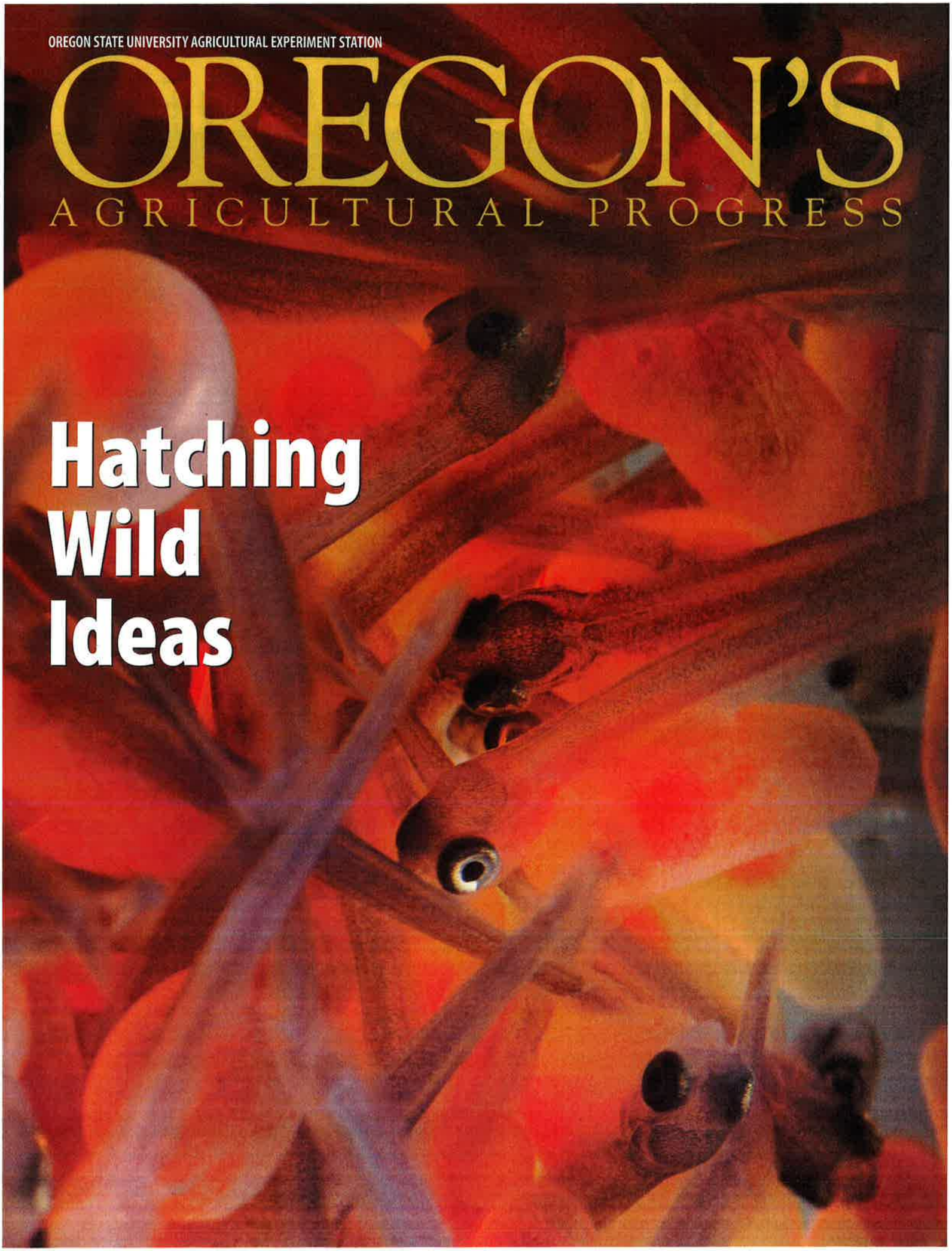
OREGON STATE UNIVERSITY AGRICULTURAL EXPERIMENT STATION

OREGON'S AGRICULTURAL PROGRESS



Hatching Wild Ideas

HATCHING NEW IDEAS A

BY CAROL SAVONEN

Nestled in a steep green valley outside of the tiny Coast Range community of Alsea, a new research fish hatchery is a far cry from the typical production hatchery that turns out salmon fingerlings by the ton.

