Taming Wild Data: An End to End Electronic Records System for Oiled Wildlife Response

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Introduction

Keeping accurate records is important in all aspects of oil spill response, but is especially critical during oiled wildlife efforts. Documenting real-time resources at risk, animal collection information (including search effort), and animal examination/rehabilitation procedures and outcomes ensure that data can be analysed, visualised, and utilised quickly. Additionally, acting on this information in near real-time means that it can used immediately in a response to improve decision making, increase the efficient use of resources, more quickly target wildlife "hotspots", and respond to health trends in order to provide the highest level of care. After a response, such organized, consistent data can also provide a basis for improving future response efforts, documenting wildlife impacts, and potentially serving as evidence in litigation if pursued. Historically, paper records have been used to meet all of these needs; however, due to the many challenges of paper record keeping when working with oiled animals (e.g., weather challenges, contaminated hands, minimally trained work force), there are often gaps. California's Oiled Wildlife Care Network (OWCN) has been working with a number of partners over the last 10 + years to develop an end-to-end digital system that can be used to increase accuracy, efficiency, and real-time use of wildlife response efforts in all areas of wildlife response.

Main Results

The digital system developed by the OWCN and its collaborators is comprised of two applications. The first is an iOS application named Wildlife Recovery (or WR) developed by a team at the California Department of Fish and Wildlife/Office of Spill Prevention and Response (CDFW/OSPR). The second is an online medical database to document care and processing of live and dead oiled animals, the Oiled Wildlife Rehabilitation Medical Database (or OWRMD), developed by Wild Neighbors Database Project.

Wildlife Recovery App

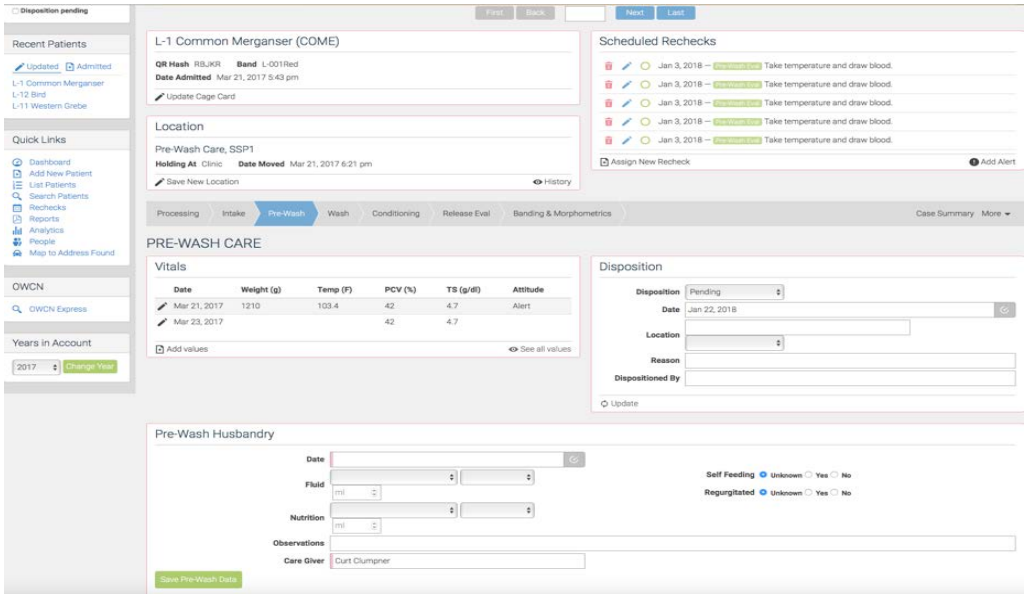
Wildlife Recovery is designed to record field data for Wildlife Field Operations teams during a spill utilizing an iPhone (Model 6 or newer) and distributed through the U.S. iOS App Store. While WR can be downloaded by anyone, use of personal phones is not preferred due to potential legal ramifications of evidence collection. Thus, the OWCN has purchased and preloaded the app on a number of entry level iPhone models with Wi-Fi only capability to provide to Wildlife Field Operations teams for use during a spill. Once field teams are deployed and begin their activities, the app records each discrete survey (e.g., section of beach, Division, or defined region) starting with operator input, including name of survey, team name, spill ID as well as drop down menus for organization (OWCN member organizations and government agencies) and method of collection (All-Terrain Vehicle, Boat, Foot, Visual Scan). As the team conducts their search, the app automatically generates and records tracking movement via the device's internal GPS. When the team comes across

