

Larry Stone

HIGH HOPES FOR ACKLEY

M's No. 1 pick drawing lofty comparisons

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Sounders get back on track, beat San Jose 2-1

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JUNE 14, 2009



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OYSTERS IN DEEP TROUBLE

Is the Pacific Ocean's chemistry killing sea life?



PHOTOS BY STEVE RINGMAN / THE SEATTLE TIMES

OYSTERS' FAILURE TO REPRODUCE will lead workers like Northern Oyster Co.'s Gildardo Mendoza to collect far more of their product from a state "oyster preserve" in Willapa Bay. Pacific oysters haven't successfully reproduced in the wild since 2004.

Oyster larvae have been dying by the billions. Scientists suspect it's a sign that carbon dioxide is dramatically affecting the ocean — and if they're right, it could push Washington into the center of the debate about the future of the seas.

BY CRAIG WELCH / Seattle Times environment reporter

WILLAPA BAY, Pacific County — The collapse began rather unspectacularly. In 2005, when most of the millions of Pacific oysters in this tree-lined estuary failed to reproduce, Washington's shellfish growers largely shrugged it off.

"[The oyster crisis is a] sign of things being out of balance, and that scares the living daylights out of me."

BRIAN SHELDON
Third-generation oysterman

WEB EXTRA
See video of Northern Oyster Co. moving oyster sets and hear Sheldon's views on the trouble at seattletimes.com

In a region that provides one-sixth of the nation's oysters — the epicenter of the West Coast's \$111 million oyster industry — everyone knows nature can be fickle.

But then the failure was repeated in 2006, 2007 and 2008. It spread to an Oregon hatchery that supplies baby oysters to shellfish nurseries from Puget Sound to Los Angeles. Eighty percent of that hatchery's oyster larvae died, too.

Now, as the oyster industry heads into the fifth summer of its most unnerving crisis in decades, scientists are pondering a disturbing theory. They suspect water that rises from deep in the Pacific Ocean — icy seawater that surges into

Willapa Bay and gets pumped into seaside hatcheries — may be corrosive enough to kill baby oysters.

If true, that could mean shifts in ocean chemistry associated with carbon-dioxide emissions from fossil fuels may be impairing sea life faster and more dramatically than expected.

And it would vault a key Washington industry to the center of international debate over how to respond to

See > OYSTERS, A8



WILD OYSTER LARVAE ARE DYING before they can attach to shells like the one on top. Whether reared in the wild or in hatcheries, dozens of larvae typically settle onto existing shells, forming "seed." Above, Eric Hall, of Taylor Shellfish Farms, counts the seeds that have settled on a shell.



PROFILES AND STATS: Our 18th annual analysis of region's best performers > Business D1

Northwest's top 100 companies? Nope, just 87 this year

BY DREW DESILVER
Seattle Times business reporter

This is an age of downsizing. Companies are slashing their payrolls, people are trading their SUVs and McMansions for hybrids and condos, and the tumbling stock market has turned a lot of 401(k)s into 201(k)s. In fact, the whole U.S. economy has shrunk for the past three quarters in a row, according to government figures.

So, in keeping with current trends, the Northwest 100, The Seattle Times' annual ranking of the region's best-performing public companies, also has slimmed down. For the first time in the 18 years The Times has compiled the Northwest 100, fewer than 100 companies qualified for it.

The main culprit: last fall's stock-market slide, which pushed dozens of Northwest stocks below \$2 a share. The Northwest 100 long has excluded companies whose shares have dropped below \$2, but never — not even during the dot-com collapse earlier this decade — have so many companies fallen below that threshold.

Among the missing names on this year's list of 87 companies: Micron Technology, Red Lion Hotels, Cray and Hecla Mining, last year's top performer.

See > NORTHWEST, A9

WEB EXTRA



Northwest 100 Q&A on Tuesday
Seattle Times business reporter Drew DeSilver, who analyzed the data behind the Northwest 100, will answer your questions about the project and the state of the region's public companies at noon. seattletimes.com

Former UW student Knox tells of shock over Brit's murder



BY MARTA FALCONI
The Associated Press

PERUGIA, Italy — Amanda Knox told an Italian court Saturday she was shocked by the death of her British roommate, Meredith Kercher, whom she considered a friend.

Amanda Knox questioned by prosecutors

Knox also said a "crescendo" of police pressure led her to accuse an innocent man of the murder.

