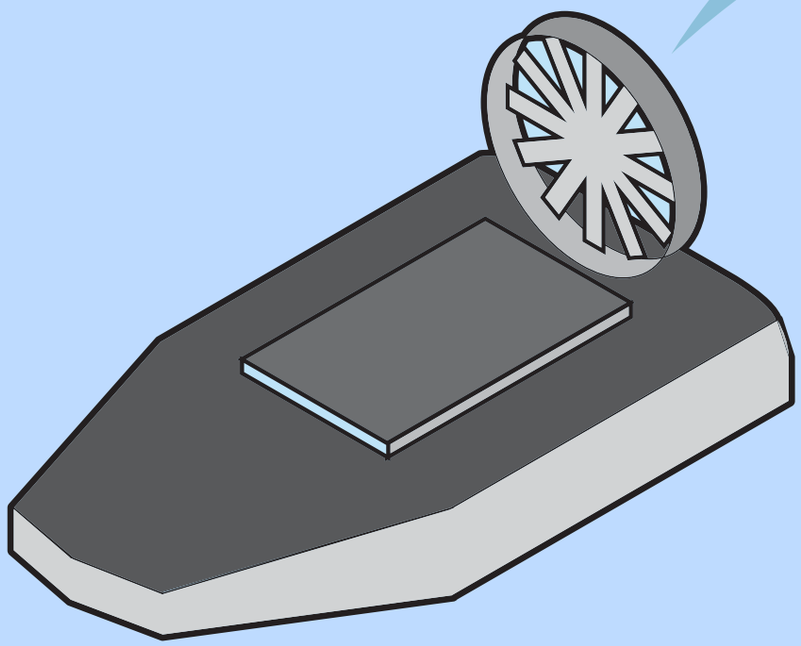
Water Quality Monitoring Made Simple

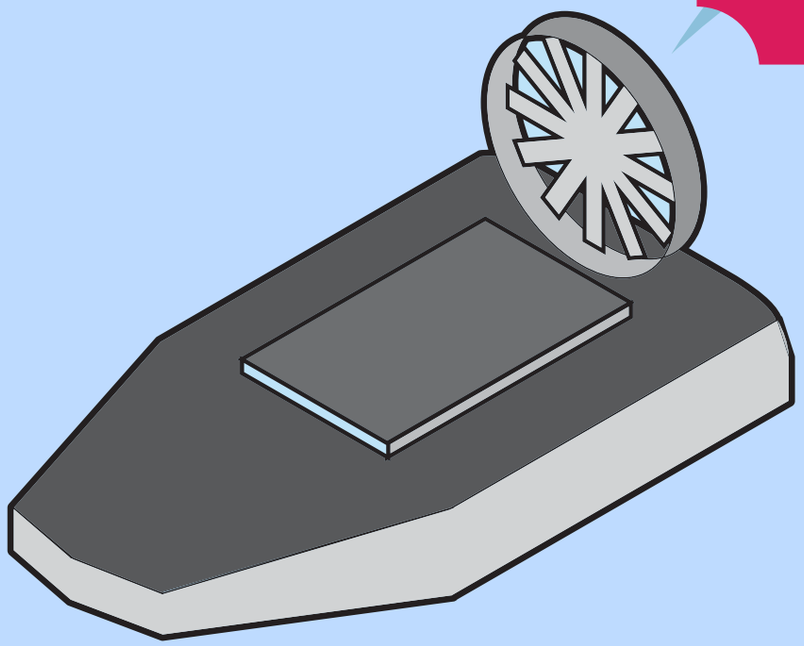
PLATYPUS

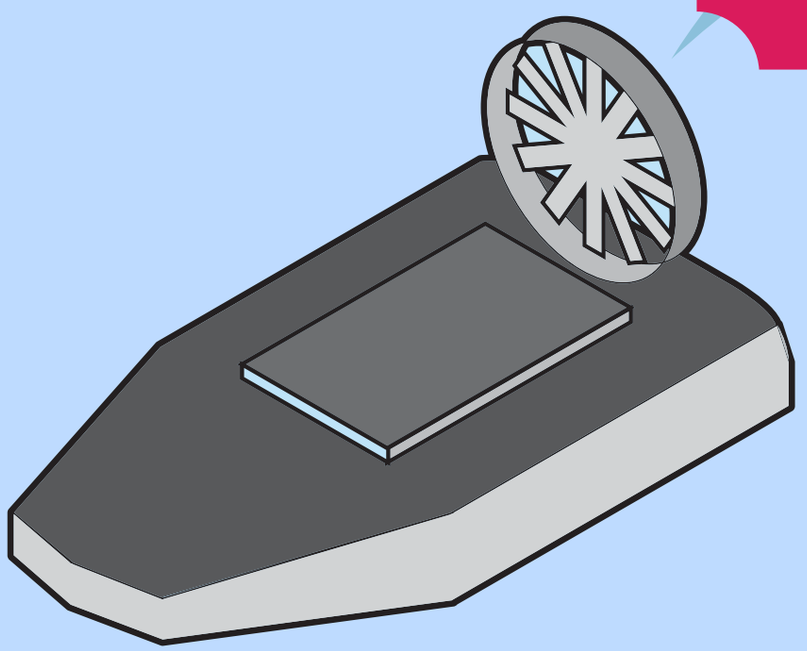
dreamtime

Aneesh Bhoopathy
Karina Chow
Alex Rothera
Dev Doshi
Soyeon Hwang



PLATYPUS dreamtime Carnegie Mellon University HCII





Dissolved Oxygen

Temperature

Conductivity

pH

Bromide Level

The New York Times

OP-ED CONTRIBUTORS

The Facts on Fracking

Cristóbal Schmal

By SUSAN L. BRANTLEY and ANNA MEYENDORFF
Published: March 13, 2013

OPPOSITION to fracking has been considerable, if not unanimous, in the global green community, and in Europe in particular. France and Bulgaria, countries with the largest shale-gas reserves in Europe, have already banned