和歌山県医大　2013年

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次の英文を読み，その内容に関する下の設問の答えとして最も適当なものをA～Dより一つずつ選び，符号で答えなさい。(＊印の語には下に注釈あり)

Residents in the Pacific Northwest of America are very much aware that the number of salmon in the area has decreased a lot in the last fifty years. Salmon populations once numbered in the millions in the Columbia River, but now thirteen populations of the fish there are listed as threatened or endangered. Hydroelectric dams have long been blamed as a major cause for that decline because they supposedly prevent young salmon from traveling to the sea. In hopes of increasing survival rates, fishery managers have modified fish passageways on dams, changed the timing of water release, and even gone so far as to truck young salmon around eight major dams on the Columbia.

To pin down the reasons behind the decline, fishery researchers have spent the last decade implanting rice-sized radio frequency transmitters called PIT tags into migrating fish. The transmitters allow scientists to gauge fish survival rates at each stage in the journey. But to pick up the radio signals, PIT tag detectors must be within about a half a meter of the tags. So researchers have placed the readers in fish passageways around dams. That made it impossible to compare the survival rates of juvenile salmon in heavily dammed rivers, such as the Columbia and Snake rivers, to those in undammed rivers, such as the Fraser and Thompson in British Columbia, Canada.

For their current study, David Welch, a fisheries biologist at Kintam Research Center, British Columbia, and co-workers turned to a newer version of tagging technology that is part of the ongoing Pacific Ocean Shelf Tracking (POST) Project, which is tracking the abundance of ten kinds of fish and invertebrates\*. The POST effort in the western United States has spread a network of acoustic\* sensors from Alaska to California that can detect signals from almond-sized transmitters surgically implanted in fish. The acoustic signals from these tags can be picked up by sensors as far as 800 meters away, which allowed Welch and his team to monitor fish in dammed and undammed rivers.

From 2004 through 2006, Welch’s team implanted acoustic tags in a thousand juvenile Chinock salmon and followed their journeys in the Columbia and Fraser Rivers. In a paper published today in *PloS Biology*, the team reports that salmon migrating past the Columbia River dams were as likely to survive their journeys to the ocean as were fish in the undammed Fraser River. “It completely surprised all of the co-authors,” Welch says, adding that they expected to see lower survival rates for fish that needed to pass the dams. “It’s a very, very intriguing paper,” says Peter Moyle, a fisheries biologist at the University of California, Davis. One possible explanation for the counterintuitive result, Moyle says, is that habitat loss or other factors are lowering survival rates in the Fraser River. The study also doesn’t look at survival rates of salmon swimming back up the rivers to their egg-laying grounds. “This is not a message that dams are okay and have no effect on survival,” Welch agrees. But at least for salmon swimming downstream, those dams may not be as dangerous as previously thought.

*Science Now* (Online), 2011 (一部改変)

\*invertebrate：an animal lacking a backbone

\*acoustic：relating to sound and the way people hear things

1．The primary interest of this article is the difference in salmon’s survival rates between ( ).

A：the rivers with and without dams

B：a few decades ago and the present

C：the Columbia River and the Fraser River

D：those swimming upstream and downstream

2．It is suggested that the survival rate of salmon ( ).

A：is falling both in America and Canada

B：is falling in America, but not in Canada

C：is falling in dammed rivers, but not in undammed rivers

D：is falling in fish going upstream, but not in those going downstream

3．Which of the following is NOT mentioned as an effort to help fish travel the river?

A：They carried fish by truck.

B：They changed the time of water release.

C：They made some changes in the fish passageways.

D：They stopped damming water during the periods salmon travel.

4．How did the researchers investigate the behavior of salmon in the initial trial?

A：They set signal transmitters around the dams.

B：They attached an electrical tag to the fin of the fish.

C：They placed an electrical device in the body of the fish.

D：They set signal receivers over the streams below the dams.

5．Why didn’t the initial research for the salmon’s survival rates go well?

A：The detectors were not very powerful.

B：The detectors were not properly placed.

C：The transmitters were not very powerful.

D：The difference in research methods did not allow comparison with the research outcomes in the other rivers.

6．Choose the correct statement.

A：The reliability of the second research was not very high due to some methodological problems.

B：The second research was conducted by the persons and method different from those for the initial research.

C：A weak point of the second research was that it did not capture the behavior of the fish traveling upstream.

D：The second research outcomes supported what had been believed by many people about dam’s influence on salmon’s migration.

7．Choose the correct statement.

A：The initial research continued for five years.

B：Welch’s team started their research as part of the POST Project.

C：Now, salmon in the Columbia River are not considered endangered species.

D：The researchers believe salmon’s survival rates are lowering in both dammed and undammed rivers.