The jade-colored water of Fall Creek flows into the hatchery and through a fish trap before it splits into four virtually identical stream channels. These parallel channels look like natural streams, filled with river-rounded gravel, broken tree limbs, and identically placed meanders and pools. The streams look so natural that dippers fly in and scout the stream beds for aquatic insects crawling in the submerged pebbles.

The new Oregon Hatchery Research Center is designed to study the influences of hatchery salmon and steelhead trout on their wild relatives. The $7.5 million state-of-the-art facility opened in October, 2005, as a joint venture between the Oregon Department of Fish and Wildlife (ODFW) and Oregon State University's Department of Fisheries and Wildlife. Here, scientists, students, and citizens will be able to study hatchery and wild fish together.

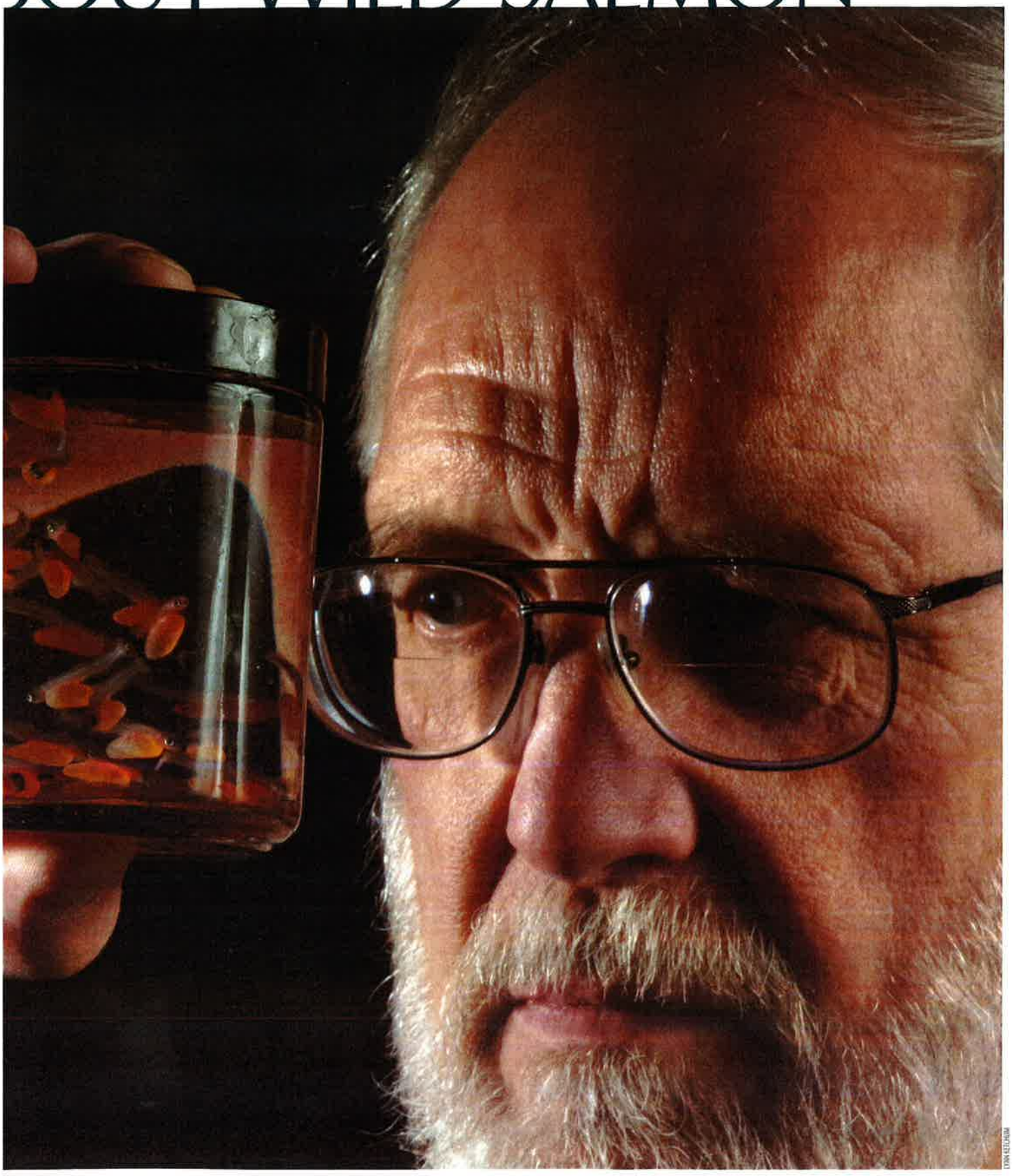
Wild salmon runs are threatened or endangered in two-thirds of their ranges in Oregon, Washington, Idaho, and California. Fisheries scientists often attribute salmon decline in our region to the "Four H's"—habitat loss, harvest, hydropower, and hatcheries. If you examine closely any of these factors, you'll find a tangled web of issues.

