

Creek: Next phase will reconnect more tributaries

Continued from Page 1A

Cove and Chinook, Smith said, the highway is heavily armored by riprap, with culverts to tributaries often perched too high up to provide adequate fish passage outside the highest of tides.

CREST found a willing partner in Lewis and Clark National Historical Park for the Columbia-Pacific Habitat Restoration, a plan to reconnect tributaries at several points along highway. The first phase installed a 12-by-12-foot culvert trough U.S. Highway 101 to reconnect nearly 100 acres of wetlands just north of the park's Fort Columbia site. The second and current phase is reconnecting Megler Creek. A third phase will look to reconnect even more tributaries upriver near Hungry Harbor.

"We have a dual mandate of doing what we can to restore natural ecosystem process, but we also want to do what we can to get our lands kind of back to a state that closely resembles what Lewis and Clark encountered when they were here," said Carla Cole, a natural resources project manager for the park.

In addition, she said, "It's becoming increasingly important along the Columbia to open access to these cold-water refuges with climate change."

Reconnecting Megler Creek

Just west of the Dismal Nitch rest area, State Route 401 shrinks to one lane. A concrete barrier separates traffic from crews with Thomp-



Danny Miller/The Daily Astorian

Thompson Bros Excavating crews work on CREST's Columbia-Pacific Passage Habitat Restoration project.

son Bros. Excavating, digging out and building up shoring walls under the northern half of the highway to start placing the precast sections of the new 25-foot concrete box culvert that will run under the highway.

After the northern half of the highway is complete, the entire process moves to the south. A new sheet pile cofferdam will hold the Columbia out of the project site until the plug is pulled in February.

Preparation for Megler Creek started before the culvert near Fort Columbia had ever opened. The project involved years of monitoring different endangered species of salmon spawning, and numerous levels of scientific review. CREST and the local park each pieced together about \$500,000 in competitive grants from various agencies to pay for the \$1 million project.

Smith said the old culvert

was only 48 inches in diameter, and perched 6 feet above mean water level, disconnecting Megler Creek from the tidal influence of the Columbia except during high tides. After redirecting about 300 feet of Megler Creek around the project site, crews had to dig out about 8 feet of sediment that had backed up behind the highway over the past century, unable to wash out into the Columbia during storms.

The lower elevation will allow tides to reach farther into the historic wetlands at the mouth of the creek. A new pebbly bottom, woody debris and shrubbery will create a more natural, nutrient-rich stream.

"I'm hopeful people will be able to see salmon going through," Cole said.

The Dismal Nitch rest area, being refurbished by the Washington Department of Transportation, will include an

informational kiosk about the project, overlooking the small inlet where Megler Creek spills into the Columbia.

Returning chum

During spawning surveys, Smith said, CREST observed several species of endangered salmon inside Megler Creek. One they didn't see inside was chum, but he and Cole said they're particularly excited about the prospects.

Clark's journal from November 1805 talks about catching "what Pore fish we can kill up the branch on which we are encamped." Cole said the term "pore" — translated to poor — likely refers to the lesser-quality chum species, which has shrunk to 3 percent of its historical run in the Columbia.

"Chum will be a big beneficiary of this project, because chum typically spawn right (at the head) of tide, and they're not as athletic as some of the others," Smith said, adding coho and steelhead will travel farther upstream to spawn.

Cole said she's excited to come back in November and watch for chum salmon spawning. She sees the species, whose roe is commonly used in sushi, as a potential new homegrown industry for the Lower Columbia.

"Chum roe is a really lucrative fishery all across the Pacific," she said. "We envision a future where there could be native chum runs, and we could have our own chum fishery, harvesting the roe, which is actually more valuable pound-for-pound than Chinook salmon flesh."

Dams: Salmon runs are a fraction of what they were

Continued from Page 1A

A federal judge urged officials to consider breaching four of those dams on the Snake River.

"Because of the scale of the EIS, there's no practical way for us, even if we wanted to, to provide a map of each and every site that we consider," said Sean Hess, the U.S. Bureau of Reclamation's Pacific Northwest Region archaeologist. "There are some important sites out there that we don't talk about a lot because of concerns about what would happen because of vandalism."

Fish survival, hydro-power, irrigation and navigation get the most attention and will be components in the environmental review due out in 2021. But at more than a dozen public meetings in the four states to collect feedback, the cultural resources program has equal billing. Comments are being accepted through Jan. 17.

Umbrella law

The review process is being conducted under the National Environmental Policy Act, an umbrella law that covers the well-known Endangered Species Act. Thirteen species of salmon and steelhead on the Columbia and Snake rivers have been listed as federally protected species over the past 25 years.

But the environmental law also requires equal weight be given to other laws, including the National Historic Preservation Act, which is where the cultural resources program comes in. Among the 4,000 sites are fishing and hunting processing areas, ancestral village areas and tribal corridors.