fracking. Protesters are blocking potential drilling sites in Poland and England. Opposition to fracking has entered popular culture with the release of "The Promised Land,"

FACEBOOK
TWITTER
GOOGLE+
SAVE
E-MAIL

The New York Times

Spring Rain, Then Foul Algae in Ailing Lake Erie

Algae blooms, like this one in 2011, are threatening Lake Erie.

Brenda Cullen/ODNR Coastal Management

By MICHAEL WINES
Published: March 14, 2013 | 177 Comments

TOLEDO, Ohio — For those who live and play on the shores of Lake Erie, the spring rains that will begin falling here soon are less a blessing than a portent. They could threaten the very future of the lake itself.

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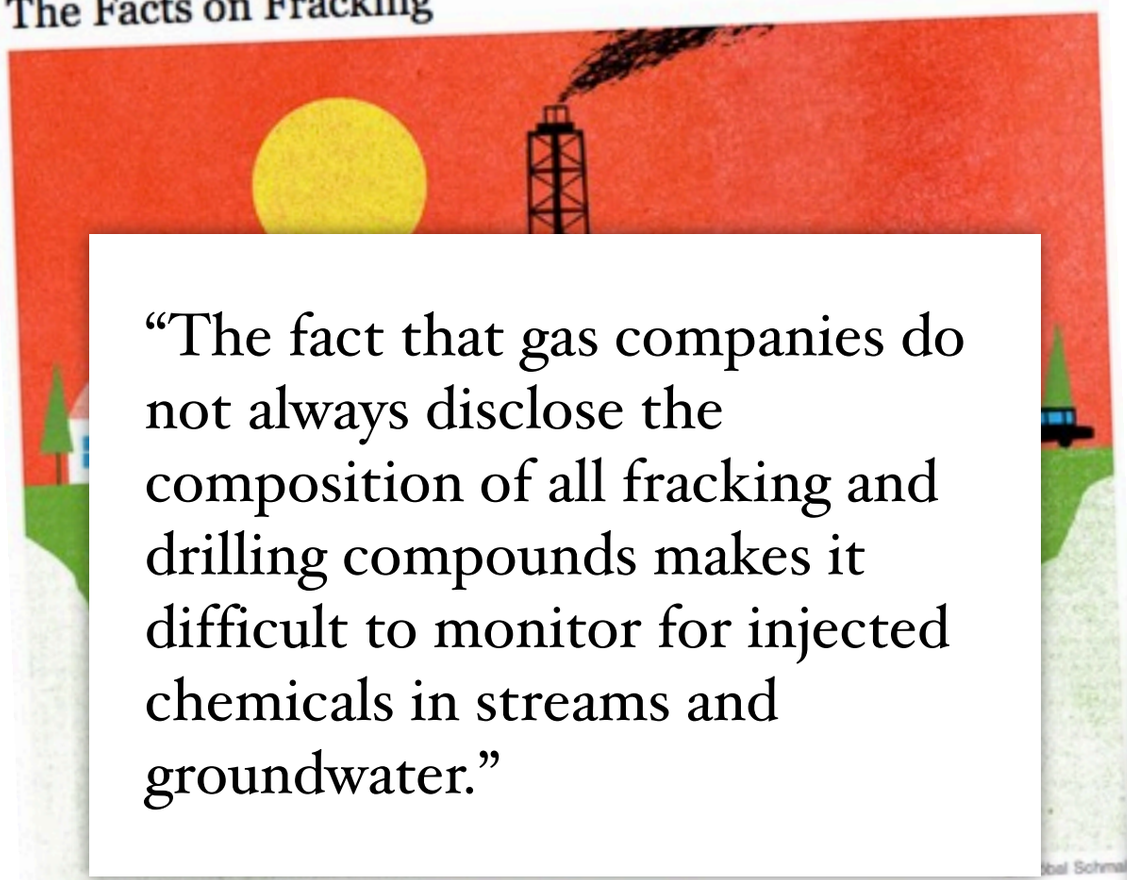

