



Idaho Department of Fish and Game

# LAKE PEND OREILLE PREDATION RESEARCH QUARTERLY REPORT

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## Autumn Tagging Efforts Yield 5 Sonic Tagged Predators

Tagging efforts in 2002 for rainbow and lake trout began on Oct. 17th and were concluded by Nov. 28th. Tagging efforts coincided with 2 LPO fishing derbies; the 2 day Captain's Table Derby (Oct 26-27) and the annual 9 day Lake Pend Oreille Idaho Club Thanksgiving Derby (Nov. 23-Dec 1). IDFG researchers were grateful to a dedicated and enthusiastic group of 7 fishermen who obtained all our fish for tagging. Fish were captured with hook and line and held in live wells until researchers could obtain the fish and transport them to a holding pen. Fish were either held for an additional 24 h or were tagged on the same day of capture. After surgery, fish were held for 24 h to ensure complete recovery before being released.

Researchers surgically implanted depth sensitive transmitters into 10 rainbow and 2 lake trout (Fig. 1). Three of 10 rainbow we tagged are currently swimming around LPO. Four of the rainbows died in our holding pen within 24 hours of surgery, 2 of which died from handling stress and 2 died from internal bleeding caused by surgery. The remaining 3 fish were released into LPO but during tracking each fish was located in close proximity (< 1 mile) of their release site. Subsequent tracking efforts verified that either the fish died and the carcass with the tag are on the bottom or the fish expelled the tag from its body. Both lake trout survived surgery and were released in LPO but one was captured and harvested by a fishermen fishing near Pearl Island 4 days after it was released near Deadman Point.

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## Nighttime Hydroacoustic Surveys Estimate More Pelagic Predators than Daytime Surveys

In August of 2002 daytime hydroacoustic surveys were performed in conjunction with the annual nighttime surveys to help determine if differences exist between day and night pelagic predator abundance. Preliminary results suggest that pelagic predator densities were higher during the nighttime in the middle and northern sections of Lake Pend

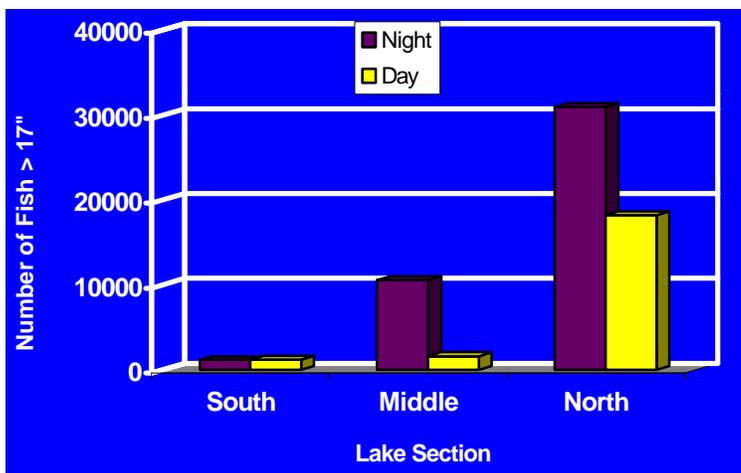


Figure 2. Bar graph comparing total numbers of fish based on hydroacoustic measurements of pelagic predators surveyed during both day and night in late August.



Figure 1. Fish biologist, Tom Bassista (left), and fishery technician, Mark Duclos are shown here making an incision into the abdomen of a rainbow trout in preparation for the installment of a sonic tag..

Oreille but were similar in the southern end (Fig. 2). Nighttime lake wide estimates of pelagic predators (42,715) more than doubled lake wide daytime estimates (21,030). One theory for the difference is that predators found in the top 75 feet of the water column during the day may have an easier time detecting and therefore avoid our research survey vessel and acoustic beam. More day and night comparisons will be made in future acoustic surveys to help verify or dispute these findings. This, and future comparisons, will be used to determine the most effective time to enumerate pelagic predators in Lake Pend Oreille.

