

What are fish ladders?

Imagine you're driving down the road when you encounter massive construction. Huge roadblocks are everywhere, and there's not a detour sign in sight. You're unfamiliar with this part of town, so you don't know any alternate routes; worse yet, there doesn't seem to be a side road that you could take even if you did know where you were going. Other drivers are confused as well, so that before long, there's a massive backup of traffic. What are you going to do? You have to reach your final destination, but there seems to be no way around the construction scene.

While any roadway construction can be inconvenient, it's unlikely that such a dire and nightmarish situation could completely block motorists. In the process of planning roadway construction, cities and states plan for warning signs, detour routes and perhaps even on-site traffic officers to aid the drivers. And yet, this scenario is very real for fish.

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While we may think of fish as creatures with the ability to swim about constantly, most species make only two really significant journeys in their lives. The first is shortly after birth, when fish move away from their spawning grounds, and the second occurs when the fish return to the spawning area to breed and die. When the world was undeveloped, the only threats to these journeys might have been bigger predators and fishermen, but now, fish face huge barriers and obstructions in the form of dams. If they can't get back to the spawning grounds, then fish populations dramatically decrease.

That's where **fish ladders** come in (you may also hear them referred to as **fish passages** or **fishways**). Fish ladders provide a detour route for migrating fish so that they can get over or around a dam that's blocking the way. That sounds

easy enough, but when you try to visualize such a contraption, you may have funny images in your head. How could a fish make it up the rungs of a ladder? Try picturing this instead: a series of ascending pools that are reached not by climbing rungs, but by swimming against a stream of water. The fish leap through the cascade of rushing water, rest in the pool and then repeat the process until they're beyond the dam.

On the next page, we'll talk more about the different types of fish ladder and how they're designed.

Designing Fishways

A lot of work goes into designing a fish ladder. The height and grade between the pools, the number of pools, the size of the pools and water flow are but a few of the factors that have to be considered. And fish ladders aren't one-size-fits-all -- each has to be tailored for the type of fish that will be using it. For example, trout and salmon have the talent for powerful bursts of swimming speeds, which means they can swim against stronger currents of water that other species can't [source: [Michigan Department of Natural Resources](#)]. Yet you can't make the water flow too weak, as a meager trickle won't attract the fish to the passage entrance.

There are, however, some basic designs for fish ladders that can serve as a blueprint:

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- A **pool-weir fishway** usually has a hole at the bottom of each pool level so that fish can jump up from level to level.
- Fish using a **vertical slot fishway** are guided upstream by a narrow passage that winds around the barrier; the water flow is constant and the

fish don't have to jump as much.

- **Denil fishways** are like choose-your-own-adventure books because baffles create rapids of different speeds so that many fish species can pass.
- **Steeppass fishways** work similarly to the Denil style, in that there are many different water velocities. They're usually narrower, though.
- If you want the fishway to blend in with its surroundings, try a **natural bypass**, which uses natural materials to recreate a stream.

[source: [Michigan Department of Natural Resources](#)]

Fish ladders aren't foolproof, however. Sometimes fish have trouble finding the entrance, and sometimes, long fish ladders exhaust the fish, preventing them from reaching the top [source: [Bailey](#)]. Additionally, while fish ladders are designed to get the fish back upstream to the spawning grounds, there may not be protection for the young fish going downstream. Without built-in protection, the young fish could get caught in a turbine, for example, leading to injury or even death.

Because fish ladders aren't always effective, some interest groups believe that dam removal is a better alternative than constructing a passage. Removal isn't always an option, particularly if the power produced by the dam is vital to existing infrastructure, but a few communities have found that removing a useless dam is less expensive than building a fish ladder.

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