"The fact that gas companies do not always disclose the composition of all fracking and drilling compounds makes it difficult to monitor for injected chemicals in streams and groundwater."

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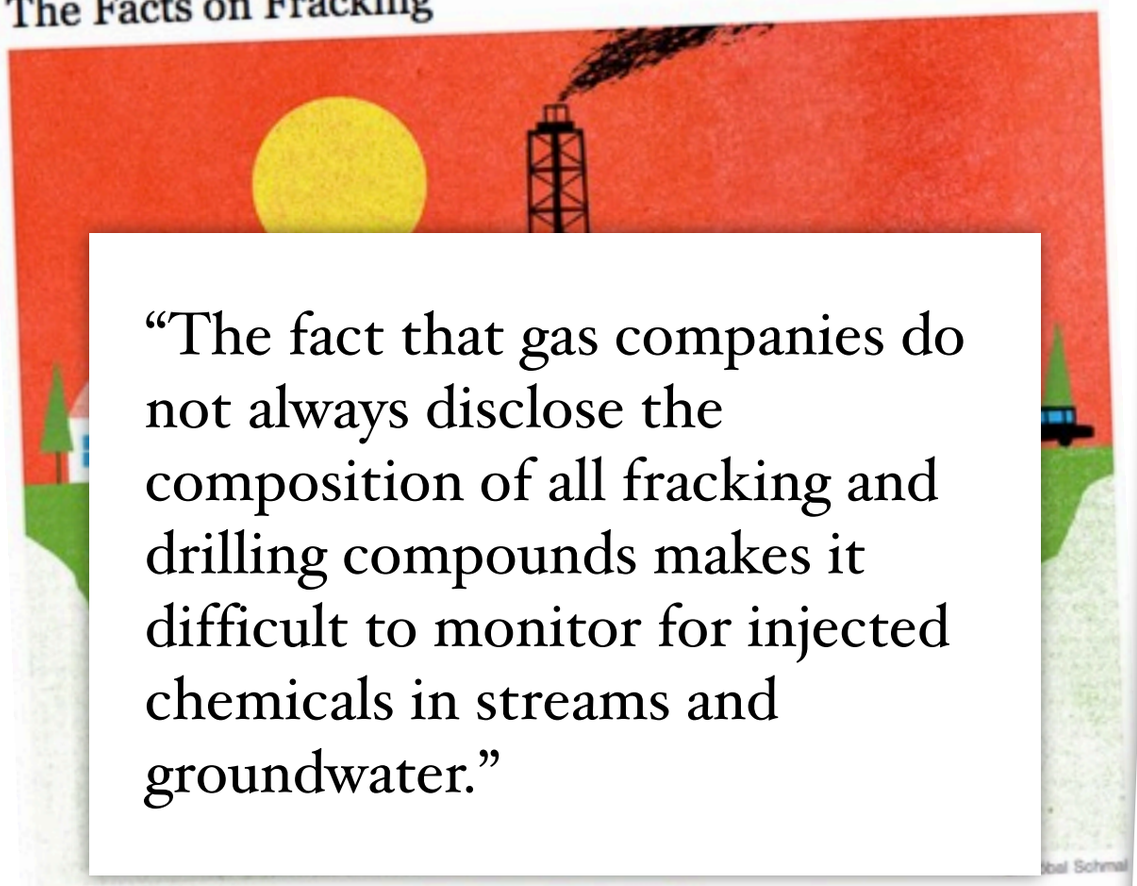

