Using Social Media and Citizen Science for Hydrologic Data Collection

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Introduction
Citizen science is the collaboration between scientists and the public in order to collect data for research. In a way, it allows everyone to become a scientist. CrowdHydrology uses citizen science in order to monitor stream stage across the United States through texting, social media, and soon, even a smartphone app.

How It Works...
At various waterways, we have placed stream gaging stations that display the current level of water. When someone walks by, they can easily see the water level, monitoring station number, and text it to the CrowdHydrology number where it is received and downloaded into a database that allows us to keep track of the water level of that specific waterway.

Where We Are & Where We’re Going

Future work
Currently, we are in the midst bringing our crowdsourcing project to social media with the introduction of Twitter (Fig. 6). We believe that with Twitter, we will be able to garner a larger audience, decrease errors, and spread the word about the importance of hydrology research. With the inclusion of a smartphone app (Fig. 7), we will encounter virtually no errors by the citizen scientist regarding monitoring station location as it uses GPS, the measurement section automatically fills in the units, and it encourages users to take a picture of the gage as well as the water to get a more accurate reading and an idea of the water quality on that specific day.

Conclusions
In conclusion, crowdsourcing hydrology research using citizen science, makes research less expensive, more consistent and thus more accurate. With the addition of social media, our research reaches a larger audience, teaches them the importance of waterway monitoring, and encourages them to participate. Afterall, we are all scientists.

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FIGURE 1. Flow diagram depicting how gage measurements are received from the field to the CrowdHydrology servers.

FIGURE 2. Texting the water levels at a gage. Top right: CrowdHydrology sign indicating the state (MI), the station (1020) and the phone number to text the current height.

FIGURE 3. Current and future states of CrowdHydrology with sample crowdsourced hydrographs from NY, WI, and MI

FIGURE 4. Amount of total valid responses (blue), texting errors (orange), and communication (grey) received for MI, NY, and WI with inset actual texts received.

FIGURE 5. Uncertainty graphs illustrating CrowdHydrology measurements against pressure transducer data.

FIGURE 6. Sticker design to be placed at each gage. Follow us on twitter! @CrowdHydrology

FIGURE 7. Design of future smartphone app.