Social Fishing Apps: A New Data Collection Tool for Fisheries Management

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It all begins with iBobber

Smallest on the Market

Longest Charge

LED Light

Strike Alarm

Fish Alarm

Waterbed Mapping
How it works ➤ iBobber

Simple. Intuitive.
Internet of Things (IoT)

Game Changer for Fishing
The power of big data

Collective – not personal – data and layered geographic information (GIS) deliver the most the hyper-local information, ensuring on-the-water success
90,000 units installed
1,100 average daily users
2,300,000+ Fishing GPS iBobber Hotspots
Individual Waterway Analysis
iBobber

- GPS spot tagging with interactive map
- Trip log with date, time, location, water temp, conditions, type of fishing, lure, number of fish caught
- Optional social media share features
Detailed trip reports with photos

Waterbody specific information
- Species presence
- Optimal times and techniques
- Locations of previously successful trips
Introducing NetFish

Big Data

Big Community

Big Fish
Netfish Dataset – As of 11/2/18

• ~220,000 users
• ~50,000 waterways
• ~65,000 catches
A Bobber’s Perspective on Angler-Driven Vectors of Invasive Species Transmission

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Recreational Angling

• More than 30 million Americans participate in fishing on freshwaters each year

• Equipment and trip expenditures total over 20 billion dollars annually

USFWS-WSFR National Survey, 2016
Angling as a Vector for Aquatic Invasive Species

- Multiple stages
  - Initial introduction
  - Secondary Spread
- Species moved dependent on gear
- Long-distance transmission through jump dispersal

Buchan & Padilla 1999
Spiny water flea
(Kerfoot et al. 2011)

Zebra mussel
(Johnson & Padilla 1996)

Parrot feather
(Blackburn & Weldon 1967)

Eurasian milfoil
(Blackburn & Weldon 1967)

Fathead minnow
(Ludwig 1996)

Rusty crayfish
(Lodge et al. 2000)
Challenge: How do we trace angler movement over broad spatiotemporal scales?

**Traditional**
- In-person surveys (Wittmann et al. 2015)
- Mail-in responses (Rothlisberger et al. 2011)

**Emerging**
- Social media use (Papenfuss et al. 2015)
- Personal fishing technology
Objectives

Anglers
1. Establish spatial distribution
2. Quantify time between trips

Location
3. Characterize fished waterbodies
   • Size
   • Land use
   • Natural vs. reservoir
4. Integrate angler movement patterns with invasive species distributions
Methods

• Joined angler activity to waterbodies (NHD)
• Calculated time and distance between trips
• Classified waterbodies by landscape (LakeCat, Hill et al. 2018) and reservoirs (USGS)
• Identified presence of invasives (NAS, USGS)
Geographic Distribution of Angling
Reflection of 2011 USFWS Survey Angling Activity

$R^2 = 0.694$
$p = 2.2 \times 10^{-13}$
Hydrilla 16 hrs.

Eurasian milfoil 2 days

N.Z. mudsnail 3 days

Zebra mussel 5 days

Asian clam 23 days

Chinese myst. snail 63 days
Characterizing Waterbodies

**Reservoir ratio:** 10X higher in fished
Invasive sp. 2.4-300X more likely in impoundments (Johnson et al. 2008)
Potential Movement of Invasives
Implications

• iBobber: valuable new data source

• Movement over short timescales
  • Variability in species’ survival

• Fished Waterbodies
  • Large (Peter et al. 1995)
  • Urban (Birch & McCaskie 1999)
  • Reservoir (Johnson et al. 2008)

• Movement poses high risk of invasion
Future Steps

• More detailed study relating angling vectors to presence of invasive species (USGS)
• Environmental variables
• Separate boaters from anglers on shore
Acknowledgments:
Rachel Fricke, University of Washington
Julian Olden, University of Washington
Alex Lebedev, ReelSonar