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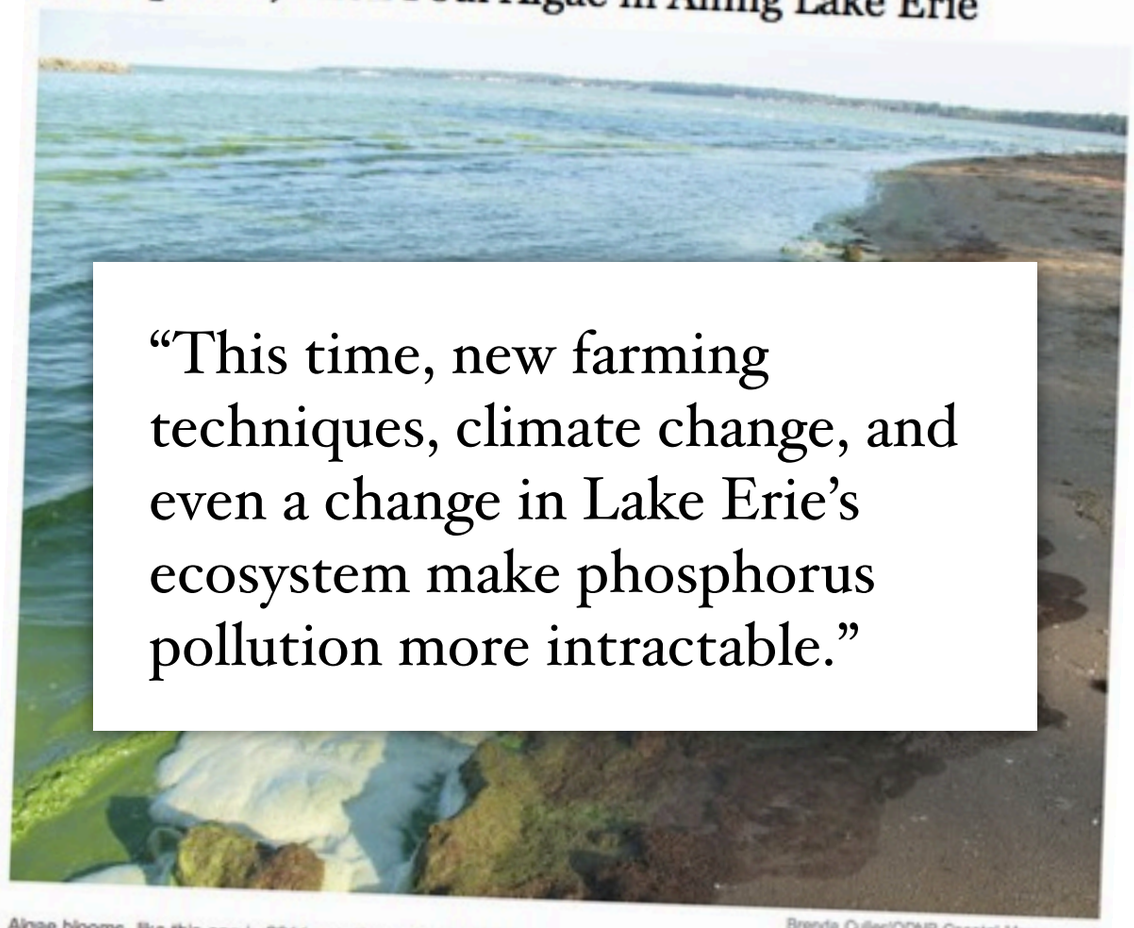

"This time, new farming techniques, climate change, and even a change in Lake Erie's ecosystem make phosphorus pollution more intractable."

