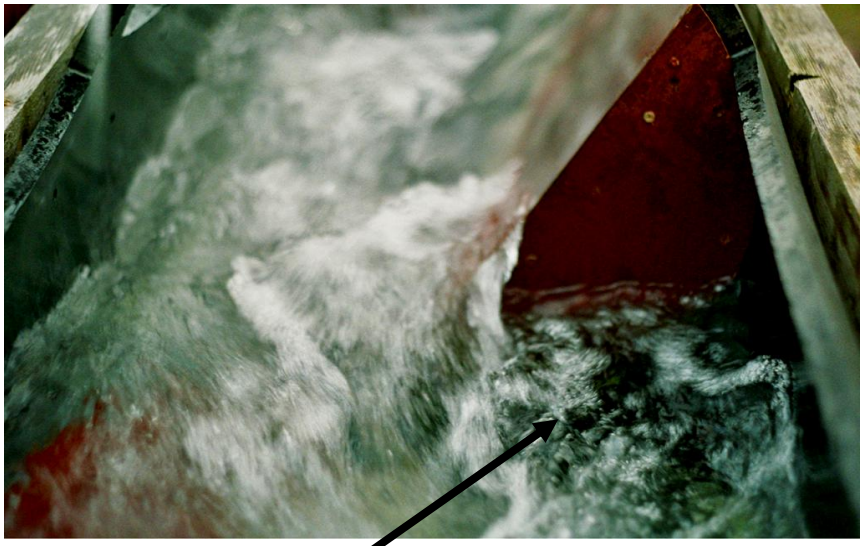
PRINCIPLE :

mimicking natural brooks

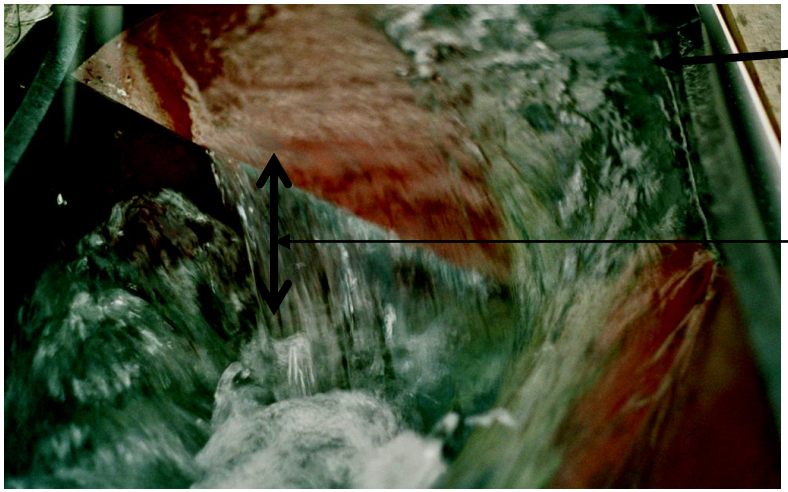
- Staggered baffles
to brake the water velocity
- Sloped baffles to prevent
the hooking of debris and
the culvert clogging

But
THE SUCCESS KEY is the combination of 30° and 60° angles





Water level raised
by the downstream 30° baffle
in the compartment sheltered by
the upstream 60° baffle.
Only a very small fall at this 60°
baffle.