Today, more than 70 percent of Oregon's

David Noakes, director of the Oregon Hatchery Research Center, examines newly hatched steelhead trout.

(PHOTOS: LYNCH KETCHUM)

BOUT WILD SALMON



salmon start life not in streams but in a fish hatchery. Hatchery salmon have been compared to farm animals, bred to be the biggest, the earliest returning, or the brightest colored. The characteristics that make them a desirable catch for people do not necessarily help them survive better in the wild.

"Farmed" salmon and "hatchery" salmon are not the same. Hatchery salmon live most of their lives in the wild, while farmed salmon are raised in captivity and fed manufactured food.

Scientists often attribute salmon decline to the "Four H's"—habitat loss, harvest, hydropower, and hatcheries.

Hatcheries have helped boost salmon numbers and maintain viable fisheries, stopping or reversing salmon decline in some areas and sometimes playing a crucial "stop-gap" role in restoring wild runs.

But many studies have shown that hatchery-bred salmon may harm native fish by spreading diseases or by contaminating their genetic fitness for conditions in a particular watershed. Hatchery fish have been found to compete with wild fish, by using up available food and habitat. Raised in raceways, munching on fish chow, these fish become easy targets for predators.

Though hatchery and wild salmon each have their proponents, most fisheries scientists are coming to realize that both are needed, explained Carl Schreck, OSU fisheries professor and member of the Oregon Cooperative Fish and Wildlife Research Unit at OSU. Scientists need to learn enough to produce hatchery fish in a way that is compatible with remnant wild fish stocks, he said.

"We have to learn how to do aquaculture successfully to be able to rehabilitate endangered wild fish," said Schreck, who serves on the science team advising the state government's Oregon Plan for Salmon and Watersheds. "We have to develop ways of rearing salmon very different from old production methods. We have to learn to do no

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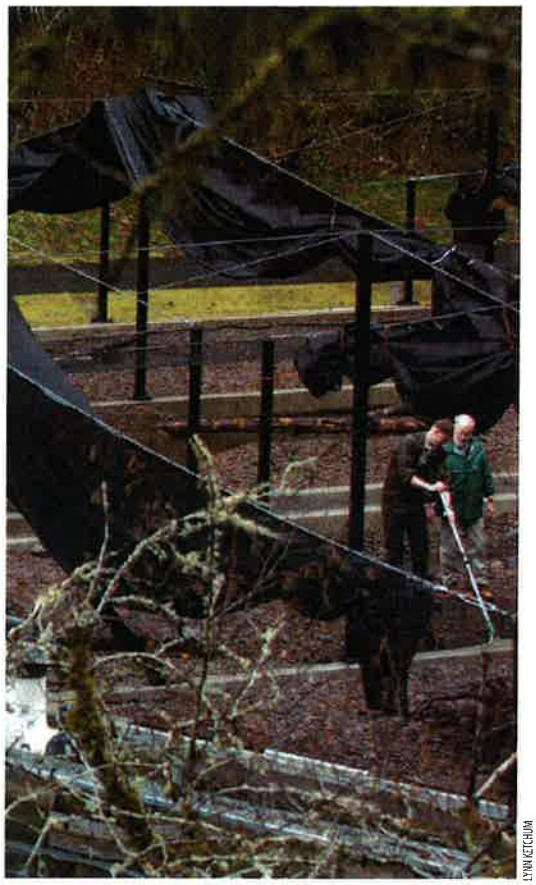
Fish trapped at the research center are measured and recorded before they are released into the experimental channels for observation.



