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Special Features for Fisheries Applications

Auto-Counting Auto-Sizing Direction-of-Passage
DIDSON software has the capability of counting, sizing, and determining the direction of travel of fish swimming in rivers, even shallow rivers with rocky, uneven bottoms.

Fish Behavior and Status of Underwater Structures
DIDSON's high resolution images provide almost video quality images in dark and turbid water where optical systems are ineffective. This allows monitoring with high precision fish behavior or status of structures in environments where such monitoring could not be done before. Three example applications are: (1) Fish behavior at entrance of deployed trawl nets, (2) Spawning salmon in turbid water or at night, and (3) Inspection of trash racks.

Selected Software Features

The following are examples of software features that can be activated with a mouse click or two and possibly entering some parameter values.

Background Subtraction
Removes static background to allow detection and counting of fish swimming over rocky, uneven bottoms

Motion Detection
Enhances the ability to auto-detect and auto-size objects moving within the sonar's field-of-view.

Mark Fish
A manual way of marking fish with mouse clicks as their images pass on the screen.

Transmission Loss
Balances the display by scaling returns to compensate for acoustic spreading and absorption as a function of range from DIDSON

Log Cursor Track
Allows the user to follow a fish image with the mouse The track is entered in a file in range and bearing coordinates.

EchoGram
The echogram marks fish passing through the center beam during the time interval spanned in a DIDSON file. It provides an overview of where fish images are in the file. The software also automatically analyzes each mark and measures the size, range, direction, and time of passage of fish associated with each echogram mark. It also makes a text file listing this information. The DIDSON echogram is different from traditional echograms because it is interactive. When the user clicks on an echogram mark, the software plays a

“video” snippet of the fish that caused the mark. This allows the user to verify what the mark indicates and answer other questions that cannot be answered by looking at the echogram alone.

Find Rare Events

A number of customers need to count fish in a small run over a period of many weeks. DIDSON has two ways to help in this task.

(1) *Selective Recording* – The user establishes a threshold and other parameters such that DIDSON records a frame only when those criteria are met. For example, the user would turn on background subtraction and motion enhancement. DIDSON would remove the static returns (rocks, weirs, etc.) from the image. When a fish passes, the dark screen would light up with a cluster of pixels representing the passing fish. DIDSON counts the lighted pixels in each frame. When the count exceeds a user-set threshold, that frame is recorded. Files recorded continuously for one hour at 7 frames/s would have 25,200 frames to monitor. Files recorded by Selective Recording over one hour would have only a few 10s or 100s of frames and each frame would have something of interest in it.

(2) *Selective Viewing* – A more conservative way would be to record every frame. That way if a rare fish passed that would not trigger the selective recording above, it still would be recorded. DIDSON helps in viewing those files. The user sets criteria as in Selective Recording above, then processes the original file. A second, much shorter file is made with index markers placed at each “passing occurrence”. The user can make additional files using different parameter values and see how the “passing occurrences” change. This second way speeds up the viewing (counting) process but retains the original “record everything” files so if one wants to go back and analyze them again with different parameters he can.