Why do mullet jump?

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PHOTO BY RICHARD WHITMAN

Snook and mullet intermingle at my dock. Perhaps snook are resuspending bottom material for the mullet to eat.

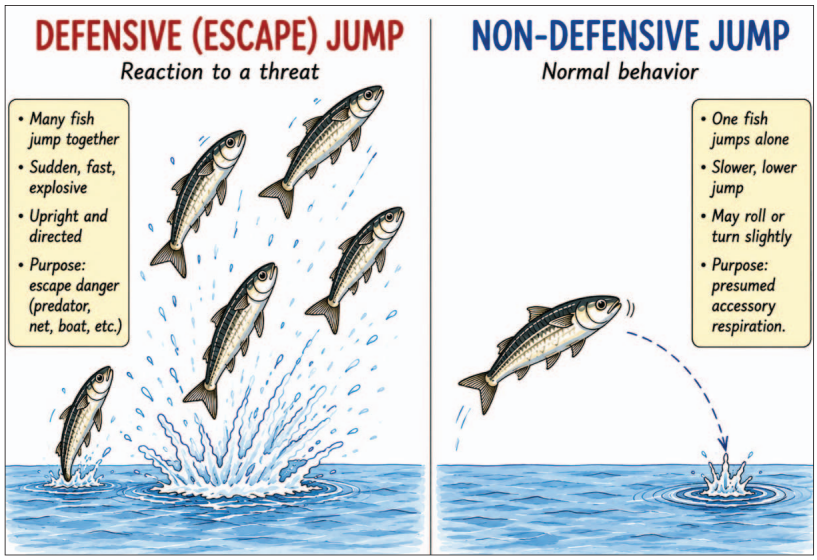

ILLUSTRATION BY RICHARD WHITMAN WITH CHATGPT

Mullet's explosive defensive jump vs. gentler but not so graceful landing of a non-defensive jump.

A very common question asked by landlubbers and "Salties" alike is, "Why do mullet jump?" Sometimes the inquiry is answered with, "Because they can." And that's actually the right answer. After all, they wouldn't if they couldn't — and they can, so they do. But why?

Another common answer, which seems palatable enough, is that they jump because it's fun — they're playing. But do fish play?

Play is generally considered voluntary, repetitive, imaginative, unstressed, and not immediately essential. Apparently, some smart fish, such as cichlids, play — not necessarily with other fish, but even with aquarium thermometers and figures.

Other intelligent aquatic animals, including porpoises, sea otters, octopuses, and even some sharks, also play. Mullet don't strike me as particularly sharp that way. Then again, they avoid my bait, right?

Why mullet jump is also a great scientific question, and many fish shrinks — ethologists, or animal-behavior biologists — have pursued it. I'll attempt to answer that question, but first, let's get to know the character in question.

Most of the mullet we see jumping are striped mullet (Mugil cephalus), although white mullet (Mugil curema) jump too. Striped mullet can grow quite large, commonly reaching several pounds. They are easy to recognize by their darker color and horizontal stripes running from head to tail. White mullet are lighter, lack the prominent stripes, and have a small gold patch near the rear of the gill cover.

Mullet are generalists and eat almost anything edible, from material in bottom sediments to food at the water's surface. That adaptability helps account for their large numbers in our estuary and canals.

Striped mullet, especially, can live in almost any habitat available in Charlotte Harbor because they tolerate low oxygen and widely varying temperatures and salinities.

They are important detritivores — detritus eaters — and help collect and process organic material from bottom sediments and surface debris. With a bird-like gizzard, mullet digest and "repackage" algae, microorganisms, and organic debris into fish flesh that becomes nourishment for predators throughout the food web.

OK, but why do mullet jump?

First, there are two kinds of mullet jumps: the defensive, panic, or escape jump and the nondefensive, apparently normal jump. They are quite different.

A defensive jump is explosive and fast, usually involving several mullet at once. The fish generally remain upright and make a directed escape, followed by a relatively clean reentry — perhaps earning a diving score of 8.5 out of 10, though not quite in the porpoise class.

In a nondefensive jump, the mullet moves much more slowly and usually jumps alone. The fish might remain upright, roll onto its side, or even turn onto its back. The jump tends to be lower and less directed, and reentry can vary from a belly flop to a back flop — closer to a cannonball than a qualifying Olympic dive.

PHOTO BY RICHARD WHITMAN

A stripped mullet acrobatic, not so graceful dive re-entry typical of a non-defensive jump.

We know why mullet make defensive jumps: to escape a predator, boat, net, or other threat. But what about the normal jump?

The leading scientific hypothesis is that mullet jump to obtain extra oxygen. During the day, they often feed along the bottom, where dissolved oxygen can be lower than it is near the surface. They may jump to take in a gulp of air, which contains a much richer supply of oxygen than water. This explanation is known as the "internal diving bell" hypothesis.

Supporting this hypothesis is a specialized, highly vascularized organ in the upper rear of the throat — the pharyngobranchial organ — that can retain a bubble of air. Scientists have proposed that a mullet renews this air supply when it jumps, allowing the trapped air to supplement respiration when the fish returns to feeding.

The awkward landing may somehow assist this process, although exactly what role the crash landing plays remains uncertain — perhaps the opposite of knocking the wind out of yourself.

Experiments and observations have found that jumping increases under low-oxygen conditions. Jumping also decreases dramatically at night, when mullet are much less active in bottom feeding. When oxygen becomes extremely low, mullet may gulp oxygenated water at the surface, a behavior known as aquatic surface respiration demonstrating that mullet have alternate ways of getting oxygen making air breathing plausible.

However, there are other reasonable hypotheses.

Fish — particularly bottom feeders that graze through muck — can pick up external parasites, debris, and other irritants. Mullet may sometimes jump to dislodge these unwanted freeloaders, in effect giving themselves a quick trip through the car wash.

Some people have suggested that mullet use the normal jump as a means of communication — a social cue that says, "I'm here," "The muck tastes great over here," or perhaps, "Cast-netter at 30 yards, north-north-west!" I don't speak mullet, so it's hard to know.

Without scientific evidence, however, I'm placing this explanation in the category of folk theory, tall tales, and fishermen's gossip.

Another suggestion is that jumping is somehow related to reproduction. The idea is that belly flops help break up egg sacs as mullet prepare to make their fall migration offshore to spawn. Again, these claims come largely from fishermen and guides, and I know of no scientific evidence supporting the conjecture.

I've even heard claims that mullet jump for the view — to get the "lay of the water" or see where they are in murky conditions. Maybe they're checking out the real estate, forecasting weather, or simply sightseeing. I like this explanation, but I don't think there is much science behind it.

I tend to favor supplemental oxygen, perhaps combined with an occasional trip through the "car wash" to power-wash away parasites and muck. So, for me, mullet sometimes jump for much the same reason I go outside: to get a little fresh air, if only for a second in the sun.

Richard Whitman has spent over 50 years studying natural and disturbed aquatic ecosystems from the Gulf Coast states to the Great Lakes. His studies are widely cited in the scientific literature. Currently his research is focused on beach and canal recreational water quality of upper Charlotte Harbor.