A Software and Hardware System for the Collection, Editing, and Reporting of Salmon Age, Sex, and Length Data: The Fisheries Database Management System (FDMS)

Katie Sechrist, Isabelle Boutin, and Greg Buck
katie.sechrist@alaska.gov • isabelle.boutin@alaska.gov • gregory.buck@alaska.gov
Alaska Department of Fish and Game, Division of Commercial Fisheries

Background

Each year the Alaska Department of Fish and Game (ADF&G) collects salmon age, sex, length (ASL), stock of origin, and biological samples from commercially harvested salmon in Bristol Bay, Alaska. Inseason this data is used to assess run strength, and postseason is used to build brood tables to establish/evaluate spawning escapement goals, forecast future returns, and address other important fisheries management objectives.

To replace a discontinued data collection tool ADF&G Bristol Bay research staff worked with a local vendor, Alaska Metrology & Calibration Services Inc., to build a practical and cost effective electronic fish measuring board (FMB) to collect individual salmon sex and length data using Bluetooth technology.

This data is then recorded in the Fisheries Database Management System (FDMS) which was developed by ADF&G in 2014. FDMS software consists of two separate components:

1) a mobile application and
2) a web application

Paired together the Bluetooth FMB and FDMS software have created an affordable and efficient system to provide managers with enhanced harvest age composition estimates which are necessary for effective salmon management.

FDMS Software

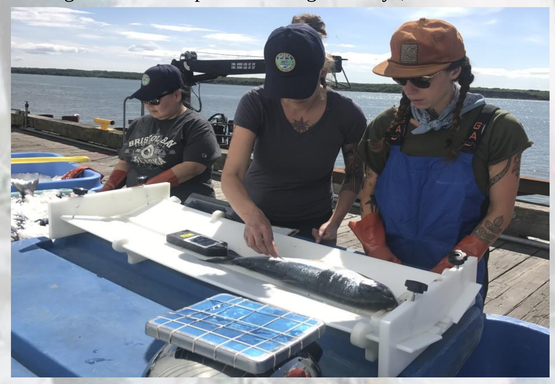
FDMS Mobile Software

- Desktop application built for Windows 7 devices (desktop/laptop/tablet)
- Used for ASL data collection in the field
- Designed for ease of use/allow samplers to visually track progress
- Loaded on each Trimble Yuma 2 (or other ruggedized handheld tablet)
- Receives fish sex and length data via Bluetooth from FMB
- Creates a unique sample id number (file name) for each sampling session
- Saves data in text file that scale agers upload into FDMS web application

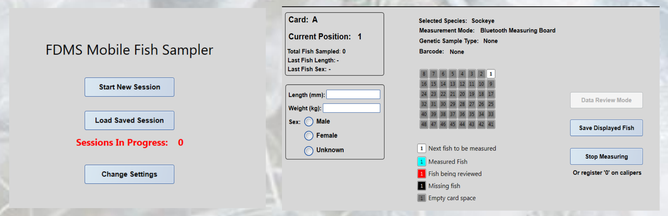
FDMS Web Software

- Accessible via web link
- Scale agers edit/upload data text files created by FDMS mobile software
- Ages/error codes are entered into the sampling session for each fish
- Sample count reports can be generated to track samples/periods
- ASL data can be exported to CSV or use OceanAK to generate age composition report

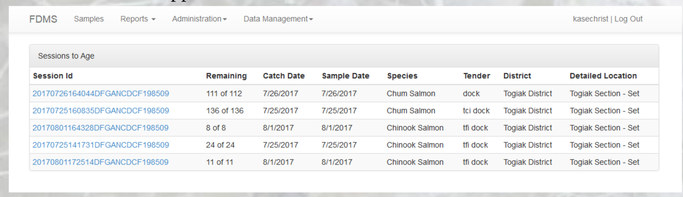
Dillingham catch sampler measuring a sockeye, 2017.



King Salmon catch samplers using Bluetooth FMB in Naknek, 2017.



FDMS Mobile Application Software.

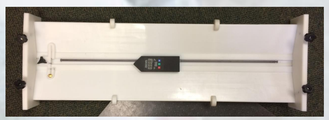


FDMS Web Application Software.

FDMS Hardware

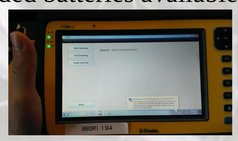
Bluetooth Fish Measuring Board (FMB)

- Electronic shuttle slides over magnetic strip on food grade plastic board
- Shuttle sends fish sex/length data via Bluetooth to FDMS mobile software on Trimble Yuma 2 (or other ruggedized handheld tablet)
- Shuttle is easy to zero, charge daily, and waterproof
- FMB easy to disassemble, transport
- Replaces discontinued Haglöf radio antenna calipers



Trimble Yuma 2

- Ruggedized tablet
- 7 inch touch screen (finger or stylus)
- Integrated Bluetooth
- Runs Microsoft Windows 7
- USB ports
- Extended batteries available for purchase



FMB Shuttle

- Five buttons (M, F, ?, Zero, Power)
- Integrated Bluetooth
- Press M for male
- Press F for female
- Press ? for unknown sex
- Press zero to calibrate at eye bolt

FDMS Data Collection Options

1) Software only - essentially free; collect data on rite-in-the rain paper and manually enter into FDMS mobile on a desktop PC; use FDMS web app to upload, edit, and age data.
2) Data collection with FDMS mobile/device only - cost of handheld device (~$1,000 to $3,000); use handheld device running FDMS mobile and enter data manually; use FDMS web app to upload, edit, age data. No Bluetooth FMB required.
3) Data collection with FDMS mobile AND Bluetooth FMB - cost of handheld device AND Bluetooth FMB; use handheld device running FDMS mobile WITH Bluetooth FMB; use FDMS web app to upload, edit, age data.

Advantages of Using FDMS

- Custom built Bluetooth FMB system is cost effective, ~ $ 1,000 board/shuttle
- Multiple ways to analyze ASL data, export to CSV, or run queries in OceanAK
- Region wide data collection and reporting system (Bristol Bay, PWS, Cook Inlet)

Funding for Cordova FDMS hardware provided by Copper River/Prince William Sound Marketing Association. Funding for Bristol Bay FDMS hardware/software development provided by Bristol Bay Science and Research Institute (BBSRI) & Bristol Bay Regional Seafood Development Association (BBRSDA). Thank you for your support!