

Automatic fish migration system using horizontal sliding doors

PhD - stream restoration - fish passage engineer

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In the immediate vicinity of the overflow threshold, downstream of it, a rectangular parallelepiped basin will be drilled and made that enters the riverbed (fig.1) Inside this rectangular parallelepiped basin another rectangular parallelepiped basin will be fixed, consisting of sheet piles. of concrete. It will be fixed to the overflow threshold with the help of metal plates and metal screws (fig.1). This basin will exceed the overflow threshold in height and will have two vertical sheet piles (extensions) that will be fixed perpendicular to the overflow threshold so that the fish can pass over the overflow threshold. (Figure 1). Inside these vertical sheet piles (extensions) the water level will have a height above the overflow threshold of two thirds of the height of the extensions.

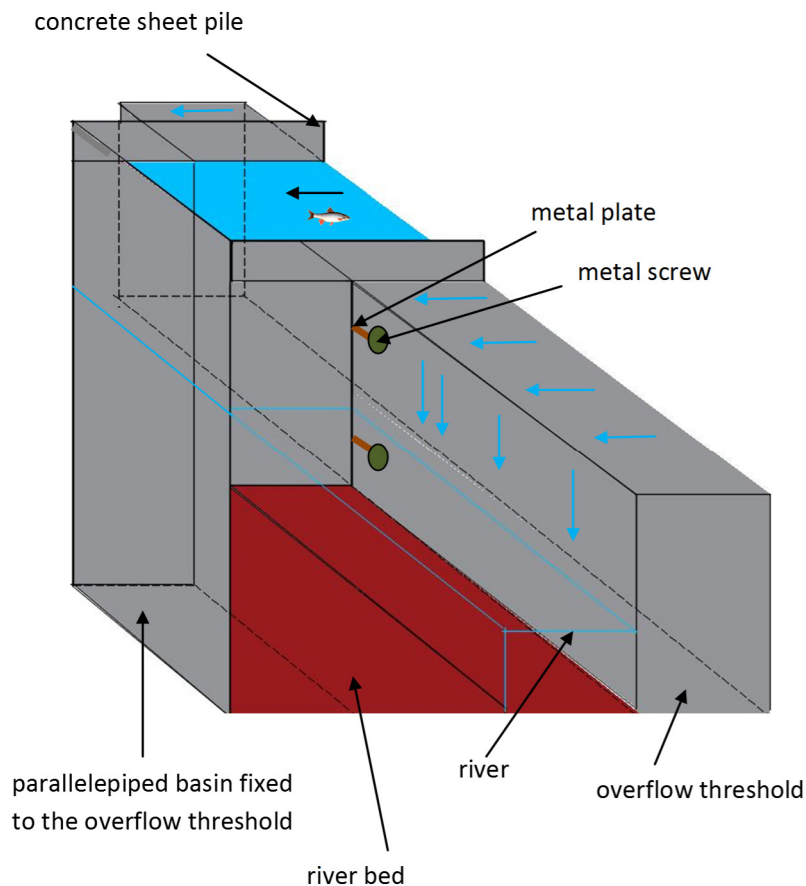


Figure 1 Positioning the fish migration basin

From the base of the basin built in the riverbed, a pipe is fixed with the upstream end in the form of a funnel (fig.2). Two doors equipped with ichthyofauna sensors are fixed to the upstream end of the funnel (pipe). The mobile doors are horizontal and have the same closing-opening mechanism as in supermarkets, except that they are in a vertical position and in our case the sensor is not moving and the ichthyofauna one. Some of the components will be fixed above the water on some metal corners fixed perpendicularly to the overflow threshold. When the system is closed, the water from the ichthyofauna migration basin does not enter the channel that is connected to the funnel (fig.3) because there is a hole that regulates the flow level in the ichthyofauna migration basin. This hole is equipped with a grid that does not allow the fish to leave the pool for the migration of fish (fig.2).