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Water from Fall Creek flows into four parallel experimental channels, protected by netting from fish-eating birds.

harm to wild stocks."

Gil Sylvia, a natural resource economist with OSU's Coastal Oregon Marine Experiment Station, thinks the new facility will help illuminate economic aspects of salmon management.

"We all want to save the salmon...but at what cost? We need a healthy ecosystem for both its human use and for nature," said Sylvia. "So much money in Oregon goes to salmon—close to $1 billion per year, including lost hydropower revenues, so we need to find the biggest bang for our buck to increase salmon populations. Will it be to reduce commercial fishing? To increase spill over the dams? Do hatchery fish actually compete with wild fish? Should we make them more like wild fish or make them so different they don't interact? These are the kinds of questions that we would hope to be able to answer."

A hatchery dedicated solely to research, teaching, and extension is very rare, according to David Noakes, the research director of the new hatchery. "Most all other hatcheries are 'production' hatcheries," he said. "Their sole objective is to produce fish, much like a factory produces products. Production hatcheries generally don't research new ideas; they don't do experiments. But our new facility is designed and planned from scratch to answer research questions."

Noakes, who came to OSU from Canada's University of Guelph, is one of the world's leading experts on fish biology and behavior. "In terms of fish, the Pacific Northwest is much more productive than northeast Canada," he said. "Salmon and trout play an integral role in the ecosystem here in a way that they don't back East. The salmon were mostly gone from eastern North America a century ago. It is fascinating that the Pacific Northwest has an ecosystem with migratory salmon coming in from the ocean, carrying their influence inland.

"Salmon have different implications for people here," he continued. "They are symbolic, almost totemic, in people's minds. Everyone here seems to hold strong opinions about salmon."

Research conducted at the Oregon Hatchery Research Center may help bring more scientific evidence to some of those opinions. A new research building with outdoor tanks and raceways provides a laboratory for experiments, and an interpretive center, living quarters, classrooms, and conference rooms make it easier to involve researchers and students.

Talk to any OSU or ODFW fish researcher, and they'll tell you they're most excited about the four experimental streams at the new research hatchery.

"Other artificial stream channels are not like this," said OSU Extension fish ecologist Guillermo Giannico. "These are natural looking, with meanders, downed wood, stream gravel. They mimic many hydrological processes. Most other artificial streams are more like wide cattle troughs with a little gravel sprinkled on the bottom."

These natural-style stream channels make it possible to observe wild and hatchery fish together, observations that might improve hatchery and wild fish management. This is integral to the center's ambitious mission—to conduct studies that will shed light on the differences and interactions between hatchery and wild salmon and steelhead. Once differences are better understood, managers can further develop practices that help conserve wild stocks.

"Salmon are symbolic, almost totemic, in people's minds. Everyone here seems to hold strong opinions about salmon."

Research is just beginning at the new hatchery. Resident ODFW hatchery staff are testing basic hatchery functions as well as rearing fertilized salmon eggs, raising young salmon and trout under varying temperature regimes, and recording where wild and hatchery adult steelhead spawn in the artificial stream channels. The staff is testing sanitation methods using ultraviolet light versus formalin to combat disease on incubating eggs.