The case against Knox, a University of Washington student who was studying in Perugia, has captivated Italy and attracted intense news coverage.

Knox, of Seattle, had already told the court on Friday that she was not in the apartment she shared with Kercher on the night in 2007 when Kercher was slain.

See > KNOX, A15

Fury erupts in Iran after contested vote

PRESIDENTIAL RACE

Reformists dispute Ahmadinejad win; his challenger's location is unknown

Seattle Times news services

Thousands of protesters roamed through Tehran on Saturday, clashing with police and setting trash bins and tires ablaze in response to the government's official pronouncement that President Mahmoud Ahmadinejad had been re-elected by a large margin.

It was the worst unrest in Tehran in a decade.

The brazen and angry confrontations pushed the reformist movement closer to a possible moment of truth: whether to continue defying Iran's security forces or, as they often have before, retreat into quiet dismay and frustra-

tion over losing more ground to the Islamic establishment.

But for at least one day, the tone and tactics were more combative than at any time since authorities put down student-led protests in 1999.

Iran's Interior Ministry said Ah-

See > IRAN, A15

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OYSTERS IN DEEP TROUBLE



PHOTOS BY STEVE RINGMAN / THE SEATTLE TIMES

ONE-SIXTH OF THE NATION'S OYSTERS come from Willapa Bay, epicenter of the West's \$111 million oyster industry.

< Oysters

FROM A1

LARVAE DYING BY THE BILLIONS

Possible factor: Corrosive water, which can dissolve shells, eat away at corals and kill fish eggs

marine changes expected to ripple through and undermine ocean food webs.

Scientists seeking to explain what's plaguing these coastal oysters say the link to more corrosive water is strong but anecdotal. It could be just one of several factors.

But the possibility leaves some shellfish farmers uneasy about more than just their future business.

Indications that ocean acidification may already play a role in the decline of oysters are a "sign of things being out of balance, and that scares the living day-lights out of me," said third-generation oysterman Brian Sheldon.

Ruffling his 8-year-old son Jebediah's head, he added, "for this guy."

"Growers are scrounging"

Pacific oysters aren't native to Willapa Bay, but shellfish growers have farmed them here since the 1920s. It's about the only place left on the West Coast where growers look to the wild to get their oysters.

Normally, oysters spawn in the water, producing larvae that swim and eventually attach to a hard surface — typically other oyster shells. This creates oyster seed, called a "set." These succulent mollusks are then moved by hand throughout the bay and take two to five years to fatten up.

But somewhere between the larval stage and settling on a shell, these embryonic oysters are dying. And since only a few young have survived since 2005, "we're running out of oysters in the bay," said Bill Dewey, spokesman for Taylor Shellfish Farms. "Growers are scrounging for whatever they can find."

Standing ankle-deep in seawater on a south Willapa sandbar last week, Sheldon, owner of Northern Oyster Co., watched his workers gather shellfish at low tide from one of the few places that still had some: a state "oyster reserve," a sort of shellfish bank growers can lease and draw upon to subsidize their own crops.

For the first time since his grandfather started the company in 1934, Sheldon plans this year to spend thousands buying oyster seed — larvae attached to shells — from hatcheries, rather than counting solely on wild reproduction. He expects he'll make only half as much as he would in a normal year.

"It perplexes me that we are still, as a country, and really, globally, denying that there is something going on," he said. "I don't have the background in the natural sciences to tell you it's one thing or the other. I can just



GROWERS RELY on wild oysters, which typically grow in clusters like this. Third-generation shellfish farmer Brian Sheldon now must turn to oysters started in hatcheries.

say that over the last 10 years it's clear to me ... something's changing. There's no doubt in my mind."

Researchers at first blamed an explosion of *Vibrio tubiashii*, an ocean-borne larvae-killing bacteria. When researchers sampled the marine waters that get sucked directly into the hatcheries from the sea, they found bacteria counts nearly 100 times above normal. Even after installing extensive microbe-killing ultraviolet water-treatment systems, larvae died.

Then they noticed the water's pH — the scale measuring acidity and alkalinity — sometimes dropped below normal, becoming more corrosive.

Seawater typically is slightly alkaline, but when oceans absorb carbon dioxide from the atmosphere — as they have by the hundreds of billions of tons since the Industrial Revolution — they become more corrosive.

