

Fake fish invented in Richland will help save real fish

The devices are deployed around the world

By ANNETTE CARY
Tri-City Herald

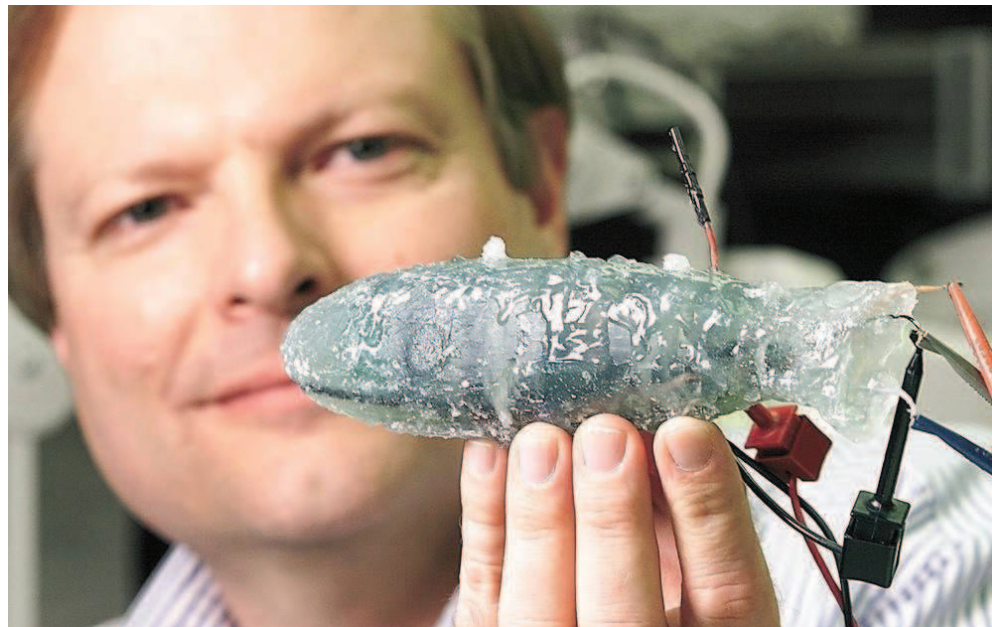
RICHLAND, Wash. — Mechanical fish developed in Richland have made their way through dams from Ice Harbor near Pasco to the Mekong River in Southeast Asia.

Now hundreds more are expected to be deployed around the world, thanks to an agreement to commercialize the technology developed at Pacific Northwest National Laboratory.

The fish are just 3.5 inches long, about the size of a larger salmon smolt.

But they are packed with instrumentation that can give scientists, and now dams and other hydro facility operators, an idea of what passing through dams is like for fish.

The Sensor Fish record about 2,000 measurements per second as they swim



Tri-City Herald

A prototype of the Sensor Fish is shown as it looked two decades ago as Pacific Northwest National Laboratory researchers worked to develop a technology that could collect data on the stresses on fish traveling through dams.

through the turbulent waters and turbines at hydroelectric facilities.

“The Sensor Fish provides information to help engineers design more fish-friendly turbines going forward,” said Daniel Deng,

a laboratory fellow at Pacific Northwest National Laboratory.

On the journey of less than two minutes in the fast-moving water through a dam, they record acceleration, orientation, pressure

and the speed at which the sensor fish rotates.

The Sensor Fish developed by Pacific Northwest National Laboratory is now commercially available for studying the stresses on fish as they travel through

specific dams around the world.

It allows dam operators to help understand the stresses on real fish, such as juvenile salmon, as they take a potentially wild ride through dams and then make improvements to structures.

PNNL began developing the Sensor Fish in the late 1990s to improve fish survival at the hydroelectric dams along the Pacific Northwest's Columbia River basin, including on the Snake River.

“The vast majority of juvenile salmon and steelhead passing through the turbines survive without injury in the Columbia River basin,” Deng said. “Still we want to understand more about the injuries and mortality that do occur from abrupt pressure changes in dam turbine chambers.”

Fish can be hurt or disoriented by the turbulence of the water and the blades of a turbine can strike them, if that's the route they take through the dam. But research with an early version of the Sen-

sor Fish has helped show the pressure changes in the dam turbine chambers that also can harm fish.

A fish traveling through a dam can experience an enormous drop in pressure in an instant and just as quickly return to normal pressure, according to the laboratory.