"People were very mobile, prehistorically," said Kristen Martine, cultural resource program manager for the Bonneville Power Administration.

Some of the most notable sites with human activity date back thousands of years and are underwater behind dams on the Columbia and Snake rivers. Celilo Falls, a dipnet fishery for thousands of years, is behind The Dalles Dam on the Columbia River. Marmes Rockshelter was occupied 10,000 years

ago but now is underwater behind Lower Monumental Dam on the Snake River.

"If we're breaching dams, it would definitely change how we manage resources," said Gail Celmer, an archaeologist with the U.S. Army Corps of Engineers.

Environmental review

U.S. District Judge Michael H. Simon ordered the environmental review in May after finding that a massive habitat restoration effort to offset the damage that dams in the Columbia River Basin pose to Northwest salmon runs was failing.

Salmon and steelhead runs are a fraction of what they were before modern settlement. Of the salmon and steelhead that now return to spawn each year, experts say, about 70 to 90 percent originate in hatcheries.

Those opposed to breaching the Snake River dams to restore salmon runs say the dams are an important part of the regional economy, providing irrigation, hydro-power and shipping benefits.

Meanwhile, several tribes said they are better able to take part in the review process than they once were.

"Tribes have not had much opportunity to participate in these things because they didn't have professional staff or trained people," said Guy Moura of the Colville Confederated Tribes in Washington state, noting the tribe employed four people in its cultural resources program in 1992 but now has 38. "With growth in size, there also came the evolution of what was being done."

The tribe at one time had a large fishery at Kettle Falls, on the upper part of the Columbia River, but it was inundated in the 1940s behind Grand Coulee Dam. Dams farther downstream on the Columbia prevent salmon from reaching the area.

Also among the 4,000 historical sites is Bonneville Dam, one of 14 dams involved in the environmental impact statement. Bonneville Dam is the lowest dam in the system at about 145 miles from the mouth of the Columbia River. It started operating in the 1930s and became a National Historic Landmark in 1987.

Sea lions: Last five years of program will be reviewed

Continued from Page 1A

conservation and management perspective to prevent the spread of a detrimental behavior and to minimize the total number of animals removed," the scientists wrote in the journal Proceedings of the Royal Society B.

"The earlier you start, the more effective you are at slowing the spread, and the fewer animals you have to remove to make a difference," said Zachary Schakner, who coauthored the study as a graduate student at UCLA and is now Recreational Fisheries Coordinator in NOAA Fisheries' West Coast Region.

The states have removed 166 California sea lions since the effort began in 2008, a small fraction of the number of animals that migrate to the Columbia each winter and spring. The states may euthanize sea lions if no permanent holding facility, such as a zoo or aquarium, can be found.

This year, NOAA Fisheries will review the last five years of the program, and will take the study findings into account, said Robert Anderson of NOAA Fisheries' West Coast Region in Portland.

"What was really new was the combination of behavioral ecology with disease ecol-

ogy to come up with management recommendations that could make the program more effective," said Michael Buhnerkempe, coauthor of the research and an assistant project scientist at UCLA.

The study examined the association between sea lions known to prey on salmon at Bonneville Dam with other animals that later developed the same behavior, assessing how the behavior passed among animals. The researchers then modeled various strategies for removing sea lions to determine which were most effective and which required the removal of the fewest sea lions.

Quick response

Just as diseases are easiest to stop when they have affected only a few individuals, so are undesirable wildlife behaviors such as the predation on salmon at Bonneville Dam. The study found that the removal of sea lions would have been more effective, requiring the removal of fewer animals overall, if it had started soon after biologists first realized that sea lions were targeting protected salmon.

"If you can do that, you're beating it before it has a chance to explode into more of an epidemic," Buhnerkempe said. "Otherwise it quickly gets out of control."