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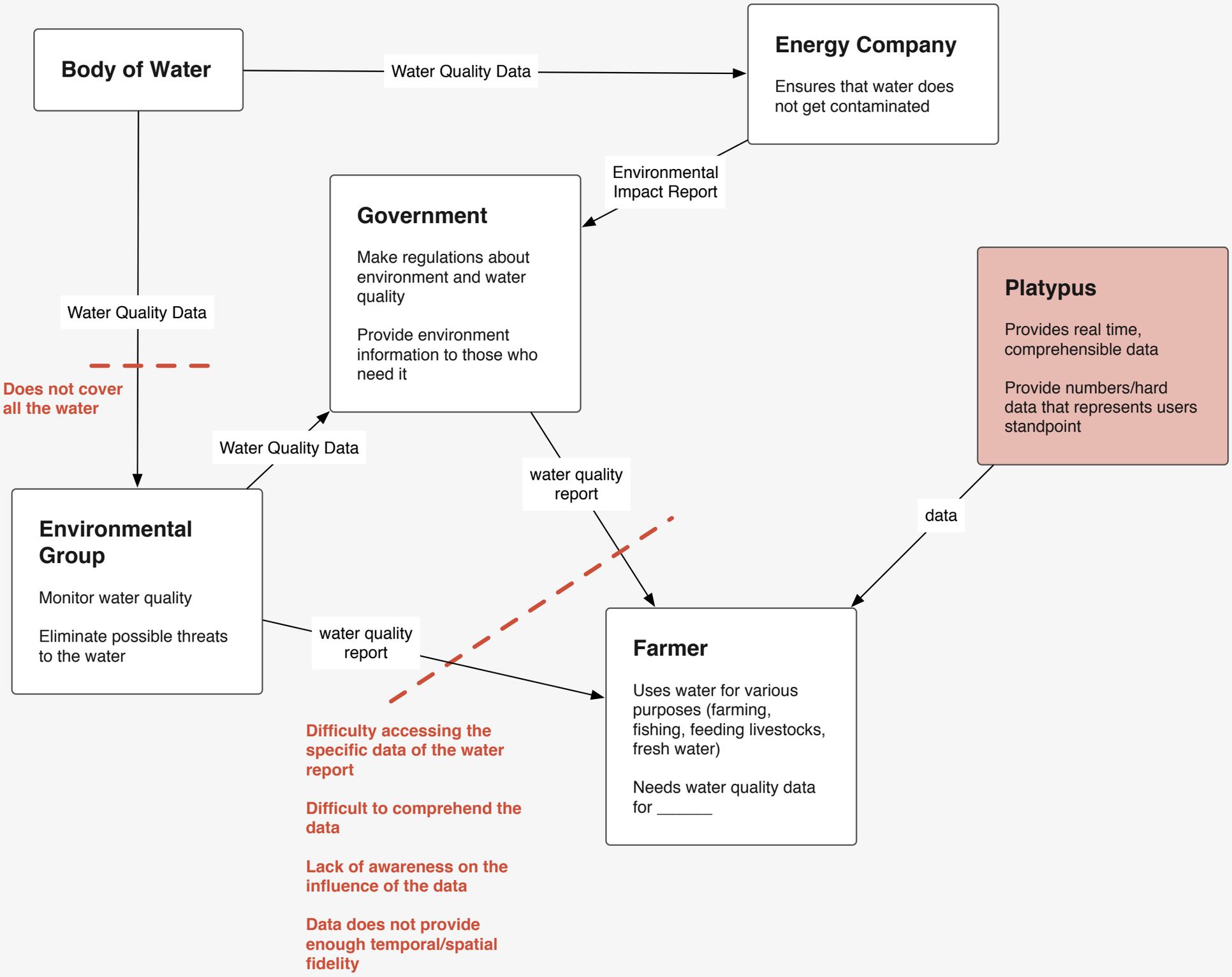