The lab compares it to a human zipping to the top of Mount Everest in the blink of an eye. The sudden pressure changes can injure or kill fish that depend on a balloon-like organ known as a swim bladder to maintain buoyancy at different depths. The bladder shrinks as the fish goes deeper and pressures are greater and increases in size as the fish rises, instantly expanding four or eight fold in some species.

Data provided by the Sensor Fish can help to redesign dam turbines so they create less severe pressure changes while maintaining or even improving power production, according to the laboratory.

Remembrance set for fallen Seaside officer

The Daily Astorian

SEASIDE — A remembrance ceremony will be held Tuesday to remember the late Seaside Police Sgt. Jason Goodding.

Goodding, 39, was patrolling downtown the night of Feb. 5, 2016 when he was shot and killed while attempting to serve a warrant.

“We should never forget Jason and the legacy he left with our department and our community,” Lt. Bruce Holt said in a news release. “He’s always with us, but this ceremony gives us a special opportunity to pay our respects and bring family, friends and others together



Jason Goodding

to honor a great man.”

The remembrance will be held at 6:30 p.m. outside of the Seaside Police Department and will include a flag ceremony, the placing of a wreath and the police officer’s prayer.

Schools close due to wintry weather

The Daily Astorian

Schools on the North Coast closed today because of wintry weather.

Astoria, Knappa, War-

renton, Seaside and Jewell school districts announced closures this morning.

Clatsop Community College and the North-

west Regional Education Service District are also closed.

A winter weather advisory was in effect until noon.

‘Meet the Mayor’ event set for Tuesday

The Daily Astorian

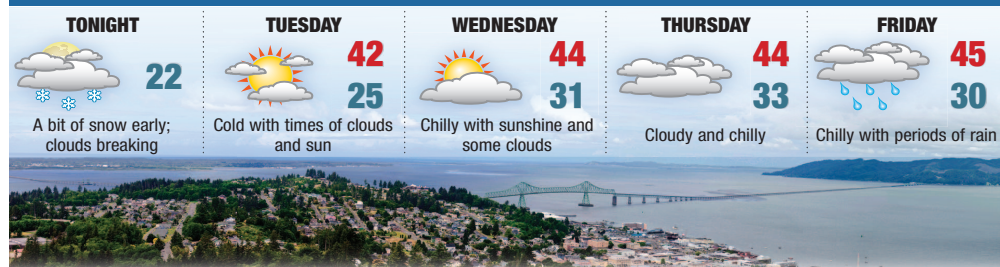
Astoria Mayor Bruce Jones will hold his first “Meet

the Mayor” event Tuesday at the Astoria Library.

The event, held in the library’s Flag Room, begins

at 4:30 p.m. runs through 6 p.m. It is a chance for anyone to come and discuss issues or voice concerns.

FIVE-DAY FORECAST FOR ASTORIA



ALMANAC

Astoria through Sunday.	
Temperatures	
High/low	43°/33°
Normal high/low	51°/37°
Record high	64° in 2009
Record low	11° in 1989
Precipitation	
Sunday	0.22"
Month to date	1.06"
Normal month to date	0.80"
Year to date	5.99"
Normal year to date	11.00"

SUN AND MOON

Sunset tonight	5:24 p.m.
Sunrise Tuesday	7:34 a.m.
Moonrise today	7:43 a.m.
Moonset today	5:24 p.m.
New Moon	Feb 12
First Quarter	Feb 19
Full Moon	Feb 26
Last Quarter	Feb 4

UNDER THE SKY

Tonight's Sky: New Moon (1:04 p.m.)

TOMORROW'S TIDES

Astoria / Port Docks				
Time	High	Time	Low	
2:08 a.m.	8.2 ft.	7:42 a.m.	2.9 ft.	
1:22 p.m.	8.9 ft.	8:15 p.m.	-0.1 ft.	