**This quarterly report contains preliminary data and conclusions that are not citable.**

## Lake Pend Oreille Pelagic Predator Communities Identified for August and December

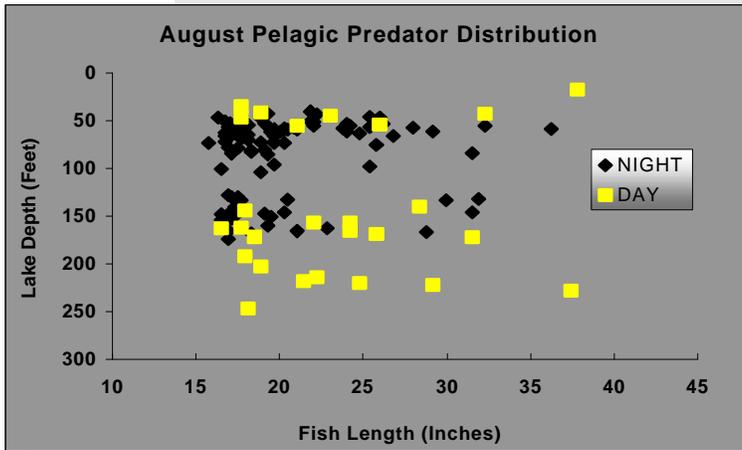


Figure 3. Hydroacoustic derived depth distribution of predators collected during a late August survey. Fish lengths were estimated from individual hydroacoustic target strength measurements. Figure compares both day and night distribution.

One objective of our predator study is to develop acoustic methodology to accurately measure the abundance of pelagic predators. We also want to be able to determine what percentage of the pelagic predator biomass is made up of the three main predators; rainbow, bull and lake trout. During hydroacoustic surveys we collected size (fish length) and depth data of individual fish. Unfortunately, the hydroacoustic gear does not identify the individual fish targets to species. What we are left with is a scatter plot, like the ones you see in Figures 3 and 4, that plots fish depth by fish size. Though we have not subjected our scatter plot data to standard statistical tests like cluster analysis (to be done next quarter), we begin to visually see patterns or clusters emerge from our data set.

Both day and night hydroacoustic surveys were conducted in August and the results of pelagic predator dis-

tribution are presented in Figure 3. Two distinct depth groups are found during both the day and the night. During the day the upper layer of fish were mostly found between 40 and 50 ft. in temperatures between 54° F to 60° F. Fish in the lower layer, which occupied a much broader depth range, were located at depths from 140 to 220 ft. in temperatures between 41° F and 46° F. During the night the upper layer of fish was found to occupy depths between 60 and 100 ft. in water temperatures that ranged between 44° F and 54° F. The deeper layer of fish held between 130 and 160 ft. in water temperatures of 42° F. The challenge now is to document what species of fish comprise the different groups.

During December we conducted a similar hydroacoustic survey but on a much smaller scale (23 miles of transects compared to 111 miles in August). Though we did not count nearly as many pelagic predators as we did in August we were able to collect some depth distribution data on pelagic predators (Figure 4). Fish ranged from 70 to 170 feet in water that averaged 44° F. Though our tracking data confirms that rainbow trout are occupying the top 30 feet of the water column we were unable to detect large pelagic predators from the surface down to 70 feet. This could have been a function of not sampling enough transect miles or simply that rainbow trout are staying in the upper water column and move away from the approaching boat that is collecting hydroacoustic data. Our tracking data suggests that lake trout are utilizing depths greater than 70 feet in December. These

pelagic predators we counted in December may be comprised of lake and possible bull trout which are segregated from the shallow water rainbow trout. More winter surveys and tracking data may reveal a window of opportunity for researchers to estimate lake trout populations without the question of what percent of the estimate is comprised of rainbow trout. As the project progresses, data will also be gathered on bull trout depth distribution in Lake Pend Oreille.

Future work will be aimed at trying to identify these distinct pelagic predator communities. It is hoped our fish tagging and tracking aspect of the study will help determine what depth/temperature rainbow, bull, and lake trout prefer to occupy during times when we collect hydroacoustic data.

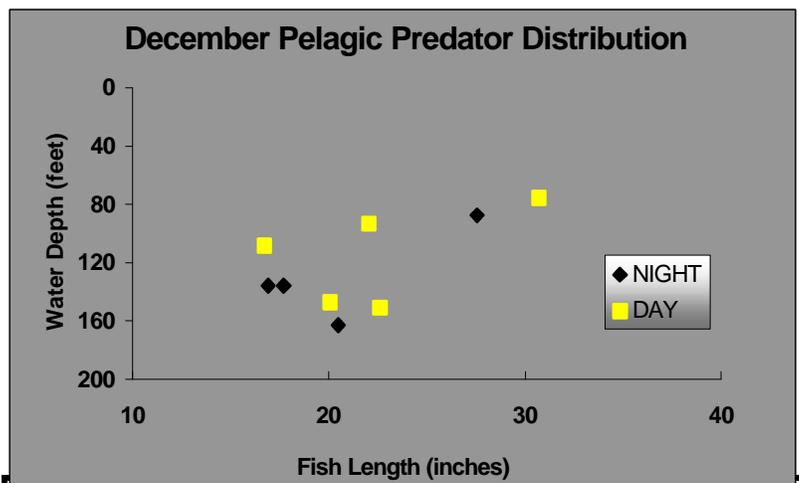


Figure 4. Hydroacoustic derived depth distribution of predators collected during an early December survey. Fish lengths were estimated from individual hydroacoustic target strength measurements. Figure compares both day and night distribution.