live or dead animals, the app automatically collects date/time and location data, and asks the user to enter, via pull-down menus, taxa (Bird, Mammal, Reptile, Amphibian and Fish), subtype (Marine, Terrestrial and Freshwater), and condition (Alive or Dead). Lastly, it allows personnel to identify the collection of a high priority species, which can help ensure quick advancement to the head of the que for life saving care. Recent modifications have added the ability to take photos of animals using the IPhone camera, and the use/recording of QR codes (with associated 6-digit alphanumeric ID number) to identify individual animals and allow accurate transfer of that animal's data to OWRMD. While the primary use of the app is for animal collection data, it can also be used to record observations of oiled animals sighted but not captured, unoiled animals in the area, oil slicks or tar balls. Once the survey is completed and the team returns to the Field Staging Area, the data are transferred to the CDFW-OSPR FTP server via the phone's Wi-Fi connection. Access to the server is password protected to avoid unauthorized uploading of non-responder data. As a backup, CSV and KMZ files are also emailed to an OWCN account. Where Wi-Fi or cellular service is not available, data can also be downloaded directly to a computer for backup. Once uploaded, data from the WR app can be used to both easily map animal collection locations, calculate search effort in regions, and begin to populate the spill specific OWRMD medical database.

Oiled Wildlife Rehabilitation Medical Database (OWRMD)

The OWCN and the Wild Neighbors Database Project have worked closely for more than three years to develop a cloud-based electronic record-keeping system that will: 1) facilitate the accurate collection of care data for each individual animal impacted by a spill, 2) allow anyone within our system to know where that animal is and its current status at any given time, and 3) give complete, real-time, and easily compiled reporting capabilities of how many animals have come into care, their status, and other key variables. There are considerable challenges in tracking the typical animal through all the different stages of professional oiled wildlife response (e.g., collection, field stabilization, processing, intake, pre-wash care, cleaning, pre-release conditioning, release) and accurately documenting all the care that occurs in each as well as the transport to get them there. At each stage, data are collected that will likely impact the specific care they receive at the next stage. The OWRMD platform is designed to accurately record detailed processing and care of each individual animal that is collected during an oil spill response. It was developed by modifying the existing Wildlife Rehabilitation Medical Database (wrmd.org), which is currently being utilized by more than 400 wildlife rehabilitation centers in 46 of the 50 states in the U.S. and in 11 countries around the world. While modifications and further improvements to OWRMD are ongoing, it has been thoroughly tested in several large-scale drills/exercises and has proven to be a big step forward in accomplishing the above-stated goals. It is expected that the OWCN will soon be using OWRMD as its primary recording keeping system for the care of oiled birds, from field stabilization to release, while continuing to increase the scope and breadth of wildlife care information that can be collected (including additional taxa).

Data from the Wildlife Recovery App to OWRMD
When an animal arrives at the main rehabilitation (or Primary Care) center, a QR code assigned to the animal in the field and attached to the paperwork and transport container will be scanned. The OWRMD program will look for that QR code among those it has acquired from the CDFW-OSPR server and, if a match is found, a patient record will be created and collection data from the Wildlife Recovery app will be imported into corresponding fields. If the QR code is not recognized or not present, it can be assigned and/or the alphanumeric ID manually typed in. After the information from the Wildlife Recovery App has been imported, the animal proceeds through standard processing and intake protocols contained in the appropriate OWRMD data input page/tab, with the data collected electronically using the computers, scanners, and digital camera.



As the animal moves through the rehabilitation process of pre-wash care, cleaning, and pre-release conditioning, treatments or evaluations are documented in OWRMD in the corresponding data entry page/tab. Assigned QR Codes are used as unique identifiers for both animals as well as locations/pens/pools so that the tracking of animal movement through the functional areas (or between cages within areas) can be done as simply as scanning the bird band, scanning the enclosure, and putting the bird into the enclosure.

There are a number of features of OWRMD that allow it to increase efficiency and be relatively easy for us to deploy:

1. Its interface is fairly familiar and intuitive to many of the people who will be oiled wildlife responders in California. The data “sheets” are based on the OWCN’s existing spill forms, with only minor modifications such as drop-down menus to ensure consistent terminology use. Additionally, many of the wildlife rehabilitation centers within California are already using WRMD for the care of their regular case load, therefore they will already have experience with OWRMD’s similar interface.

2. It will interface seamlessly with the CDFW/OSPR server in order to automatically populate collection data, therefore decreasing the need for repeated data input and saving significant time.

3. It allows for the easy tracking of animals through multiple locations via incorporating the use of QR codes for animals, rooms, and even cages, pools, or aviaries.

4. It is an online, cloud-based platform, therefore allowing real-time information to be gleaned by appropriate individuals, whether they are in the Incident Command Center, Field Stabilization, the Primary Care Center or anywhere else that the internet is available and on whatever platform or device they prefer.

5. It can quickly generate a variety of pre-designated reports as well as allowing a wide range of individualized searching and sorting.

Conclusion

With ever increasing demand for science-based decision-making (such as that involved in NEBA/SIMA) and real-time electronic data collection (such as that utilised within IAP software platforms) within all elements of oil spill response, it is critical to ensure that such accurate documentation also occurs in all aspects of oiled wildlife response. The use of a comprehensive system that provides electronic information collection and communication will increase the ability to analyse and utilise such data to improve real-time response effectiveness as well as to increase the ability to accurately capture lessons learned through post-response reflection.