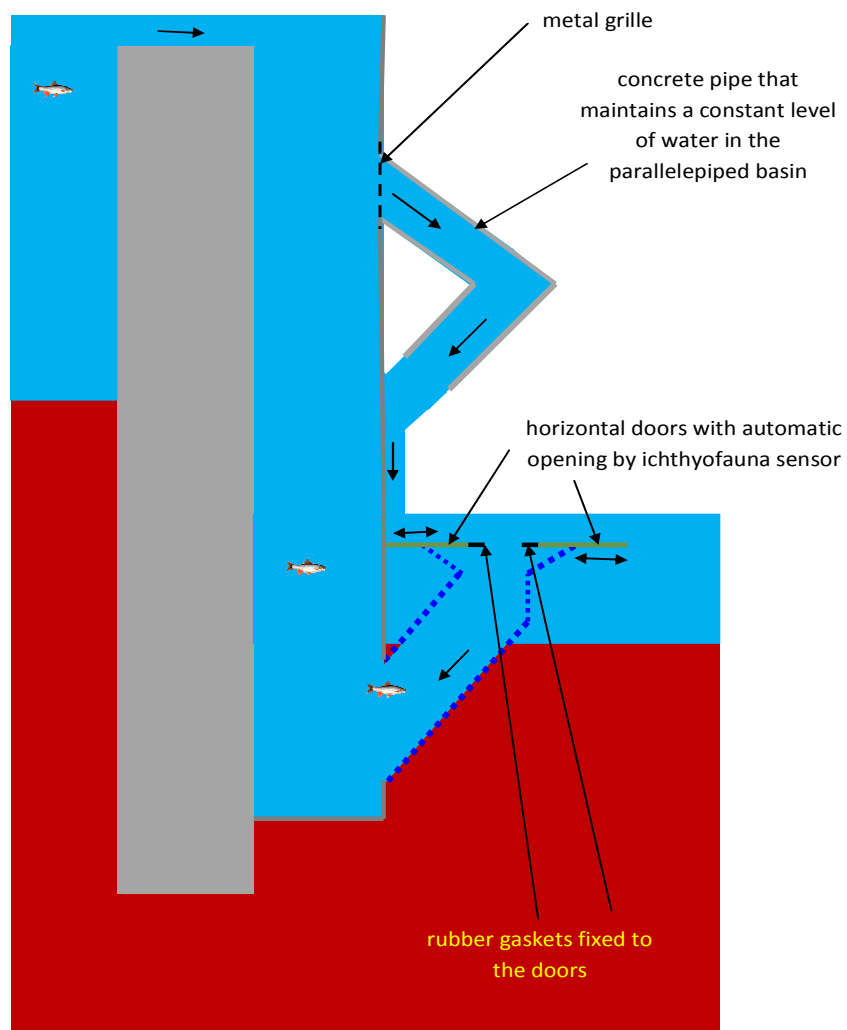


Figure 2 Open system for fish migration

The system that sets the two doors in motion, which facilitates the gravitational penetration of fish into the funnel and then into the ichthyofauna migration basin, is encapsulated and water-resistant. The whole system is water resistant. This system is supplied with electricity from the national grid or from the solar panels (fig.3). The movable doors are inside the water body.