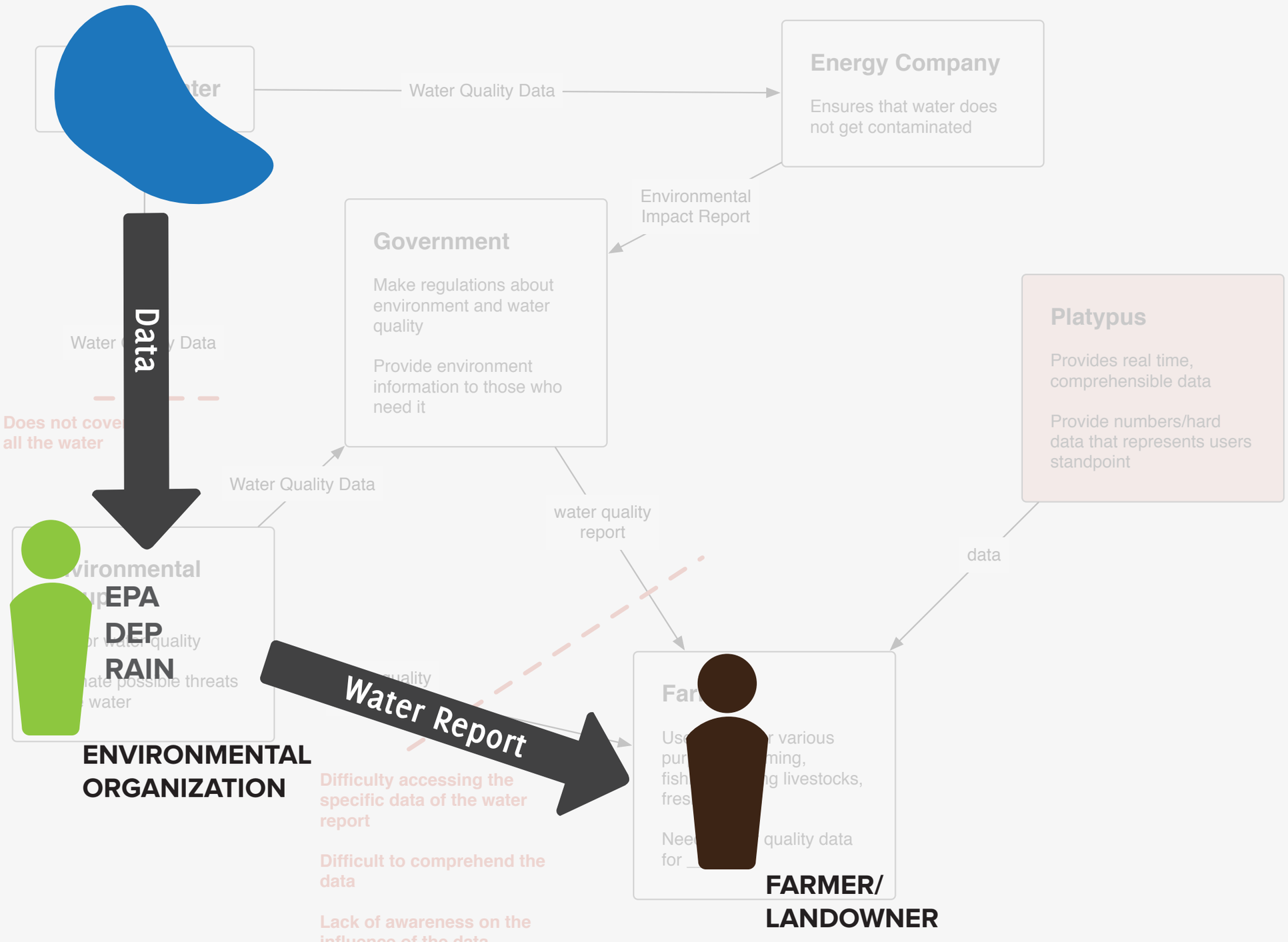
BACKGROUND RESEARCH DESIGN DEMO


