Galvanized steel is simply steel with zinc fused to the surface. Galvanizing extends the useful life of steel components by preventing and inhibiting corrosion of the underlying steel. Zinc protects the steel in two ways:

1st Defense: "Don't let the water touch the steel."
Zinc forms a physical barrier between the steel and the water. If the galvanized steel is properly pretreated during startup to passivate the zinc surface, a nonporous surface of zinc carbonate and calcium carbonate is developed as a barrier against corrosion of the zinc and underlying steel. Basically, if the water cannot get to the steel, it cannot corrode it.

2nd Defense: "Be a sacrificial anode to protect the steel that's exposed to water."
Over time, the zinc layer is corroded away (due to the affects of higher alkalinity, low hardness, etc.) and/or eroded away. Mechanical damage can remove the zinc coating as well. The steel becomes exposed to the water and all its corrosive properties. When this happens, the zinc becomes a sacrificial anode. In the galvanic series, zinc is more active (anodic) than steel, meaning zinc will preferentially corrode before the steel.

When zinc starts acting as a sacrificial anode, you now have one more corrosion mechanism taking place in addition to what has been taking place over the years to reduce the thickness of the zinc coating in the first place. This may significantly increase the overall zinc corrosion rate and the levels of zinc found in the system water depending upon the magnitude of galvanic corrosion taking place. Once the zinc is gone, the iron is left to fend for itself.

Galvanized steel has a lifespan that is based upon the environment to which it is exposed. Galvanized cooling towers can often be expected to last 10 to 15 years before failures in the galvanized steel becomes a real problem.