THE DAILY ASTORIAN

TV LISTINGS

Evening listings
TUESDAY

TUESDAY EVENING												JANUARY 3	
A	L	6 PM	6:30	7 PM	7:30	8 PM	8:30	9 PM	9:30	10 PM	10:30	11 PM	11:30
2	KATU	(2) KATU News at 6		Jeopardy!	Wheel of Fortune	The Middle	Amer. Housewife	Fresh Off-Boat (N)	The Real O'Neals	Marvel's Agents of S.H.I.E.L.D.		KATU News at 11	(35) Jimmy Kimmel
5	KOMO	(4) KOMO 4 News		Wheel of Fortune	Jeopardy!	The Middle	Amer. Housewife	Fresh Off-Boat (N)	The Real O'Neals	Marvel's Agents of S.H.I.E.L.D.		KOMO 4 News	(35) Jimmy Kimmel
6	KING	(5) NBC Nightly News	KING 5 News	KING 5 News	Evening	The Wall "Mike and Shana" (N)		Chi.Fire "Some Make It, Some Don't" (N)		Chicago P.D. "Don't Bury This Case" (N)		KING 5 News	(35) Tonight Show
7	KOIN	(6) KOIN Local 6 at 6	CBS Evening News	Extra	Ent. Tonight	NCIS "Willoughby" (N)		Bull "EJ" (N)		NCIS: LA "Follow the Monkey" (N)		KOIN 6 News @ 11	(35) S. Colbert
8	KIRO	(7) KIRO 7 News	CBS Evening News	The Insider	Ent. Tonight	NCIS "Willoughby" (N)		Bull "EJ" (N)		NCIS: LA "Follow the Monkey" (N)		KIRO News	(35) S. Colbert
9	KGW	(8) KGW News at 6:00 p.m.		Live at Seven	Inside Edition	The Wall "Mike and Shana" (N)		Chi.Fire "Some Make It, Some Don't" (N)		Chicago P.D. "Don't Bury This Case" (N)		KGW News at 11	(35) Tonight Show
10	KRCW	(3) Last Man Standing	Last Man Standing	Modern Family	Modern Family	The Flash		No Tomorrow		KGW News at 10	Two and a Half	Two and a Half	Met Your Mother
11	KOPB	(10) Ask-Old House	Business (N)	PBS NewsHour		American Masters "Sidney Lumet" (N)				Frontline "President Trump" (N)		POV	
12	KPTV	(12) 6 O'Clock News		Family Feud	Family Feud	New Girl	The Mick (N)	Bones (SP) (N)		10 O'Clock News		11 O'Clock News	2 Broke Girls
13	KPDx	(8) Mike & Molly	Mike & Molly	Big Bang Theory	Big Bang Theory	FOX 12's 8 O'Clock News on PDX-TV		FOX 12's 9 O'Clock News on PDX-TV		Family Guy	Family Guy	American Dad	Cleveland Show
14	KCPQ	(13) Modern Family	Modern Family	Big Bang Theory	Big Bang Theory	New Girl	The Mick (N)	Bones (SP) (N)		Q13 News at 10		Q13 News	The Simpsons
20	TBS	(20) Seinfeld	Seinfeld	Seinfeld Pt. 1 of 2	Seinfeld Pt. 2 of 2	Big Bang Theory	Big Bang Theory	Big Bang Theory	Big Bang Theory	Big Bang Theory	Big Bang Theory	Conan	
22	KZJQ	(22) Two and a Half	Two and a Half	Last Man Standing	Last Man Standing	Modern Family	Modern Family	Q13 News at 9		Big Bang Theory	Big Bang Theory	Friends	Friends
29	ESPN	(29) NCAA Basketball	Texas A&M at Kentucky (L)			SportsCenter		SportsCenter		SportsCenter		SportsCenter	
30	ESPN2	(30) NCAA Basketball	Kansas State at Kansas (L)			NFL Live		College Basketball	30 for 30 "Run Ricky Run"		Sport Science	30 for 30 "Rand University"	
31	NICK	(31) Henry Danger	Henry Danger	Henry Danger	The Thundermans	The Thundermans	The Thundermans	Full House	Full House	Full House	Full House	Friends	Friends
32	DISN	(32) Liv Maddie Cali	Stuck in the Middle			Liv Maddie Cali	K.C. Undercover	Girl Meets World	Bunk'd	The Lodge	Stuck in Middle	Liv and Maddie	Austin & Ally
34	FAM	(34) The Middle	*** National Lampoon's Vacation '83	Beverly D'Angelo	Chevy Chase	*** Coming to America (1988, Comedy)	Arsenio Hall, James Earl Jones, Eddie Murphy					The 700 Club	
35	FMC	(35) (5:00) Footloose ('11) Kenny Wormald.	(15) *** Footloose (2011, Comedy/Drama)	Julianne Hough, Dennis Quaid, Kenny Wormald.		*** Life of Pi (2012, Fantasy)	Irrfan Khan, Adil Hussain, Suraj Sharma.	(35) FXM Presents				30 Something Grandma	Little Women: Dallas
36	LIFE	(36) Dance Moms		Dance Moms		Dance Moms		Dance Moms				30 Something Grandma	Little Women: Dallas
38	ROOT	(38) Halls of Fame	Mark Few (N)	NCAA Football	Foster Farms Bowl Utah vs. Indiana Site: Levi's Stadium -- Santa Clara, Calif.			Mark Few	The Game 365	NCAA Football	Foster Farms Bowl		
