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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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**
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)

FishBooth

FishBucket

FishNote

FreeWilly
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

File Edit Help

Create New
Get PIT Tag
Get Weight (g)

Species
Steelhead

Location
JDA

Treatment
SGN

Observer
Hall, K

Categories
Eyes
Fins
Flanks
Gills
Incision
Instrument
Knockdown
Spleen
Suture
Tag Placement
Vent
Moribund

Observations

- Embolisms
- Fungus
- Damage 0 - 3
- Hemorrhaging
- Parasites

Recent Edits

- Fins => Red
- Incision => 0

Pit Tag

3D9.1C2E02BE68

Recent Entries

- 3D9.1C2E02B334
- 3D9.1C2E02B334
- 3D9.1C2E08A842
- 3D9.1C2E03049F
- 3D9.1C2E02C5BE
- 3D9.1C2E02C46C
- 3D9.1C2E0329A2
- 3D9.1C2E0303A8
FishEye! – Morphological and Physiological Database Program
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
| PIT Present | AT Absent | AT Absent | IL 5 mm | IL 6 mm | IL 7 mm | IL 8 mm | IL 9 mm | Anterior Present | Posterior Present | Anterior Tension Acceptable | Anterior Tension Too Loose | Anterior Tension Tight | Anterior Tension Tearing/Torn | Posterior Tension Acceptable | Posterior Tension Too Loose | Posterior Tension Tight | Posterior Tension Tearing/Torn | Anterior Knot Profile Acceptable | Anterior Knot Profile Stacked | Anterior Knot Profile Loose | Posterior Knot Profile Acceptable | Posterior Knot Profile Stacked | Posterior Knot Profile Loose | Anterior Bite 2 mm | Anterior Bite >2 mm | Anterior Bite <2 mm | Posterior Bite 2 mm | Posterior Bite >2 mm | Posterior Bite <2 mm | DBI Pinching | DBI >1 entry/exit | Apposition Eversion/Puckering | Apposition Gaping (<50%) | Apposition Overlap (<50%) | Apposition Gaping (>50%) | Apposition 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                      | x                    | x                      | x                    | x                      | x                    | x                   | x                   | x                   | x                   | x                   | x                   | x                   | x                   | x                   | x                   |

**3D9.1BF23CAA30**

Pacific Northwest National Laboratory
Proudly Operated by Battelle Since 1965
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
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!

FishBucket!

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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FishEye Translator

FishEye

FishSuite
(Suite of Applications and Shared Codebase)

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