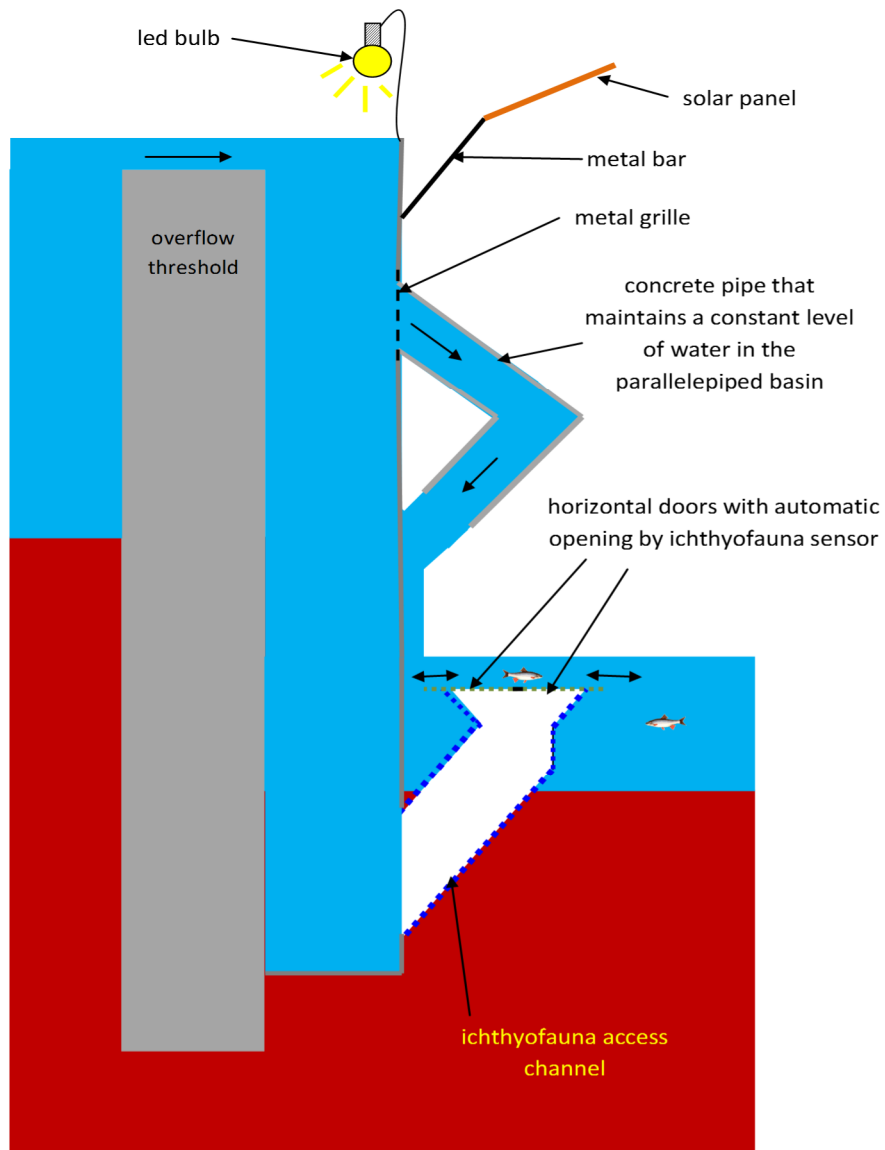


Figure 3 Closed system for fish migration

The automatic horizontal doors are positioned approximately 30 cm downstream of the overflow threshold (fig.4). Two metal cables are fixed to the banks and to the frame where the movable doors are fixed, on which floats are fixed, which will redirect the fish above the movable doors (fig.4). Downstream of the overflow threshold, a metal grate partially submerged in water is fixed with the help of two metal bars so that the fish can pass under it but also on the side easily (fig. 4) This semicircular grid stops or redirects the floats, the system remaining functional. . Each door has a gasket in their intersection area (fig.4). When the doors open automatically, the fish above them enter the funnel and reach the ichthyofauna migration basin. The fish climb into this pool being guided by the light. If there are fish that migrate at night, we can fix a LED bulb that lights up only at night with energy from the solar panel (fig.3).

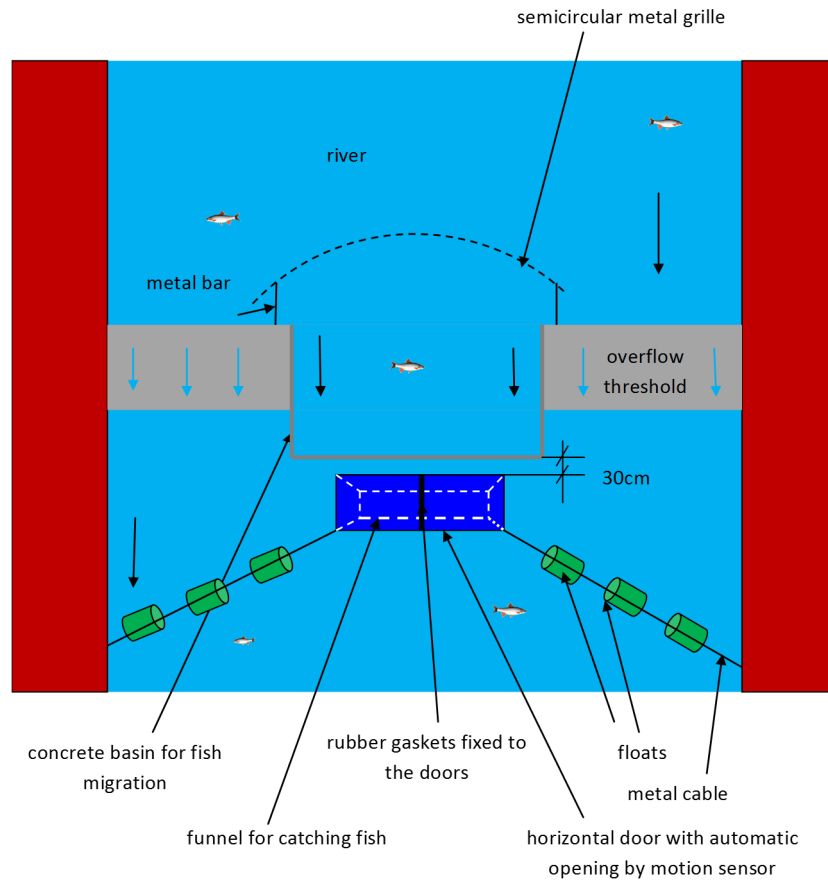


Figure 4 Positioning the fish redirection system

Conclusions

The system can theoretically be applied on any overflow threshold up to 4 meters, it does not affect in any way the structure and functionality of the overflow threshold. The sizing of the system is done depending on the size of the overflow threshold. This system due to the energy captured by the sun can work in any area. Due to its shape, only the ichthyofauna migration basin can be partially affected during floods. The system can be detached and used on another spillway page.

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August 2020
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