

Report on lungfish involved in the fish kill in 2009 below Somerset Dam and the Lake Samsonvale spillway.

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Twelve large adult lungfish were collected from among at least 70 dead specimens among rocks below the wall of Lake Somerset (Stanley River). Reports from SEQ Water staff indicated that these fish were possibly trying to swim upstream in the flood waters and it was impossible to turn them back. Some were rescued, and others died when flood waters receded and left them exposed among the rocks. A further eight, also adults, were collected from the area below the spillway at Lake Samsonvale (Pine River system) during a flood event a few weeks later. Up to 50 lungfish died at this time.

Post mortems on nine of the fish from the Stanley River, four females and five males, have been completed. All have large irregular patches of red scales on the bellies, as well as a few missing scales on the sides and back. Two have extensive bruising with abraded skin on the head and jaws. Uninjured areas of the bodies have the normal off season colour, dark brown on the back and dull pink on the belly. One has a broken jaw, and another has fractured skull bones. Examination of the teeth of one fish from the Stanley River suggests that it has not eaten much food for a long time. The tooth plates are worn flat, as if the fish had been grinding the teeth together with no food present.

Eight fish from the pool below the Lake Samsonvale spillway, four males and four females, have been examined. These fish had extensive bruising on the belly, and the bruises affect the underlying skin and muscle. On several fish, large areas of scales

have been removed. Examination of the remaining scales at the edge of these areas shows that damage to these scales has been caused by abrasion against a rough surface. Skin has also been removed from the snout and the mandible of most fish, in places where there are no scales. One fish had evidence of healed trauma to the pectoral fins, suggesting that it had been washed over the spillway during a previous flood event, and had been living in the spillway pool for some time.

Body condition in the Stanley River fish is reasonable, and in the Lake Samsonvale fish the condition is poor. There are some ecchymoses in the abdominal cavities of all of the fish examined, but little frank blood. No major blood vessels are damaged. The lungs are full of air.

The damaged scales and the bruises, while serious, may not have killed the Stanley River fish. They could possibly have survived them, given time. They died of exposure after the floods went down, and they were trapped behind rocks. The Lake Samsonvale fish had more serious injuries, and were all in poorer condition to start with, compared to the Stanley River fish. These fish were stranded high on the banks around the spillway when water levels receded.

Gonads in the fish living in the spillway pool below Lake Samsonvale are all small and poorly developed, in line with the poor condition of the fish. Ovaries and testes in the Stanley River fish were large, but not completely developed to spawning condition. At the time of year when the event happened, six months after the end of the 2008 spawning season and two months before the start of the 2009 season, this is not unusual. The trigger for spawning in this fish is increasing photoperiod, not rain, and it is unlikely that the fish were carrying out, or attempting to carry out, any activities related to spawning.

It is not unknown for any large sighting or catch of lungfish to include only large individuals, and small lungfish are rarely found. Further, spawning activities in much of the Brisbane River catchment had been suppressed for some years prior to 2009 because of the drought and because of the overgrowth of cyanobacteria in the Brisbane River and associated dams. The fish have not spawned for three years in at

least two places in the river below Lake Wivenhoe, where spawning used to be prolific, and did not spawn in a third place last year (2008).

The Stanley fish and the fish from the Lake Samsonvale spillway pool were all large adult fish, around a metre in length. A more accurate estimate of age will have to wait until the examination of skull bones and teeth is complete, but it would appear that all of these fish were quite old.

The anterior sac and the intestines of all of the fish examined contained no fresh food. Guts of most of the fish had blackened blood clots in the anterior sac, either the result of bleeding into the gut or the swallowing of blood from the oral cavity. Seven of the Stanley River fish had discoloured and digested fragments of filamentous algae in the posterior intestine, one had nothing, and one had fragments of *Corbiculina* shells as well as filamentous algae. Fish from the Lake Samsonvale spillway had traces of filamentous algae in the rectum, and a few had fragments of tree leaves in the intestine. Tree leaves are not a normal component of the diet.

A normal adult lungfish would have an intestine full of partly digested food, such as small clams and snails, and prawns. Lungfish feed by sucking food into the oral cavity, and filamentous algae enter along with the food they want. The fact that these fish had nothing but fragments of filamentous algae in the posterior intestine and rectum indicates that they have not been feeding properly for some time, weeks or even months.

Engineers from Wivenhoe Reservoir and Somerset Dam have assured me that no water came over the walls of these dams in 2009. I understand that valves were opened at the base of the wall of Lake Somerset, but these could not have allowed fish to pass through. I think that the fish were injured when they were battered against the rocks by the flow of water out of Lake Somerset, and died when flood waters receded and left them stranded.

Fish collected from the surroundings of the spillway below Lake Samsonvale had either been living in the pool for some time or came over the wall when the spillway was opened, and were battered by the water. They died, most probably, of exposure

when the water receded. Despite the lungs, they are no more able to survive out of the water than any other fish.

SEQ water workers who rescued large numbers of the lungfish below the wall of lake Somerset said that the fish could not be persuaded to swim back into the reservoir. They may have come from the upper Brisbane River, and may have been trying to get back into that part of the system.

Every time there is a major flood in the catchment of a dam or reservoir, many fish, including lungfish, are washed out of the reservoir. Amateur anglers have reported the rescue of lungfish, from the spillway pools below Lake Samsonvale and below Wivenhoe Reservoir, during and after large floods for many years. Several research projects at the University of Queensland are based on lungfish that came over the spillway at Enoggera Reservoir in times of flood, and these date back to the 1980s. Coming over the spillway in a flood accounts for the presence of lungfish in the creek below Lake Samsonvale, and for the lungfish living quietly in Enoggera Creek. Condition of these fish is poor because there is not much to eat in a suburban creek.

I understand that SEQ water are as concerned as members of the public are about the losses, not only of lungfish, but of other species of fish from reservoirs during a flood, and that they have schemes in place to rescue fish when conditions permit this to be done. However, a permanent solution to the problem may require assistance from engineers as well as biologists.