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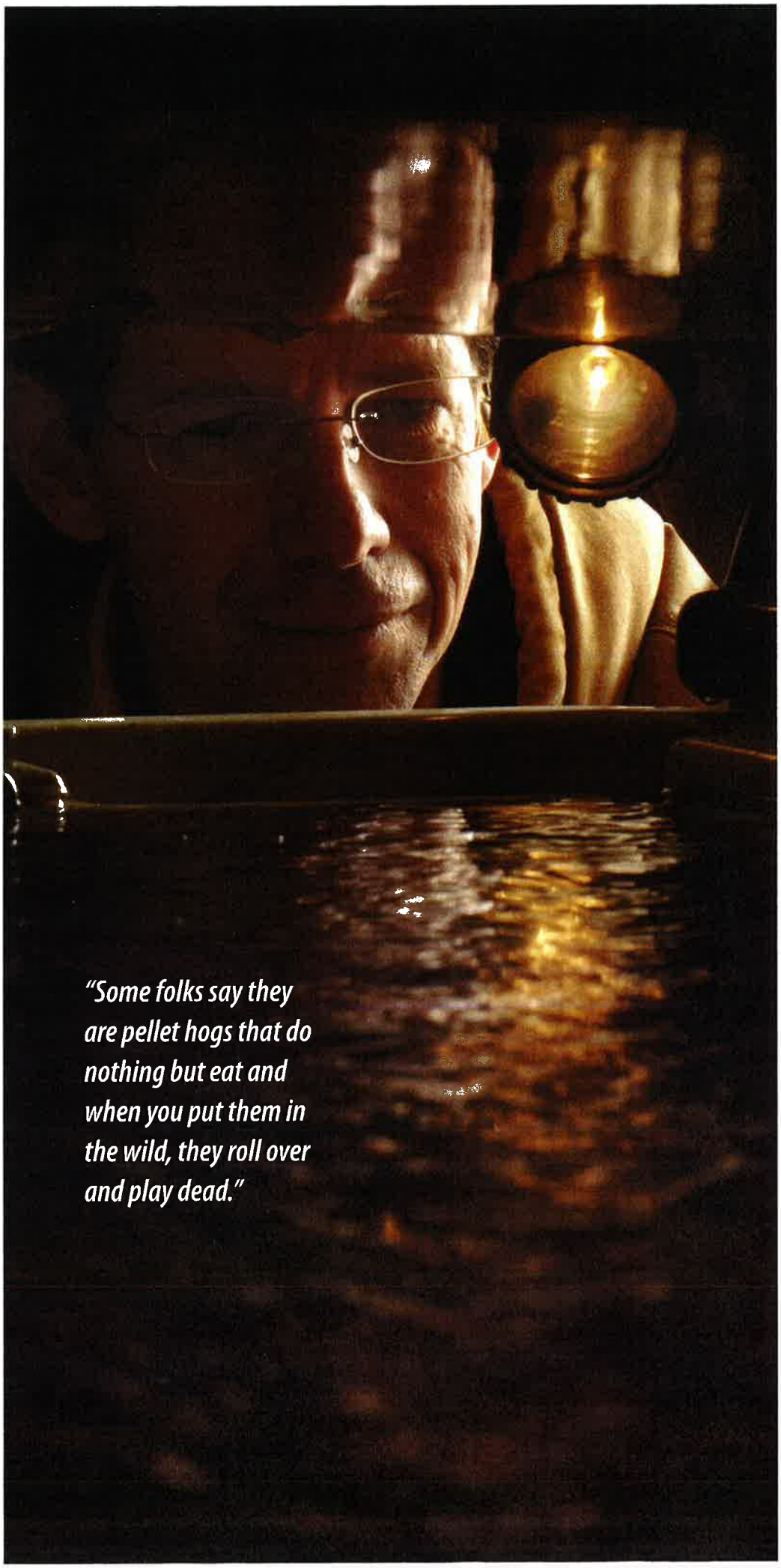
With their eyes on the future, young steelhead emerge from eggs incubated at the hatchery research center.

"We want to be asking questions all the time," said Noakes.

How do salmonids choose mates, spawn, grow up, travel, and compete for food? How do hatchery and wild fish interact as juveniles? As returning adults? Where do they spawn?



"Some folks say they are pellet hogs that do nothing but eat and when you put them in the wild, they roll over and play dead."

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Where do they go after they are released? Where do they spend time in the gravel and how do they develop under different temperature, disease, and food and light regimes?

