Jun 27th, 10:45 AM - 11:05 AM

Concurrent Sessions C: Tracking and Evaluating Passage - FishSuite-Software for Annotating, Photographing, Tracking, and Reporting Fish Related Data

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FishSuite!
Software for annotating, photographing, tracking, and reporting on fish and physiological condition

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Pacific Northwest National Laboratory
ICEEFP Annual Meeting, 2013
Since 2004 the Juvenile Salmon Acoustic Telemetry System (JSATS) has been used to study salmon and lamprey survival and passage in the Columbia River basin.

In 2012, over 72 days (April-July) 25,850 fish were tagged and released during 448 events.

Between 0.5 and 1 petabyte of data are collected each year, from at least 8 locations and processed at 4 locations.

Studies of this size pose challenges for data management, collection, and processing.

- Biological Opinion needs
- Linked data
- Project protocols
- Assess fish condition
Why FishSuite!

- **Data automation**
  - Faster photography to reduce stress on fish
  - Reduce to eliminate technological and data entry errors
  - Increase number of quality control checks

- **Photo log with retrievable metadata**
  - Survival model assumptions
  - BiOp records
  - Long-term searchable data recall

- **Integration and reporting**
FishSuite!

- Multi-level fish condition assessments were used to quantify fish health as a variable for survival and passage studies.

- FishSuite is a novel and user-friendly tool to collect and coordinate metadata, fish condition and tagging activities.

- FishSuite is a series of software programs that expedites annotation, photographing, tracking, and reporting data for tagging studies.

- Programs operate independently or as a suite; and interface with touchscreen monitors, digitizer boards and balances.

- Code for each application is shared in a central library for maximum return on investment.
FishSuite!

FishEye Translator

FishEye

FishSuite
(Suite of Applications and Shared Codebase)

FishBucket

FreeWilly

FishBooth

FishNote
FishBooth! – Imagery Program

► Records:
  ■ Images by assigning PIT, JSATS AT, GUID, or text strings
  ■ Image location or description (left, right, wound, etc.)
  ■ Species, Surgeon, Location
  ■ Date and Time
  ■ Metadata embedded in JPEG EXIF fields
    ○ *FishBooth! Editor* manages EXIF data

► Utilities:
  ■ Canon EOS DSLR
  ■ BioMark FS2001 and antenna
  ■ Hope Industries Industrial Touchscreen
  ■ Hands-free using web cameras

► Over 120K photographs taken since 2010
FishBooth! – Imagery Program
FishBooth! – Imagery Program
FishEye! – Morphological and Physiological Database Program

- Records Real-time input (SQL, exportable .csv)
  - Injury and health observations
  - Location, Observer, Treatment, Species, Date and Time
  - QR coded samples

- Programmable:
  - User-based template system
    - Count, Severity, Binary
  - Identification PIT, JSATS AT, GUID, or text strings

- Utilizes:
  - BioMark FS2001 Reader and Antenna
  - Digitizer databoard (FL and other metadata)
  - Ohaus scale
  - Motorola handheld scanner
  - Hope Industrial Touchscreen
FishEye! – Morphological and Physiological Database Program
FishNote! – Reporting Program

- Generates reports
  - Powerpoints
  - PDFs
  - Excel spreadsheets
- Searches
  - Imagery, Metadata, SQL
    - FishBooth!
    - FishEye!
- Uses
  - GUID
  - PIT or JSATS AT
## FishNote! – Reporting Program

### Search Criteria

- **Images And Surveys**
  - **Tag**: Pit/AMT Tags - separated by ';'
  - **Surgeon / Observer**: Surgeons - separated by ';'
  - **Species**: Spec. Name/Code - separated
  - **Location**: Locations - separated by ';'
  - **From**:
    - Select a date: 15
  - **To**:
    - Select a date: 15

### Images Only

- **View Types**
  - Add
  - Remove

### Surveys Only

- **Category**:
  - **Obs.**
  - **Val**
  - **Add**

### Results

**Images**

- ...

**Surveys**

<table>
<thead>
<tr>
<th>Pit</th>
<th>Amt</th>
<th>Species</th>
<th>Observer</th>
<th>Date Created</th>
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<tr>
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</tbody>
</table>

29 image results found, 411 database results found
| PIT Present | AT Present | IL 5 mm | IL 6 mm | IL 7 mm | IL 8 mm | IL 9 mm | Anterior Present | Anterior Absent | Posterior Present | Posterior Absent | Prior Tension | Posterior Tension | Anterior Knot Profile | Posterior Knot Profile | Anterior Bite | Posterior Bite | DBI Pinching | DBI Ripping | Eversion/Puckering | Gaping (<50%) | Overlap (<50%) | Overlap (>50%) | Ulceration <1 mm² | Ulceration 1-3 mm² | Ulceration >3 mm² | Erythema <1 mm² | Erythema 1-3 mm² | Erythema >3 mm² | Fungus On Suture | Fungus On Body and Suture | Tissue Swelling |
|-------------|------------|---------|---------|---------|---------|---------|----------------|----------------|-----------------|-----------------|---------------|-----------------|-------------------|-------------------|---------------|---------------|--------------|-------------|-----------------|----------------|-----------------|----------------|----------------|-----------------|----------------|----------------|----------------|----------------|----------------|----------------|---------------|----------------|----------------|----------------|
| x           | x          | x       | x       | x       | x       | x       | x              |               | x               |                | x             |                 | x                 |                   |               |               | x            | x           |                 |                |                 |                 |                |                 |                 |               |               |               |               |               |               |
| x           | x          |         |         |         |         |         | x              |               | x               |                |               | x             |                 | x                 |                   |               |               |              | x           |                 |                |                 |                 |                |                 |                 |               |               |               |               |               |               |               |
QR codes are “double-coded” with readable text

- Location, Continuous Sample Number, Treatment, Day
- Sample Number, Tissue Type
- Release Code, Release Time, Day/Night, Bucket Number
Fish Bucket! – Tag Accounting Program

Records
- Count tags (fish) in holding container
- Verify tags in holding container
- Associated tags to barcode (holding container) reader

Utilities
- PIT reader and wand
- Barcode reader
Expected Fish

R1 2200 N164 (Fish Expected: 5 Fish Found: 5 at 9:34 AM)

- 3D9.1C2C4347B9 ALIVE
- 3D9.1BF2448B55 ALIVE
- 3D9.1BF26D6572 ALIVE
- 3D9.1BF26D8FA1 ALIVE
- 3D9.1BF240E2E5 ALIVE

Tags

Barcode

Data successfully written to: CAUsers\dk689\Desktop\FishBucket25_6_2013_JDA_1.csv
Free Willy! – Location Tracking Program

- Records:
  - Bucket release barcode
  - Location (GPS) of each use
  - Date and time of transfer and release

- Utilities
  - Mobile rugged platform (Windows CE 6.5)
  - Opticon
Free Willy! – Location Tracking Program
FishSuite! Data Flow

FishBooth! → FishEye! → Fish Bucket! → Free Willey! → FishNote!
Conclusions

- Developed a software suite to assist fisheries researchers and professionals in biological and environmental assessments

- FishSuite!
  - Reduced labor costs
  - Minimized tracking, tagging, and entry errors
  - Tracked condition more than 50K juvenile salmon with centralized database

- Other applications
  - Off shore and coastal environmental and biological assessments
  - Aquaculture
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  - Kasey Knox
FishEye Translator

FishEye

FishSuite
(Suite of Applications and Shared Codebase)

FishBucket

FreeWilly

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FishBooth