Climate modelers predicted

greenhouse gases would make marine waters more acidic by century's end. They expected to notice it first in deep water, some of which hasn't circulated to the surface in 1,500 years and has therefore accumulated more atmospheric carbon dioxide. And deep waters already run higher in carbon dioxide because dying plants, animals and fish sink and decay.

But two years ago, oceanographers Richard Feely and Chris Sabine, both with the National Oceanic and Atmospheric Administration's Pacific Marine Environmental Laboratory in Seattle, found more acidified waters already reaching the surface.

The north winds that blow off Washington's coast push marine surface waters off shore. Those waters are replaced by the icy-cold, more corrosive seawater welling up from hundreds of meters below.

Throughout 2008, researchers at Oregon's Whiskey Creek Shell-

fish Hatchery noticed a trend: Their die-offs tended to come after north winds pushed those very same deep waters into the pipes that feed the hatchery.

"There seems to be a strong correlation," Feely said.

Ripple effects for fish

In a sense, that's exactly what scientists expected — just not so soon.

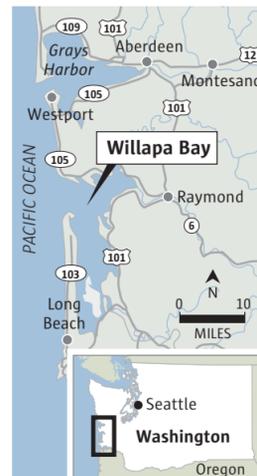
Corrosive waters can dissolve clam shells, eat away at corals and kill fish eggs. Already, scientists have taken pteropods, tiny marine snails that swim in the open ocean, from the Gulf of Alaska and exposed them to slightly acidified marine water in a laboratory. Their protective shells immediately dissolved.

Those creatures make up 60 percent of the food for Alaska's juvenile pink salmon. Similar creatures support many of the major fish species in Alaska's North Pacific, which in turn supports the billion-dollar Seattle-based industry that provides half the nation's catch of fish.

"The fish we depend on — salmon and pollock and herring — when they're in the first year of their life, they all depend on shellfish for survival," Feely said. "Early models suggest a 10 percent loss in pteropods can cause a 20 percent loss in weight of a fish."

Just last month, Smithsonian scientists published a paper suggesting that in the next century more acidified oceans will threaten the world's shellfish. Oyster larvae, they pointed out, are particularly susceptible. Their early shells are made from an easily eroded form of calcium carbonate.

Researchers believe that might be part of what's already happening on the Northwest coast. If oyster larvae are swimming in marine waters — whether pumped from the sea into a hatchery or in the bay — as deep, acidified water is pushed toward shore, "that



THE SEATTLE TIMES

could be a problem," said Simon Alin, a NOAA scientist who works with Sabine and Feely.

In addition, *Vibrio tubiashii* thrives in this more corrosive environment. "It becomes the dominant pathogen," Feely said.

Still, it's too soon to say for certain if these issues are localized or part of a broader phenomenon. The hatchery is not far from a low-oxygen dead zone off the Oregon coast. There also isn't sophisticated enough equipment in place to get precise pH readings.

But it all suggests significant ocean changes are coming fast, if they're not here already.

"We're not saying we're killing all life in the ocean," Sabine said. "There will be winners and losers. But this is not something that's off in the future. This is not something for our children's children. It's happening now."

Asking for help

Already the oyster industry is seeing job losses and other effects. In the last year, Taylor spent \$500,000 just trying to get oysters to attach to shells in a secondary hatchery, said Willapa Division Manager Eric Hall.

The industry has asked Congress for help replumbing hatcheries and developing monitoring systems to track upwelling events and the quality of incoming seawater. Without intervention, its economic contribution to the region could drop another 30 percent just this year, said Robin Downey, director of the Pacific Coast Shellfish Growers Association.

So far in 2009, hatcheries have been able to improve production because of fewer upwelling events. Combined with new piping and technology, oyster production could stabilize before consumers notice a change.

But without major changes in the marine environment, small operators who count entirely on nature, like Sheldon, will likely continue to struggle. "I hope you have your fingers crossed for us," he said.

He wants desperately to pass his business to his son, so he plans to keep on hunting for oysters.

But now he'll do so with one eye trained on the coast's north winds.

Craig Welch: 206-464-2093 or cwelch@seattletimes.com



HATCHERY OYSTERS FACE PROBLEMS, too, since they're spawned in water piped from the ocean. Eric Hall, of Taylor Shellfish, now spends much more money on producing oyster seed.