Water Quality Monitoring: There’s an APP for that!

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Overview

• The need for data
• Data collection challenges
• ODK Collect Android APP
  – What it is
  – Where it is being used
  – What it does
• AMD Program adaptations and applications
• Benefits, challenges, and possible future directions
• Discussion, suggestions, “play” with app
Watershed Groups need data
(also state and federal natural resource department, consultants, citizen volunteers, others)

• To monitor and document the health of the watershed
  • Trends
  • Impacts
  • Changes
  • Improvements

• To engage community support
• To justify and secure funding
Water Quality Monitoring requires:

• DATA collection
  – Chemical
  – Biological
  – Geographical
  – Historical
  – Flows, pHs, conductivity, coordinates, time, lab numbers and cross references……..and more
DATA Collection Requires:

• Equipment!
  – Field meters
  – Buckets
  – Bottles
  – Camera
  – GPS
  – Notebooks, paper, pencils, acid for preservation, filters, measuring tapes… And more
All that data must be recorded
Monitoring locations are often:

- Remote
- Off roadways and beaten paths
- Hot, cold, or wet
- Away from wifi signals, electric outlets, and often even cell signals
All that equipment must be carried in. And out.

- What currently available technology could help with all of that?
Capabilities

- GPS
- Camera
- APPs
- Wifi Connectivity
The APP:
ODK (Open Data Kit) Collect

- [http://opendatakit.org/](http://opendatakit.org/)
- Open Data Kit (ODK) is a free and open-source set of tools which help organizations author, field, and manage mobile data collection solutions. ODK provides an out-of-the-box solution for users to:
  - **Build** a data collection form or survey;
  - **Collect** the data on a mobile device and send it to a server;
  - **Aggregate** the collected data on a server and extract it in useful formats.

- Funded by Google’s Focused Research Award ([http://opendatakit.org/](http://opendatakit.org/))
Some ways the program is being utilized and adapted:

• Philippine Red Cross – community health
• USAID - Agriculture adaption for Feed the Future program
• Monitoring Deforestation in the Amazon in Brazil
• Documenting human rights violations in CAR (by surveys)
• See more: http://opendatakit.org/about/deployments/
AMD and Watershed Use

• Adapted and built by:
  – Natalie Kruse, Ph.D. and Steve Porter
    - Ohio University
    Voinovich School of Leadership and Public Affairs
Form for AMD Watersheds

- Date/time
- Site name
- Sample ID for lab reference
- Site Description, Photo
- GPS Coordinates
- Weather conditions (current & past 24 hrs.)
- Site Type/Addt’l photos
- Field data
  - pH
  - Temp
  - Conductivity
  - Dissolved Oxygen
  - Oxygen Reduction Potential
- Comments
You are at the start of WillsCreek. Swipe the screen as shown below to go backward and forward.

backward to previous prompt

forward to next prompt

Enter an id for this site
Two letter stream abbreviation then 4 number river miles (ex: HR0130)

Sorry, this response is required!

Enter an id for this site
Two letter stream abbreviation then 4 number river miles (ex: HR0130)

WE3805
APP SCREEN SHOTS

What type of feature is this?
- Stream
- Strip Pit
- Seep
- Gob pile
- Body of water
- Wetland

Capture your location
Use the Bluetooth GPS Receiver
- Replace Location
  - Latitude: N 39°19'12"
  - Longitude: W 82°6'39"
  - Altitude: 137.4m
  - Accuracy: 5m
APP SCREEN SHOTS

Take a photo of the site
- Take Picture
- Choose Image

Enter an id for this site
Sample Id
What is today’s date?
02/09/14
Enter a description
Trib to White Eyes upstream of water treatment plant.
Take a photo of the site
Capture your location
39.32020665 -82.11083894 137.39999389648438 5.0
What is the weather like?
Cloudy Temperature is Mild
Does it appear to have rained in the last 24 hours?
Yes
What type of feature is this?
Go Up  Go To Start  Go To End
FIELD Tested in Raccoon Creek and Wills Creek Watersheds
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Visualizing data
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</tbody>
</table>

**Note:** The table contains metadata fields such as site name, sample codes, and timestamps, along with various environmental and geographical data points.
Benefits

- Data organization
- Quick visualization
- Photo organization and geo-referencing,
- Double-checks for sampling and recon
- Less equipment to carry
- Cuts down on human error
Limitations & Challenges

• A waterproof case is highly recommended
• Does require Bluetooth-GPS connection with no cell or wifi
• Limited by bugs, app capabilities, technological capabilities, human error (forgetting to charge, etc)
• Data can be viewed (but not manipulated) by anyone. Online database.
Possible Future directions

• Integrate flow measurements
• Easier interface between databases
• Field meter connections
• Remote connections to deployed monitors
Questions, Comments, Suggestions?