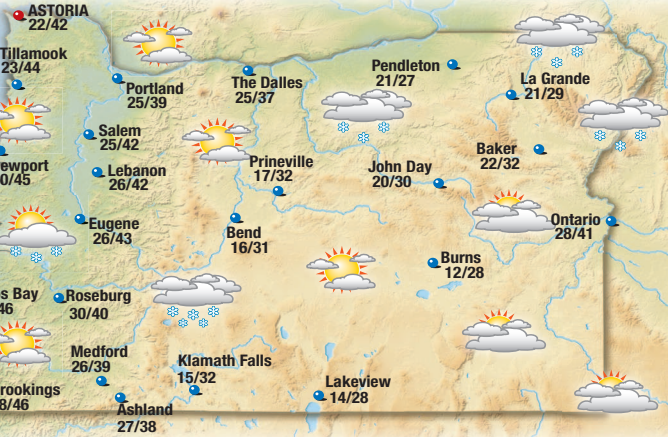
NATIONAL CITIES

City	Hi	Lo	W	Hi	Lo	W
Atlanta	66	55	c	70	60	pc
Boston	53	39	s	57	29	pc
Chicago	52	28	r	31	26	pc
Denver	57	29	s	54	25	pc
Des Moines	30	10	pc	27	22	i
Detroit	51	29	r	37	24	pc
El Paso	70	53	c	65	52	pc
Fairbanks	17	3	sn	19	7	sn
Honolulu	82	67	pc	80	68	c
Indianapolis	57	31	r	45	40	c
Kansas City	37	21	pc	33	25	i
Las Vegas	59	45	sh	52	35	r
Los Angeles	58	47	r	55	38	r
Memphis	68	60	sh	72	66	c
Miami	80	64	pc	79	65	s
Nashville	66	58	r	71	64	c
New Orleans	72	64	sh	74	65	sh
New York	54	39	s	58	41	pc
Oklahoma City	60	43	pc	67	51	pc
Philadelphia	53	37	s	60	34	pc
Pittsburgh	65	27	sh	44	42	c
Salt Lake City	51	20	sh	42	25	r
San Francisco	51	40	t	52	39	r
Seattle	33	22	sn	36	21	pc
Washington, DC	58	39	s	63	43	pc

Weather (W): s-sunny, pc-partly cloudy, c-cloudy, sh-showers, t-thunderstorms, r-rain, sf-snow flurries, sn-snow, l-ice.

REGIONAL WEATHER

Shown is tomorrow's weather. Temperatures are tonight's lows and tomorrow's highs.

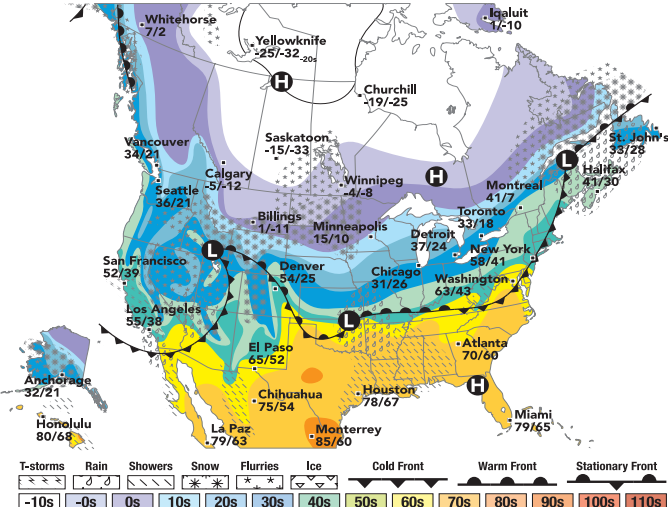


REGIONAL CITIES

City	Hi	Lo	W	Hi	Lo	W	City	Hi	Lo	W	Hi	Lo	W
Baker City	41	22	sn	32	11	sn	Olympia	34	19	sn	37	18	pc
Bend	30	16	sn	31	14	sn	Pendleton	32	21	sn	27	15	sn
Brookings	42	30	c	46	31	pc	Portland	40	25	c	39	23	pc
Eugene	41	26	c	43	24	pc	Roseburg	38	30	c	40	29	pc
Ilwaco	39	26	c	42	27	pc	Salem	41	25	c	42	24	pc
Klamath Falls	32	15	sn	32	10	pc	Seaside	41	24	c	43	26	pc
Medford	37	26	sn	39	23	pc	Spokane	24	11	sn	23	7	pc
Newberg	40	24	c	41	23	pc	Springfield	41	28	c	43	26	pc
Newport	44	30	c	45	31	pc	Vancouver	40	23	c	39	21	pc
North Bend	42	30	c	46	31	pc	Yakima	33	19	sf	32	11	pc

TOMORROW'S NATIONAL WEATHER

Shown are noon positions of weather systems and precipitation. Temperature bands are highs for the day.



ON THE RECORD

DUII

• At 6 p.m. on Sunday, Janessa Wright, 24, of Astoria, was arrested by Seaside police on the 200 block of Roosevelt Drive after she allegedly hit the bus stop near the McDonald's restaur-

ant and then continued to drive. She was charged with reckless driving, driving under the influence of intoxicants, hit-and-run and resisting arrest. Her blood alcohol content was 0.25 percent.

