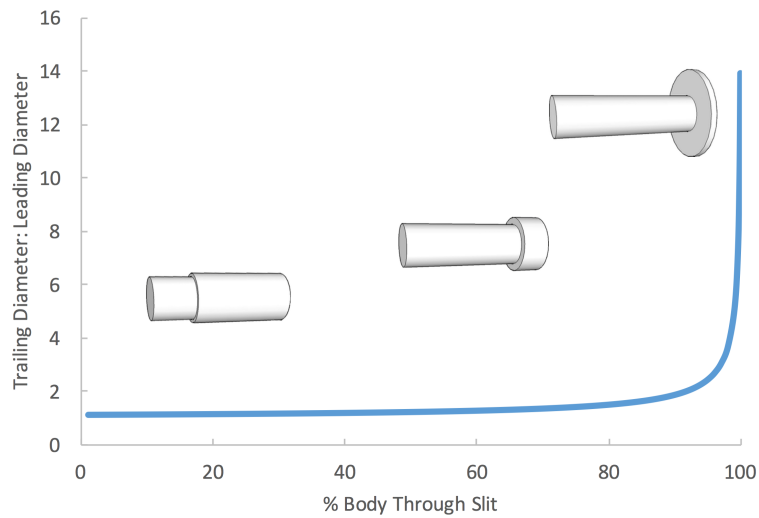


**Figure S1. Custom-built enclosure with adjustable slit-shaped aperture.** The enclosure was placed into a large cooler filled with artificial seawater, and hagfishes were placed, one at a time, into the enclosure and observed from above as they attempted to escape through the slit. A glass lid (not shown) allowed filming from above. The enclosure had dimensions of 0.203 m x 0.0508 m x 0.176 m for a total of 1.17 m<sup>3</sup>.



**Figure S2. Simplified model of body diameter at the leading and trailing sides of a hagfish as it moves through a narrow opening.** The model assumes a cylindrical body surrounded by a compliant skin, with a volume of incompressible fluid in the space between that is 20% of the total volume. The model assumes that fluid retention in the trailing side is complete, with no leakage toward the leading side. Squeezing more fluid into a progressively smaller space causes the ratio of trailing to leading diameter to go to infinity as the body approaches 100% passage through the hole. However, even up to values of 80% passage, swelling is modest (about 50% increase in diameter).

**Table S1.** Behavior key used to define the behaviors demonstrated by Atlantic hagfish (*M. glutinosa*) and Pacific hagfish (*E. stoutii*) while maneuvering through narrow slits (see Supplementary Videos S1 and S2 for demonstration of some of these behaviors).

| <b>CODE</b> | <b>BEHAVIOR</b> | <b>DESCRIPTION</b>  |
|-------------|-----------------|---|
| <b>A</b>    | Anchor          | The leading portion of the body is hooked around an object (>90° bend around a support)   |
| <b>B</b>    | Twist           | A rotary movement about the long axis of the body   |
| <b>C</b>    | Wag             | The leading portion of the body is swung from one side to another   |
| <b>D</b>    | Rest            | The animal remains motionless with a part of its body within the slit   |
| <b>E</b>    | Tight Loop      | The animal forms a loop with the portion of the body immediately adjacent to the slit - used for both forward progress and retreat  |
| <b>F</b>    | Double Loop     | The animal forms two tight loops, resembling the shape of an eight  |
| <b>G</b>    | Glide           | Forward progression without any obvious swimming motion (non-undulatory forward movement)   |
| <b>H</b>    | Head Bend       | The animal's head (first few cm) is bent laterally at an angle >90° from the rest of its body - used to force the head through the slit                                   |
| <b>I</b>    | Wide Loop       | A part of the trailing portion of the body is pressed against the walls of the enclosure or through the slit, while the leading portion is pulled back into the enclosure |



**Movie 1. A Pacific hagfish (*E. stoutii*) maneuvering through a slit with a width of 7.0 mm.** In this video, the hagfish makes repeated attempts to pass through a slit with width equal to half its body width and is eventually successful. This video, recorded in the lab, illustrates some of the behaviors described in Table S1.



**Movie 2. An Atlantic hagfish (*M. glutinosa*) demonstrating the “glide” behavior while passing through a slit with a width of 8.5 mm.** This slit is nearly half the width of the animal’s body (17.9 mm). This gliding behavior is a form of non-undulatory locomotion and is described in Table S1.