### Predator Tracking Results For December

Thorough lake wide searches for sonic tagged fish began the first week in December (Fig. 5). Previous testing revealed that our transmitters were detectable from approximately 1 mile away, which provided a basis for our searching protocols. A lake wide search pattern was developed to sample the entire lake and was tested on Dec. 3rd and 5th. All of our tags that were implanted in rainbow trout samples were located (n=6). Three were found to be high in the water column and moving and 3 were found in depths greater than 500 ft and were observed to be stationary. We assume the later 3 rainbows died after release, however, the tags may have been expelled through the body cavity (see

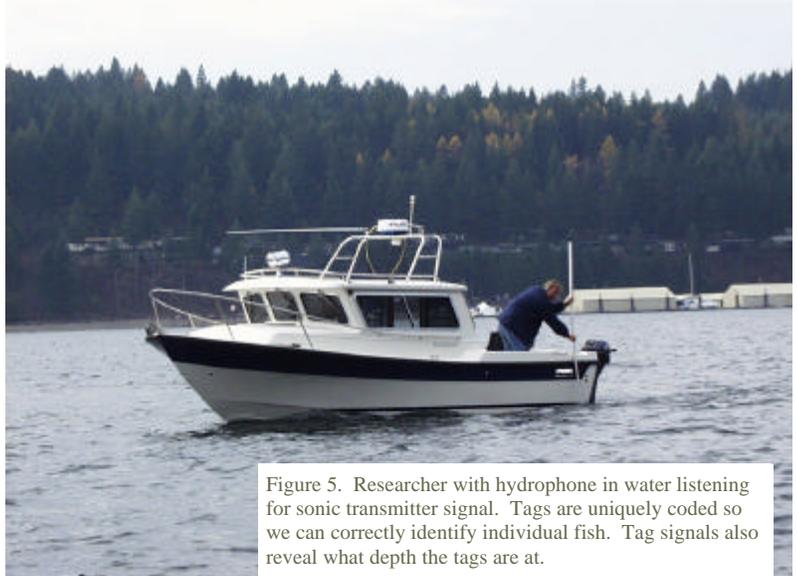


Figure 5. Researcher with hydrophone in water listening for sonic transmitter signal. Tags are uniquely coded so we can correctly identify individual fish. Tag signals also reveal what depth the tags are at.

Fig. 6 for surgery wound). There is no way to recover these tags because of the extreme depths of the lake. No lake trout were found during the first week of searching, though the first lake trout we tagged and released was located on three occasions in November (7th, 14th, and 19th). Researchers located this fish again during the second week in December. It was brought to our attention that the second lake trout was creeled by an angler four days after release. Fortunately the angler returned the tag and reported the harvest.

Fish were monitored for habitat selection during daytime hours. Nighttime habitat monitoring was initiated on Dec. 10th but equipment failure in the field put an end to sampling on that night and previous days thereafter. Rainbow trout occupied depths of 3 to 30 feet in temperatures of 44.3°F to 46.4°F. All fish were found swimming pelagically (deep open water) where lake depths were in excess of 500 ft (540 ft to 1082 ft) and were located no closer than 0.5 nautical miles from shore (0.5-1.67 nautical miles). During November the lake trout occupied depths of 95 to 126 feet in water temperatures of 45°F to 49°F and were found to be within 0.25 nautical miles from shore in lake depths ranging from 300 to 743 feet. Only one lake trout habitat observation was made in December, the fish was found in 72 ft of water that was 44.4°F, 0.6 nautical miles from shore in a lake depth of 991 feet, apparently swimming in the pelagic zone.

### New Predator Research Vessel Put Into Use

During this quarter we purchased a 22 ft. SeaSport boat to be utilized as a research vessel for the predator study (See Fig. 5). The boat is equipped with 2 huge live well compartments that helped us immensely when transporting large fish for tagging



Photo by J.R. Tomelleri

### Activities for Next Quarter

Winter tracking of rainbow and lake trout will continue through next quarter. We will attempt to collect and tag 2 more lake trout for our tracking study. A hydroacoustic survey will be performed in February to determine pelagic predator distribution. Work will begin to identify all sizes of pelagic fish communities by using a statistical method called cluster analysis. Preparations and writing for the annual report will also begin next quarter.



Figure 6. Fresh surgery wound on rainbow trout. A 1.75 inch incision is closed with 5 monofilament stitches.

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