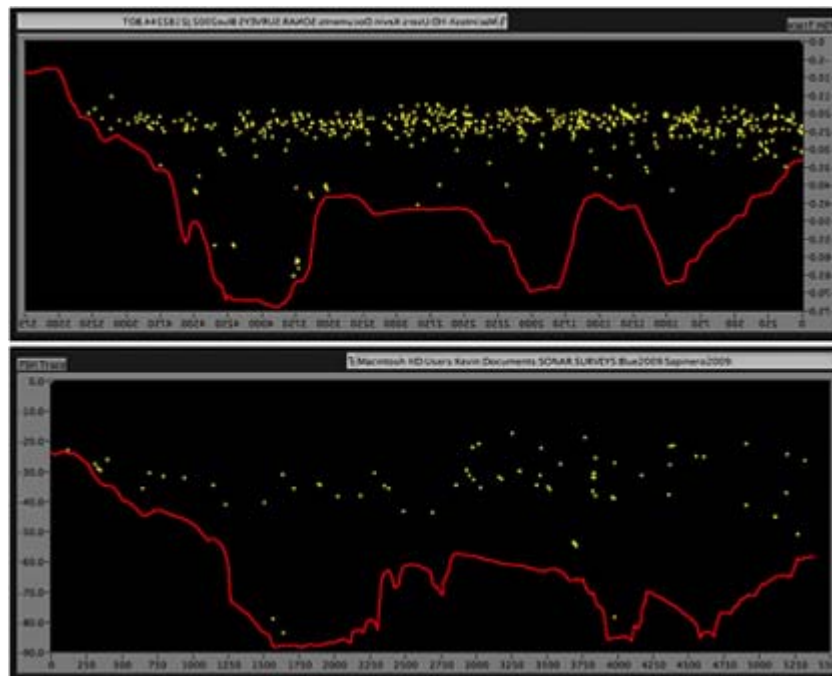


SONAR Surveys Reveal Emerging Crisis At Blue Mesa Reservoir

By Kevin Rogers

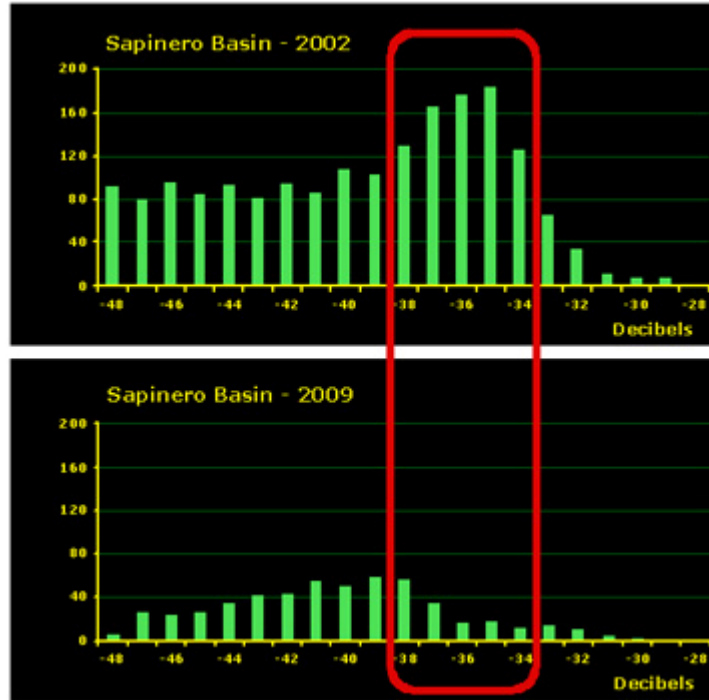
Annual summer hydroacoustic surveys conducted by the Division of Wildlife's Aquatic Research Group yield peek into the future.

Each summer, researchers with the Division of Wildlife (DOW) conduct hydroacoustic (SONAR) surveys on major cold-water reservoirs to evaluate fish population numbers. Standardized transects are run each year so that comparisons can be made. These surveys are conducted around the new moon in August and September for two reasons. Particularly dark nights encourage pelagic fish like kokanee salmon to spread out rather than school up as they do during the daytime, making new moon nights better for detecting individual fish targets. Big cold-water reservoirs are stratified in August and September with warm water on the surface being separated from the colder water below by a layer of rapidly changing water temperatures called the thermocline. Kokanee seeking a combination of well oxygenated cooler water to digest their prey stack up on the thermocline, making them easy targets for our sounding system. Figure 1, below, shows how Kokanee salmon stack up on the thermocline in late summer. Numbers of fish targets are greatly reduced when compared to the same transects run in the early part of the decade as demonstrated by the mile long Transect #5 (of 15) from Blue Mesa for 2002 (top) and 2009 (bottom).

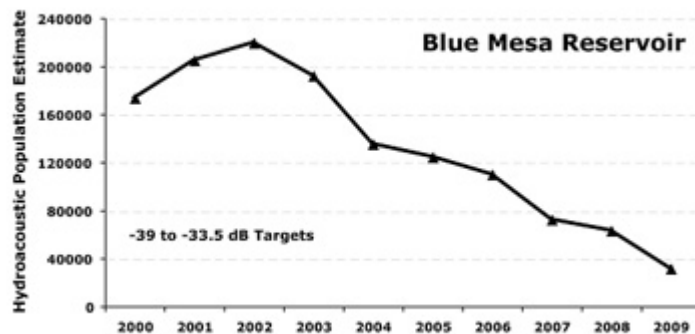


Like commercial grade echosounders, the DOW's scientific grade system registers the strength of the returning echoes in decibels, (dB) which are directly related to fish size. Unlike commercial echosounders, the DOW's system uses split-beam technology to determine where in the acoustic beam a fish is located. This allows for an accurate assessment of fish size as fish centered in the beam tend to give larger returning echoes than similar sized fish on the edge of the beam. Accumulated estimates of fish size can then be used to develop length-frequency histograms that allow biologists to predict the strength of subsequent spawning runs. Figure 2, below, shows actual numbers of fish pinged on six standard transects covering

6.4 miles in the Sapinero Basin of Blue Mesa Reservoir in 2002 (top) and 2009 (bottom). The acoustic size that represents the following years spawners are highlighted in the red box. Division biologists collect eggs from these spawning runs to maintain kokanee populations across the state.



Depth and location of each fish is also recorded, enabling researchers to extrapolate an estimated population size for an entire body of water from a single night survey effort. Unfortunately, inspection of these surveys suggests an alarming decline in numbers of adult fish over the last six years. Figure 3, below, shows population estimates of following year kokanee spawners derived from annual hydroacoustic surveys from Sapinero and Cebolla basins.



Ramifications of this decline are significant as the kokanee population at Blue Mesa was historically the number one egg producer, in some years providing over 80% of the eggs used

to support 26 other kokanee fisheries around the state. In fact, the bounty Blue Mesa used to provide allowed the DOW to bring back kokanee salmon in Granby Reservoir after the population crashed in response to a similar predatory burden in the late 1990s. Without Blue Mesa as a source of kokanee eggs, both the kokanee program and food webs that rely on them will be in jeopardy.