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Project Proposal: Marine Mammal Stranding Data Tracking

Background

Over a 9-year period from 2007 to 2016, there were approximately 43,125 stranding events on the west coast alone (NOAA, 2019). Marine mammals are protected in the United States, yet there is a severely outdated system of responding to, tracking, and reporting a stranding as a citizen. Even if someone is aware of the importance of protecting a marine mammal from the general public, many people may not even know they should call or who to call. As someone who volunteered time as a marine mammal responder for the Whatcom Marine Mammal Stranding Network, I found the system of reporting and responding to events cumbersome and in need of a major revamp. The marine mammal stranding network program has already given us tons of invaluable information in addition to furthering the mission of marine mammal protection (Wilkinson and Worthy, 1999). With a little more collaboration and a system aided through today's technology, I believe the data could move us ahead leaps and bounds beyond where we are today.

Problem

All along the coasts of the United States there exists a network of volunteers, National Oceanic and Atmospheric Administration (NOAA), and Department of Fish and Wildlife professionals who are trained to respond to entangled and/or stranded marine mammals that happen upon our shores. These responders collect data about responses and work to protect these mammals from the public, while simultaneously educating and protecting the public from the detrimental effects of interacting with wildlife. As someone who has experienced this as a volunteer responder, I can say firsthand that many of the steps could be improved significantly with a central application that connects directly to a database.

When a stranding occurs and it is encountered by someone in the general public, they are supposed to call a NOAA hotline or local stranding group in order to detail the location in which a responder should respond. A verbal description of a location can often be confusing, especially along a rocky coastline and/or a beach that may stretch for miles. Responders are typically selected and organized through a group text and a centralized organizer. Once a responder has responded to the stranding location, they assess the situation, identify the species, and fill out a standardized government form that periodically changes over time through revisions. After which, they move to educate the public, keep a viable distance between the mammal and the general public, and may be scheduled in shifts to ensure that the mammal is "watched" until it returns to the water. A great example of this in the Pacific Northwest is a Harbor Seal. During pupping season, a Harbor Seal will often leave its pup on the shore while in search of food. The problem however is that if the pup is

bothered too much, the mother will not return. Therefore, there must be a system in place to reduce human contact until the pup is reunited with the parent to avoid abandonment.

Solution

In order to address the issues with the current system, I propose the development of an application that can utilize the GPS abilities of the users' phone. By introducing a GIS/GPS aspect, we can not only cut down on response times by more accurately placing response locations on the map for responders to find, but we can also immediately attach data sets to GPS locations. With the application in place, we can remove the additional work of utilizing paper forms, thus saving not only time to input data, but also resources used to produce and distribute forms. Not only that, the application can serve as a resource to the responder in identifying the mammal or assessing other aspects used in analyzing the scene. In addition to streamlining data collection and response aspects, having an application can also greatly improve scheduling for response groups. Group members would have access to a given area of stranding reports, allowing for push notifications of new events and an ability for responders to select time slots necessary for that event type. In addition to scheduling, group members would have access to enhanced communication with the ability to send messages to one another or comment on stranding events for increased collaboration.

In the Puget Sound alone, there are 12 different stranding groups (Figure 1) that work in conjunction with NOAA to preserve our marine mammals and reduce interference in a crowded world. By standardizing responses and modernizing the system in place with this development project, we can improve collaboration among groups and improve the effectiveness of this mission.

