Under construction outdoors, the Liahona displays her hard chine, shallow draft, and a little weathering.

Adaptive boatbuilding

An innovator changes tack with his new limit seiner

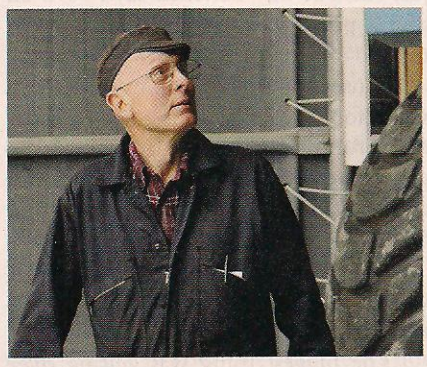
By Michael Crowley

Designing and building boats for the commercial fisheries is generally very much about tradition, with few people ready to do anything radically different. But one fisherman and boatbuilder who hasn't hesitated to experiment is Ray Wadsworth, whose sometimes-roving boat shop goes by the name Kodiak Marine Construction.

Wadsworth first achieved notoriety in 1990 with the Order of Magnitude, a 56-foot, 32-ton Alaska seiner powered by a 4,000-hp turbine and a water jet that he designed and built with a 31.3-inch impeller.

Speed was what it was about with that boat, which could run at 42 knots. She made the 600-nautical-mile trip from Sequim, Wash., to Ketchikan, Alaska, in 17 ½ hours of running time, burning 238 gallons of diesel an hour.

Nearly 20 years later, Wadsworth is at it again with the 58' x 24' x 3' 2" limit seiner Liahona. Though Wadsworth's new boat resembles the Order of Magnitude in a profile view, she's a very different boat. Then again, these are different times.



GARY SIEBEL PHOTOS

"When I built the Order of Magnitude, I had the grandiose plan to have the fastest commercial fishing boat in the world, which I guess it was. But then herring were so valuable, it didn't matter what you spent on a boat or fuel. What mattered was catching the most fish."

As he said in this magazine in 1996, "What's a couple hundred gallons of fuel when you are talking about a quarter million dollars of fish."

> **"My boat is like throwing a 2-by-12 in the water. You just can't about turn it over because of the beam and the hard chine."**
>
> — Ray Wadsworth

But once the price of fuel went past 60 cents a gallon, the Order of Magnitude became impractical. "At five dollars a gallon, like it is in [Bristol] Bay now, I won't dare light that baby off," Wadsworth notes.

No 4,000 horses for the new Liahona, she's got a pair of 330-hp John Deere

Inside the **Liahona**

- **Boatbuilder:** Kodiak Marine Construction, Oakley, Idaho
- **Designer:** Ray Wadsworth
- **Owner:** Ray Wadsworth
- **Material:** Steel
- **Dimensions:** 58' x 24' x 3' 2"
- **Wheelhouse plating:** 3/16-inch
- **Hull plating:** ¼-inch bottom and bow (portion), 3/16-inch sides
- **Main deck plating:** 3/16-inch
- **Keelson:** ½-inch plate runs complete length of boat and from bottom-hull plating to deck
- **Skegs:** Two skegs, each 6-inches wide and 26-feet long, serve as keel coolers.
- **Longitudinal frames:** 1 1/2" x 2 1/2" x 1/4"
- **Transverse frames:** ¼-inch
- **Powertrain:** A pair of 330-hp John Deere 6081 diesels are matched up with ZF 301 marine gears and 32" x 18" props.

diesels for power that burn 15 gallons an hour for the two engines, pushing the Liahona along at a leisurely 8 knots.

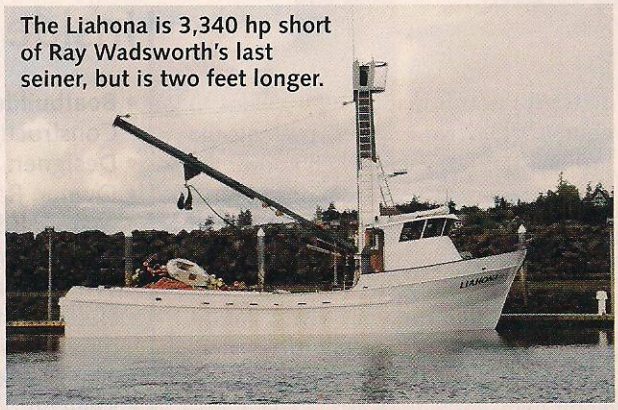
That seems to be fairly conventional power for a boat of this size. Nothing different there. But you can be sure that Wadsworth isn't going to design and built a boat like everyone else's. And if you look at the boat below the waterline, it's obvious there's something different here.

This is nearly a flat-bottomed boat with only about 10 degrees of deadrise between the bottom and the chine line. That makes for a very shallow-draft boat — 38 inches with fuel aboard as opposed to about 9 feet for a standard 58-foot seiner. Wadsworth says the Liahona is probably the only boat of its kind with the limited draft. There's a reason for that.

"Most of my seining income comes from terminal fisheries, where the fish go to spawn, and not an intercept fishery," Wadsworth says. That means getting up into the shallows of bays and rivers. "If you happen to be around a terminal fishery and have a million humpies and they are in three feet of water, we can get them and guys with deeper draft can't get near them," says Wadsworth.