• At 12:30 a.m. on Sat-

urday, Michael Thomas Pool, 43, of Milwaukie, was arrested by Oregon State Police on U.S. Highway 26 near milepost 30 and charged with DUII. His blood alcohol content was 0.10 percent.

BIRTHS

Jan. 21, 2019

ARMSTRONG, Alexandra and Andrew, of Astoria, a girl, Helena Louise Armstrong, born at Columbia Memorial Hospital in Astoria.

Jan. 3, 2019

MARION, Ella Mae and Ramon, of Warrenton, a girl, Piper Bobbi Marion, born at Columbia Memorial Hospital. Grandpar-

ents are Bobby Marion, of Portland, Carol Marion, of Manchester, Connecticut, Elmar Divinagracia, of Atlanta, and Vilma Cong, of San Diego.

DEATH

Feb. 3, 2019

HANSEN, Dorothy H., 88, of Birkenfeld, died in Astoria. Caldwell's Luce-Layton Mortuary of Astoria is in charge of the arrangements.

PUBLIC MEETINGS

MONDAY
Astoria City Council, 7 p.m., City Hall, 1095 Duane St.

TUESDAY
Seaside Community Center Commission, 10 a.m., Bob Chisholm Community Center, 1225 Avenue A.

Seaside Library Board, 4:30 p.m., Seaside Public Library, 1131 Broadway.
Clatsop Care Health District Board, 5 p.m., Clatsop Care Memory Community, 2219 Dolphin Ave., Warrenton.
Miles Crossing Sanitary

Sewer District Board, 6 p.m., 34583 U.S. Highway 101 Business.
Cannon Beach City Council, 7 p.m., City Hall, 163 E. Gower St.
Seaside Planning Commission, 7 p.m., City Hall, 989 Broadway.

LOTTERIES

OREGON
Sunday's Pick 4:
1 p.m.: 3-7-9-3
4 p.m.: 2-3-6-2
7 p.m.: 0-2-9-8
10 p.m.: 7-7-8-0
Sunday's Lucky Lines: 2-8-9-16-20-21-28-32
Estimated jackpot: \$37,000
Saturday's Pick 4:
1 p.m.: 7-6-0-2
4 p.m.: 5-0-0-6
7 p.m.: 8-6-8-1
10 p.m.: 4-7-6-2
Saturday's Lucky Lines: 3-5-11-14-19-22-26-29
Estimated jackpot: \$35,000
Saturday's Megabucks: 8-15-25-36-37-46
Estimated jackpot: \$7.7 million

Saturday's Powerball: 10-17-18-43-65, Powerball: 13
Estimated jackpot: \$204 million
Friday's Pick 4:
1 p.m.: 1-9-8-4
4 p.m.: 6-8-6-8
7 p.m.: 0-6-7-0
10 p.m.: 0-5-5-3
Friday's Lucky Lines: 2-8-11-16-20-23-25-29
Estimated jackpot: \$34,000
Friday's Mega Millions:
2-37-48-66-68, Mega Ball: 11
Estimated jackpot: \$139 million

WASHINGTON
Sunday's Daily Game: 0-4-9
Sunday's Keno: 09-12-14-18-19-23-26-36-37-51-55-57-59-60-67-69-70-74-78-80

Sunday's Match 4: 14-16-20-21
Saturday's Daily Game: 7-5-6
Saturday's Hit 5: 04-06-29-36-38
Estimated jackpot: \$160,000
Saturday's Keno: 15-19-21-23-24-25-32-38-39-40-43-48-58-59-69-71-73-74-79-80
Saturday's Lotto: 11-12-15-16-21-41
Estimated jackpot: \$3.8 million
Saturday's Match 4: 06-13-17-21
Friday's Daily Game: 7-8-6
Friday's Keno: 01-06-08-10-14-16-30-32-35-40-41-42-44-46-51-64-67-69-72-79
Friday's Match 4: 06-09-10-14

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The Daily Astorian publishes paid obituaries. The obituary can include a small photo and, for veterans, a flag symbol at no charge. The deadline for all obituaries is 9 a.m. the business day prior.

Obituaries may be edited for spelling, proper punctuation and style. Death notices and upcoming services will be published at no charge. Notices must be submitted by 9 a.m. the day of publication.

Obituaries and notices may be submitted online at DailyAstorian.com/forms/obits, by email at ewilson@dailyastorian.com, placed via the funeral home or in person at The Daily Astorian office, 949 Exchange St. in Astoria.
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