

## **The Use of Digital Imagery and Mobile Computer Applications in PIT Tagging Studies**

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The use of Passive Integrated Transponder (PIT) tags in mark and recapture studies has allowed researchers to create unique records for animals in order to understand survival, migration patterns, and other life history characteristics. Oftentimes an animal must be handled only briefly during capture and tagging, limiting the amount of data that can be collected. We developed a mobile data application that allows researchers to incorporate digital records and imagery with each unique PIT tag code. We tested this application on fish collected at three different juvenile bypass facilities on the Snake and Columbia rivers from 2007-2010. In total, 47,819 steelhead (*Oncorhynchus mykiss*) smolts were handled and PIT-tagged, each associated with a unique record including morphometric, fish condition, and rear-type data, as well as digital images of both sides of each fish. The total time to handle, PIT-tag, photograph, and release each fish was, on average, < 30 seconds. The record and associated imagery produced could then be reviewed and analyzed at a later time to verify data and to further evaluate and quantify various fish characteristics (e.g., fish length and rear-type) and conditions (e.g., degree of descaling, ectoparasite infestations, and other external anomalies). This application allowed us to test hypotheses on how individual fish characteristics and conditions at the time of tagging are related to a fish's survival, susceptibility to predation, and how fish condition varies by collection site, stock, rearing type, and migration timing. Incorporating computer-based data collection applications into PIT tag studies not only eliminates many of the errors associated with transcribing data, but allows researchers the ability to record an abundance of data tied directly to uniquely identified individuals. Data fields can be tailored to a project's needs, thus minimizing time spent with a fish in hand. Overall, these types of computer applications can be easily incorporated in to any PIT tag study to improve the efficiency and effectiveness of data collection in the field.