Highest fall at the 30° baffle

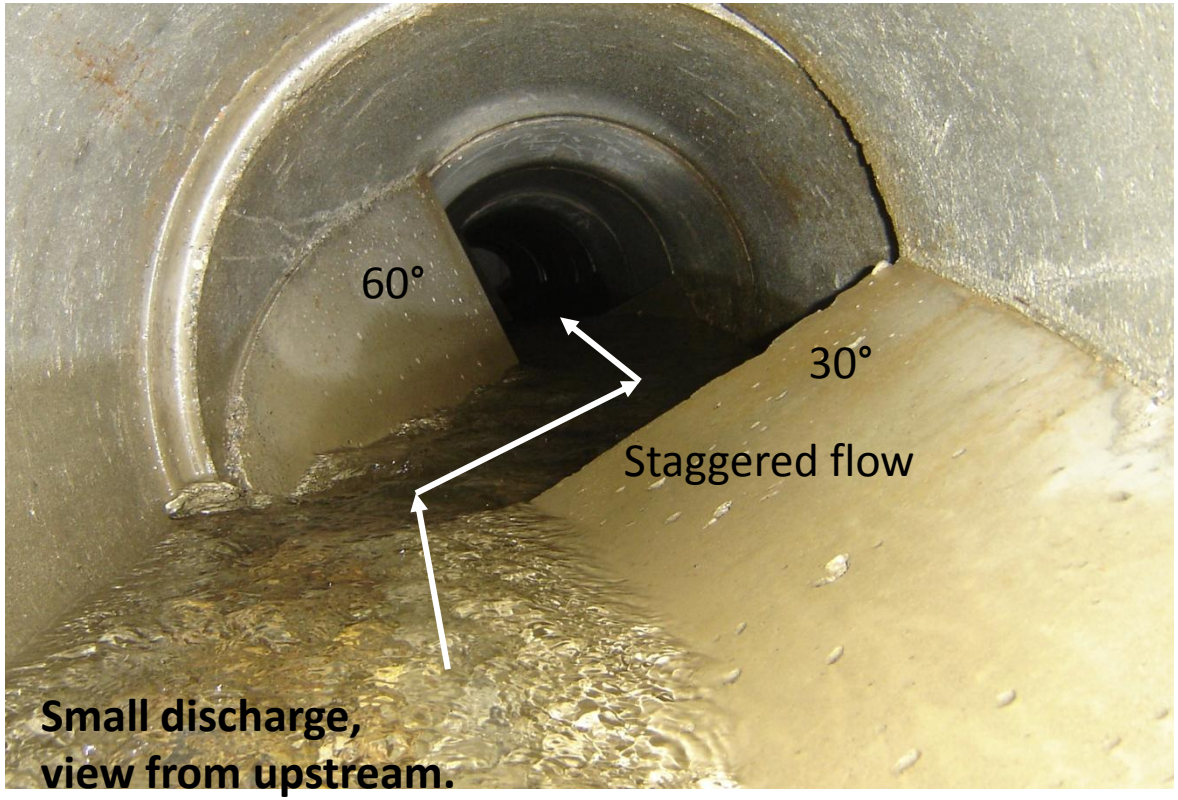
High discharge water levels

Alternate positioning on one sole and on the other provides the two different angles with the same and unique standard element

On the **blue sole : 60°** angle with the horizontal

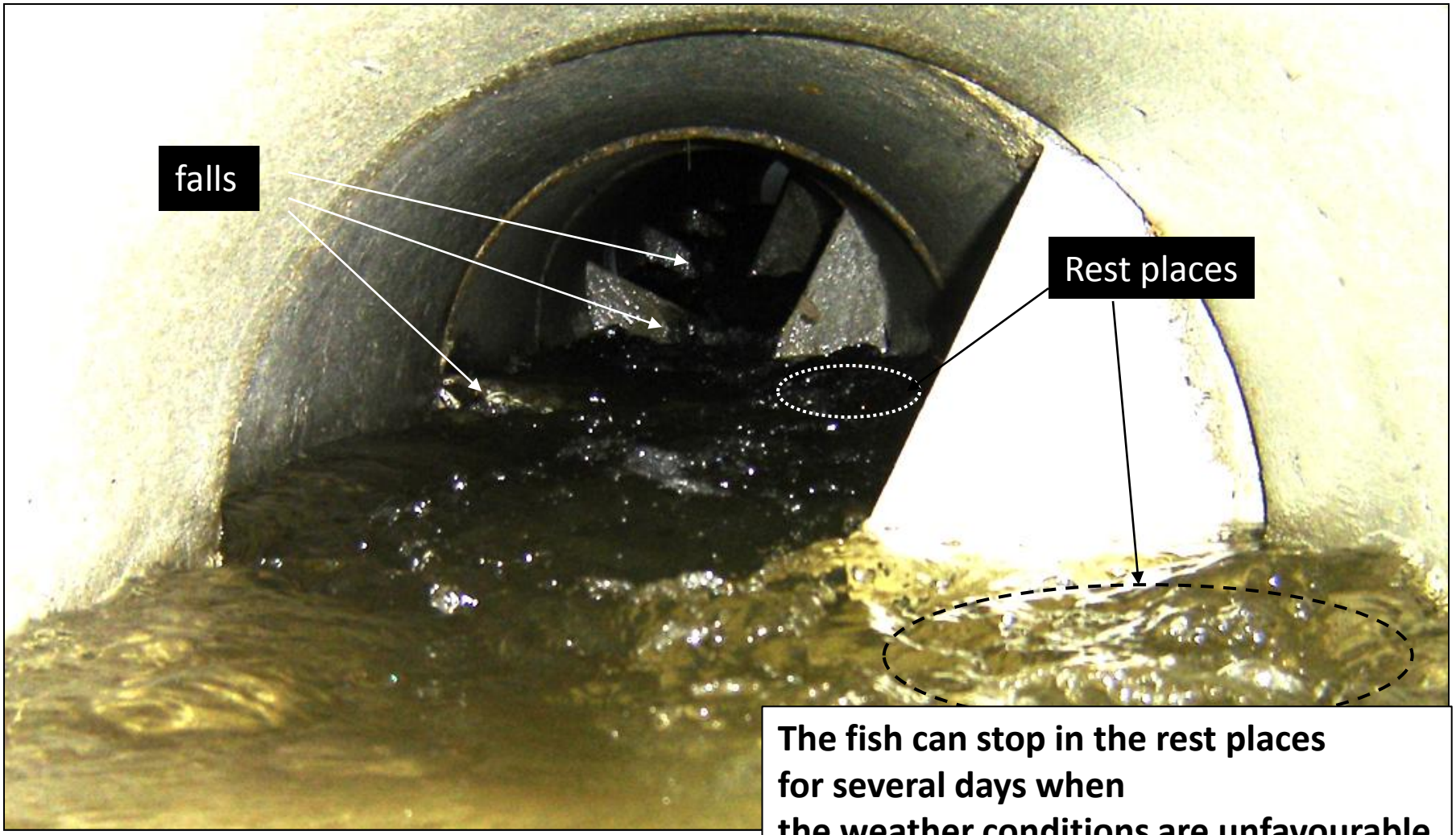
On the **red sole : 30°** angle with the horizontal

ALTERNATE POSITIONING
DETERMINES
STAGGERED BAFFLES
AND A STAGGERED FLOW



Small discharge,
view from upstream.

Internal pipe structure viewed towards upstream



The fish can stop in the rest places for several days when the weather conditions are unfavourable


Checking of the 5% slope over several su
30
°
60
°

THANKS FOR YOUR ATTENTION

Stairs pipe

Standard element

side, up and down views

with

notched corner

as external mark of the positioning

Information at :

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