39	FS1	(39) (5:00) UFC UFC 207		UFC Classics (N)		Fox Sports Live	TMZ Sports (N)	Speak for Yourself		Skip and Shannon: Undisputed Opinions on the biggest sports topics of the day.			
43	SPIKE	(43) Cops	Cops	Cops	Cops	Cops	Cops	Cops	Cops	Cops	Cops	Cops	Cops
44	COM	(44) Futurama	Futurama	Futurama	Futurama	Tosh.0	Tosh.0	Tosh.0	Tosh.0	Tosh.0	Tosh.0	The Daily Show (N) @midnight (N)	
45	HIST	(45) Counting Cars	Counting Cars	Counting Cars	Counting Cars	Counting Cars	Counting Cars	Counting Cars	Counting Cars	(05) Motors	(35) Motors	(05) Counting Cars	
46	A&E	(46) First 48 "Carjacked" Bad Connection"		Intervention "Robbie"		Intervention	Intervention "Jasmine" (N)			Remini: Scientology "Auditing" (N)		(05) Remini: Scientology "Golden Era"	
47	TLC	(47) Say Yes-Dress	Say Yes-Dress	Little People "Time to Go Wild" (N)		Little People, Big World (N)		OutDaughtered (N)		Kate Plus Eight "Sweet 16" (N)		OutDaughtered	
48	DISC	(48) Moonshiners "Luck of the Irish"		Moonshiners "Big River Redemption"		Moonshiners: Outlaw Cuts (N)		Moonshiners (N)		Fields "The Hunt Continues" (SP) (N)		Moonshiners	
49	NBC	(49) Live Free or Die "Race Against Time"		Live Free or Die "To the Bone"		Live Free or Die "Making Moves"		Live Free or Die "Bring It Home"		Behavi. "For You I'd Go with Strawberry"		Behavi. "For You I'd Go with Strawberry"	The Last Ship "SOS"
50	TNT	(50) *** The Help (2011, Drama)	Viola Davis, Octavia Spencer, Emma Stone.			*** Gladiator (2000, Epic)	Joaquin Phoenix, Connie Nielsen, Russell Crowe.						Enter the Dragon
51	AMC	(51) (4:30) *** The Departed ('06) Matt Damon, Jack Nicholson, Leonardo DiCaprio.				*** Underworld: Awakening (2012, Action)	India Eisley, Michael Ealy.			*** Underworld: Awakening (2012, Action)	India Eisley, Michael Ealy.		
52	USA	(52) NCIS		NCIS		WWE Smackdown! WWE superstars do battle in long-running rivalries.		Chopped "Healthy Rivalry"		Shooter (N)		Incorporated	
53	FOOD	(53) Chopped "\$50,000 Tournament: Part 4"		Chopped		Chopped "Lemon Meringue Why?" (N)		Chopped "Light Makes Right"		Chopped "Clean Eatin'" (N)		Chopped "Light Makes Right"	
54	HGTV	(54) Fixer Upper		Fixer Upper		Fixer Upper		Fixer "Retiring to the Country" (N)		House Hunters (N) House Hunters (N)		Fixer Upper	
56	FX	(56) (5:30) *** Riddick (2013, Sci-Fi)	Karl Urban, Katee Sackhoff, Vin Diesel.			*** Underworld: Awakening (2012, Action)	India Eisley, Michael Ealy.			*** Underworld: Awakening (2012, Action)	India Eisley, Michael Ealy.		
57	CNN	(57) Anderson Cooper 360		CNN Tonight With Don Lemon		CNN Tonight With Don Lemon		Anderson Cooper 360		Anderson Cooper 360		CNN Tonight With Don Lemon	
58	FNC	(58) The Kelly File With Megyn Kelly		Hannity		The O'Reilly Factor		The Kelly File With Megyn Kelly		Hannity		On the Record	
61	CNBC	(61) The Profit		Billion Dollar Buyer		The Profit		Billion Dollar Buyer		The Profit		Paid Program	Paid Program
63	BRVA	(63) Beverly "The Buddha Bentley Birthday"		Beverly Hills "Going Commando"		Beverly Hills Social (N)		Beverly Hills "Amnesia Appetizers" (N)		Ladies of London (N)		Watch (SP) (N)	Beverly Hills
64	TCM	(64) (5:00) Cool Hand Luke	Paul Newman.	(15) *** Brute Force ('47, Drama)	Hume Cronyn, Charles Bickford, Burt Lancaster.	*** Riot in Cell Block 11 ('54) Emile Meyer, Neville Brand.		*** The Big House ('30) Robert Montgomery.					
65	SYFY	(65) (5:30) *** Quantum of Solace ('08) Olga Kurylenko, Mathieu Amalric, Daniel Craig.		*** Lost in Space (1998, Sci-Fi)	Heather Graham, Mimi Rogers, William Hurt.							The Darkest Hour ('11) Emile Hirsch.	
162	RFD	(162) (5:30) Cattlemen	LandLeader TV	Downunder Horseman.		Chris Cox	Rural Eve. News	Ag PhD	Cattlemen to Cattlemen	LandLeader TV		Product Showcase	

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