"We can see how wild fish and hatchery fish compete."

"One of the questions we want to investigate is: Are hatchery fish competent?" Noakes said. "Some folks say they are pellet hogs that do nothing but eat and when you put them in the wild, they roll over and play dead. Others say that hatchery fish are the source of all evil, that they take over and crowd out wild fish. And many others see hatcheries as the only realistic option for supplementing and conserving fish species.

"We can see if hatchery fish will spawn with wild fish, or if they will crowd them out of spawning beds. We can compare juvenile growth rates and survival. We can see how wild fish and hatchery fish compete."

Most hatcheries have an objective of producing as many young salmon as

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▲ New information may help researchers understand when and where hatchery fish can be caught without impacting wild runs.

◀ Joseph O'Neil pores over the progress of young salmon in the Oregon Hatchery Research Center, where he is assistant manager.

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Experimental streams mimic natural features with gravel bars, woody debris, and natural meanders and pools.

they possibly can. Is this the right way of doing business? Schreck sees the Oregon Hatchery Research Center as an excellent place to determine the optimal density for raising young salmon smolts. "Maybe we can test to see if it is more cost effective and successful to produce fewer high-quality, not high quantities, of fish at hatcheries," he said.

"I would be really interested in looking at the competition between hatchery and wild juvenile fish in those experimental streams," said Giannico. "Young salmonids compete for territories in streams. One could look at the effect that sequence of arrival to a territory, or relative size differences among fish, may have on the outcome of wild and hatchery fish competition for the best feeding spots in a stream reach. This kind of information could help design hatchery release strategies that minimize undesirable impacts on wild salmonids."

Noakes wants to make sure that the research at the center is interdisciplinary and far ranging. He's formed several advisory committees, including an advisory committee to review research proposals and a stream advisory committee with hydrologists, stream ecologists, and forest engineers.

"The more people that give us insight and conduct research here, the better," he said. "There's no real limit to what we can do here."

"I could see the center as a good place for watershed councils, conservation groups, commercial fishers, and angler groups to participate in workshops

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David Noakes sees the center as a place to bring together researchers, students, and the community.

and other information sharing," said Giannico. "Local students will have a great opportunity to study natural science here, not only at the hatchery, but in the surrounding watershed itself."

Patience on the part of citizens and scientists will be required, as funding and results are not going to be instantaneous. "There's a huge potential here to benefit the people and fisheries of Oregon," said Schreck. "But people have to give it time to succeed. Salmon life cycles are long. It takes three to six years to follow one generation of salmon from egg to a spawning adult. None of this is quick."

Carol Savonen is a communications specialist in OSU's Department of Extension and Experiment Station Communications.

The Oregon Hatchery Research Center is a new facility on Fall Creek, in the central Oregon Coast Range.

The mission of the Oregon Hatchery Research Center is to:

- Understand mechanisms that may create differences between hatchery and wild salmon and steelhead
- Develop approaches to best manage differences to meet fishery and conservation objectives
- Help Oregonians understand the role and performance of hatcheries in responsibly using and protecting Oregon's native fish

The Oregon Hatchery Research Center received $7.8 million total funding:

- $4 million from Ballot Measure 66 capital funds
- $1.125 million from the OWEB Restoration and Protection Research Fund
- $1.875 million from ODFW
- $.84 million from the ODFW Fish Restoration and Enhancement Program

Research will provide information to help:

- Use hatchery fish responsibly to support viable populations of wild fish and sustain sport, commercial and tribal fisheries
- Understand biological processes and management implications on landscape scales
- Identify hatchery practices that minimize the impact of hatchery facilities on the natural environment

The OHRC staff includes:

- A Senior Scientist to oversee research and operations, identify research priorities, plan and conduct research, collaborate with fishery professionals and students, and coordinate with an advisory team
- A facility manager, assistant manager and one technician to operate the facility, oversee maintenance and safety, conduct education and outreach activities, and provide fish-culture guidance

For more information about the Oregon Hatchery Research Center:

- Call the center at 541-487-5510
- Visit the website at: **http://www.dfw.state.or.us/OHRC/**

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