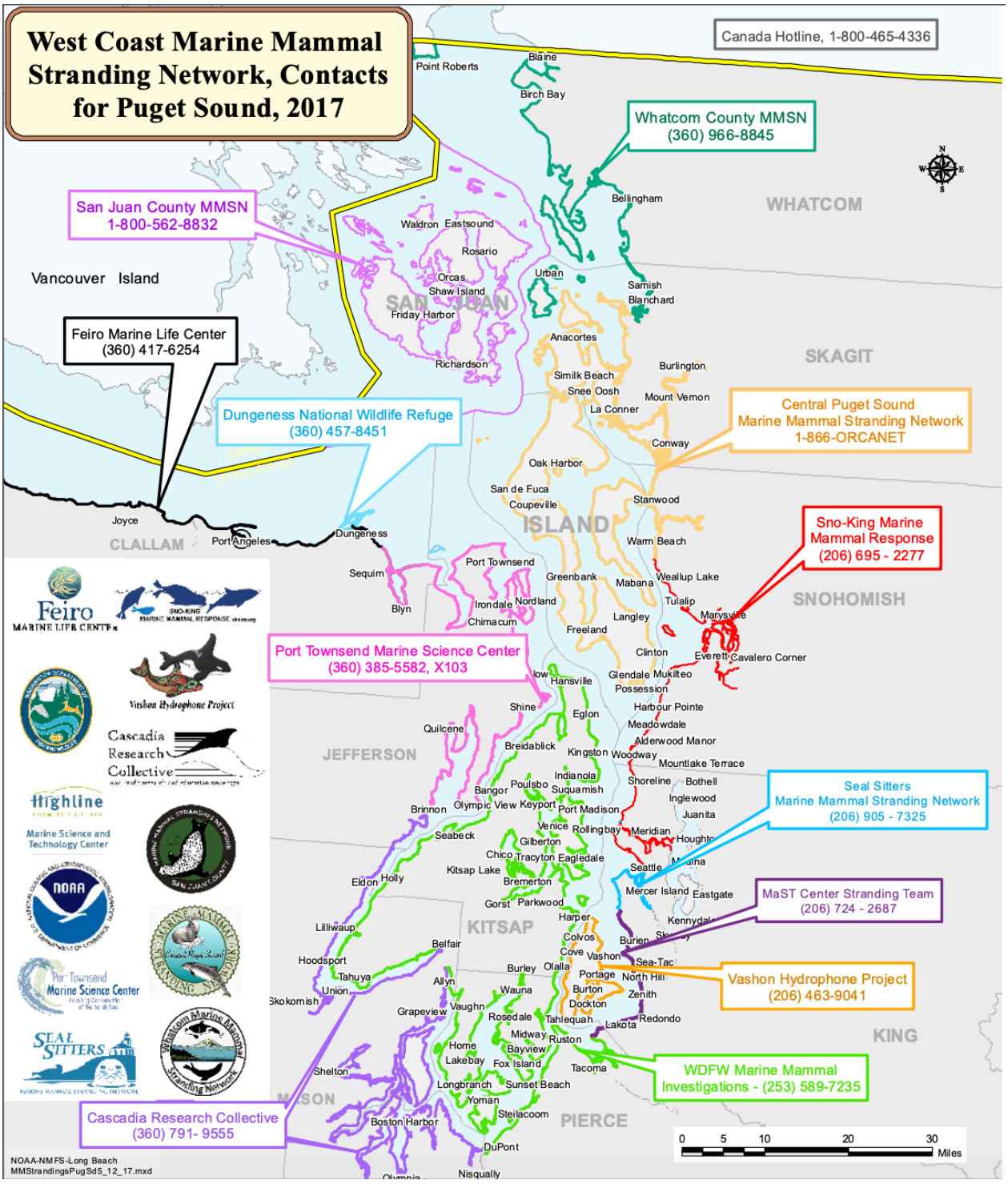

Figure 1: Map of Puget Sound marine mammal stranding response groups and their contact information. (NOAA, 2019)

Objectives

- Simplify the reporting process for the general public by allowing for GPS enabled reports through a web enabled application.
- Improve accuracy of reporting from public through an additional/more accurate reporting method.
- Streamline data collection and improve accuracy of data by integrating response forms with GPS data collection.
- Improve response times through map-based location services.
- Immediate placement of data will save on administrative costs and allow for instant data recollection.
- Improve scheduling of responders through response group accounts where responders can select time slots for applicable events or choose to be an initial responder for new response tasks.

Development/Hardware Requirements

- Back-end server system for database that holds research/stranding related data and GPS data.
- Development team for web and/or phone application.

Application Requirements

- Must be able to hook into a database for transmitting and retrieving data.
- Ability to inform users of any new stranding that may need a response and maintain a schedule amongst the group (this could be push notifications for a cell phone application or text notifications for a web-based application).
- Ability to update forms from a central location and allow responders to directly fill out forms on site to be sent to the centralized database.
- Application must be able to work offline, with the ability to send filled out forms and photographs once data coverage is restored. There are many times in which loss of coverage is possible when on scene.
- Ability to report a marine mammal stranding for the general public and send the GPS location of the event. General public should not have access to all stranding data, only the data they send out.
- References for marine mammal responders and general education resources for non-responders to improve usage amongst the general public. It would be nice to be able to improve not only responses but education and usage of the app amongst the general public.

Costs

The overall costs of development are expected to be fairly low and would not require anything extraneous technologically, provided everything runs smoothly. The largest challenge will be developing a system that can work across a wide range of environments (with data/without data coverage) and still perform as necessary for any field activity, including reporting a stranding. Additionally, with promoting

education amongst the general public, the overall system may require a fair amount of development in order to meet all of the desired functionality. Other costs would be a server architecture substantial enough to handle the data loads. With over 43,000 stranding events in a 9-year period, a database and software efficiency level must be able to handle such loads.

Summary

By bringing the current system into todays' technological environment, it is my belief that we can accommodate greater response times, more accurate data, and possibly even faster responses through more accurate methods of reporting. All of these benefits could increase our ability to properly manage marine mammals and protect them by discovering potential issues far quicker than before.

References

NOAA. (2019). West Coast Marine Mammal Stranding Network. Retrieved from https://www.fisheries.noaa.gov/west-coast/marine-mammal-protection/west-coast-marine-mammal-stranding-network.

Whatcom Marine Mammal Stranding Network - https://www.wmmsn.org/

Wilkinson, Dean and Worthy, Graham. (1999). Marine Mammal Stranding Networks.