That shallow draft comes in good for tendering as well, which the Liahona was doing in July in Bristol Bay after finishing up the False Pass seine season. "I was told by the owner of [the canning company] that we are the best tender because I can get to the dock at low tide and none of the other tenders can. And I can take fish from boats that are fishing a sand bar in four feet of water while they are watching fish hit their net."

Wadsworth compares the Liahona's design with the traditional deeper boats as the difference between a 4-by-4 and a 2-by-12. "A lot of these boats are built like 4-by-4s. You have to throw a bunch of ballast in to make sure the bottom stays on the bottom. My boat is like throwing a 2-by-12 in the water. You just can't about turn it over because of the beam


The Liahona is 3,340 hp short of Ray Wadsworth's last seiner, but is two feet longer.

and the hard chine."

And, as Wadsworth likes to point out, it doesn't need rolling chocks, something that he seems to find particularly offensive. True, a deep-draft, round-bottomed boat slides easily through the water, "but it rolls like a son-of-a-gun," Wadsworth says. "So you stick these ugly practically barn doors out from the hull and call them rolling chocks. Build the boat with a hard chine to begin with and you wouldn't need those things. But it's kind of hard to break through that tradition."

Though the Liahona doesn't have the depth other seiners have, she still packs 130,000 pounds in four holds equipped with refrigerated seawater. "The objective of the boat was not only to be shallow draft, but to pack like crazy," Wadsworth explains.

To do that, he shoved the two main engines up into the fo'c'sle and ran 36-foot-long shafts back to the props. Wadsworth says it might not be the best arrangement, but it keeps the engines out of the fish-hold space.

Being a flat-bottom boat — or nearly so — the Liahona doesn't have a keel running down the hull's centerline. There are two six-inch wide and 26-foot long skegs, which also serve as keel coolers. But to provide the stiffness to the hull, the backbone, which is usually the stem, keel and sternpost, is a length of 1/2-inch plate steel. Except for some cutout areas, it runs the full length of the boat and from the hull plating to the deck.

The Liahona was built outdoors at Port Townsend, Wash., but the original idea was to build it in Oakley, Idaho, where Wadsworth has a shop. The boat was to be constructed in two halves — port and starboard — with a quarter-inch-thick plate running down the centerline of each half. About 200 bolts would hold the port and starboard sections together.

"Then we'd take it apart and take it down the Columbia River," Wadsworth says. Once the Pacific was reached the two sections would be re-bolted and welded together. But by the time Wadsworth got his financing together, there wasn't enough time for that operation.

So after he computer lofted the boat, the steel was cut in Salt Lake City, Utah, and delivered on three flatbed trucks to Port Townsend.

Wadsworth's new boat, along with three previous boats bearing the Liahona name (from the Book of Mormon, in which people sailing from Jerusalem to the Americas navigated with an instrument called the Liahona), and the Order of Magnitude, all have at least one thing in common: a bold-looking bow

that juts out and up and carries a lot of compound curve.

It's kind of a signature piece for Wadsworth. "Us artists have a thing in our head that tells us what things should look like. Even when I design a skiff, it comes out looking like the same shape," he says. That's another way of saying that's how any self-respecting bow should look. But a lot of work is required to shape those compound curves.

It means running steel planks up to the stem. That's opposed to a conically developed bow. "The bow isn't a portion of a cone where one big piece of steel is wrapped around the frames. It's a regular compound curve, made possible because of the planking technique. You get a nice looking shape this way. You get to do your art," says Wadsworth.

Besides the "art" aspect, since each steel plank overlaps the one below it by two inches the bow section is stronger. There's a double weld, one on the inside and one on the outside. "It's infinitely stronger than a butt weld," says Wadsworth. He notes he's not the only one to use this building method. Marco boats were constructed this way and Hansen Boat Co. in Everett, Wash., builds their boats with the planking style.

Once Wadsworth finishes this fishing season don't expect him to be taking much of a rest before the start of Alaska's 2011 salmon season. First off, he has to design and build himself a new seine skiff. This year he borrowed a skiff, but because the Liahona is so heavy, he needs a bigger skiff to handler her.

It will be a shallow-draft skiff to match up with the Liahona's ability to go into skinny water. She'll measure about 26-feet long and 12-feet wide and be powered with a jet drive.

Secondly, and as an indication of how far Wadsworth has moved in his thinking from the Order of Magnitude days, he's going to be rigging his boat for sail — as in wind propulsion.

The boat was designed for a dagger board, which improves a sailboat's lateral resistance, allowing her to sail closer to the wind. The Liahona's dagger board is built. It's one-inch steel plate with a breakaway hinge and drops six feet below the bottom of the boat. There will be a hydraulic hoist to raise the dagger board up inside the hollow mast.

The Liahona's mast and boom are designed to carry and store a sail. The sail will be "carried inside a half pipe on the boom above the vang winch," Wadsworth says. On the mast, the sail will be on rings that slide up a cable.

Wadsworth notes there are two benefits to carrying a sail on a fishing boat. It acts like a "huge stabilizer. It takes all the snap out of the boat."

And it should reduce fuel costs, especially on the trip across the Gulf of Alaska. "Crossing the gulf you have a quartering wind of sometimes 30 knots. Why not spread a sail?" he asks.

On Liahona's first trip from Seattle to Kodiak the fuel cost $20,000. "Part of the trip we had a good fair wind. We could have saved $5,000 [with a sail], picked up a couple of knots and not been out there fighting it for so long," Wadsworth says. NF

Michael Crowley is the Boats & Gear editor for National Fisherman.

For information on companies mentioned in this article, see page 49.