Body of Water
Water Quality Data
Energy Company
Ensures that water does not get contaminated
Environmental Impact Report
Government
Make regulations about environment and water quality
Provide environment information to those who need it
Platypus
Provides real time, comprehensible data
Provide numbers/hard data that represents users standpoint
Water Quality Data
Does not cover all the water
Water Quality Data
water quality report
data
Environmental Group
Monitor water quality
Eliminate possible threats to the water
water quality report
Farmer
Uses water for various purposes (farming, fishing, feeding livestocks, fresh water)
Needs water quality data for _____
Difficulty accessing the specific data of the water report
Difficult to comprehend the data
Lack of awareness on the influence of the data
Data does not provide enough temporal/spatial fidelity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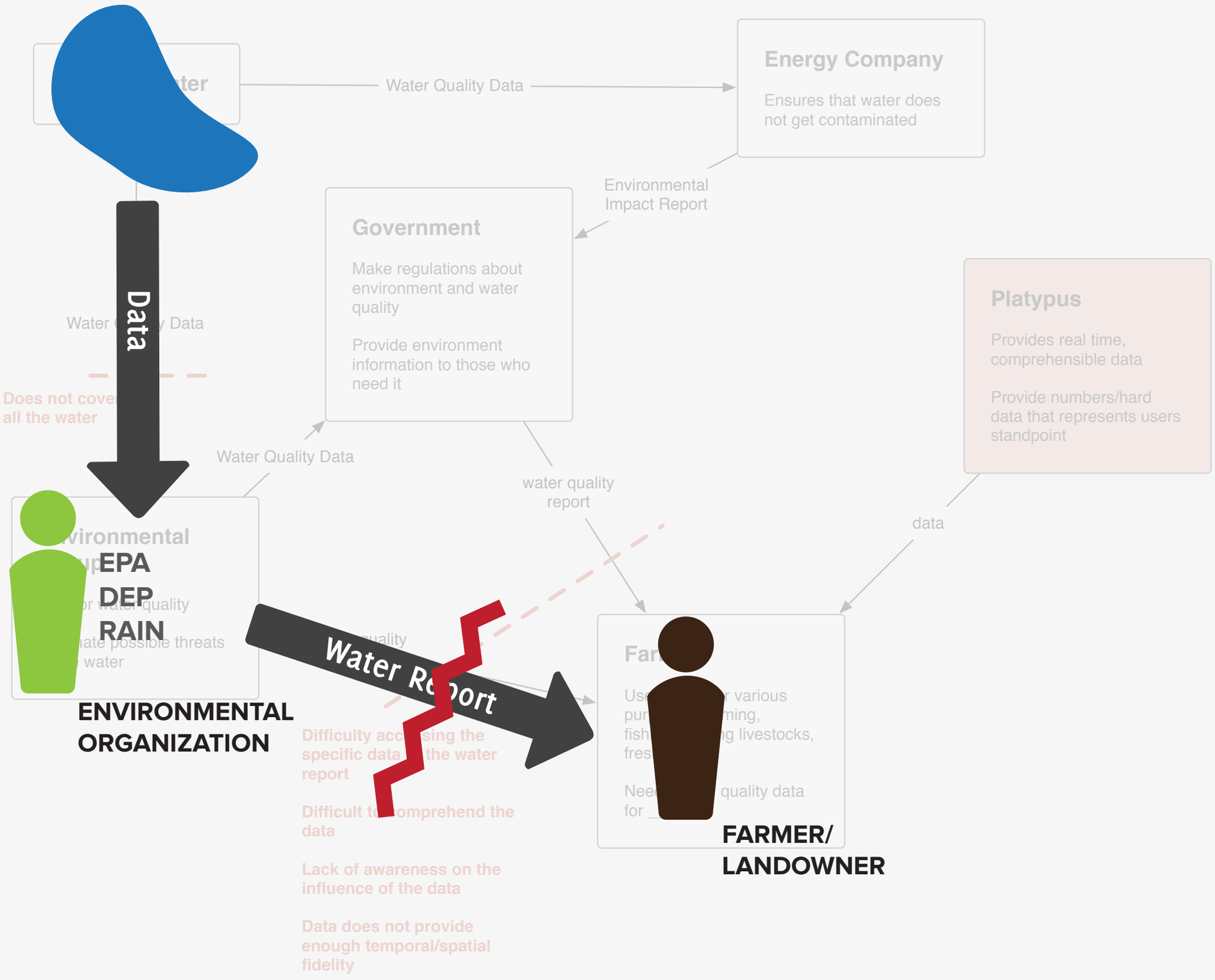
FARMER/ LANDOWNER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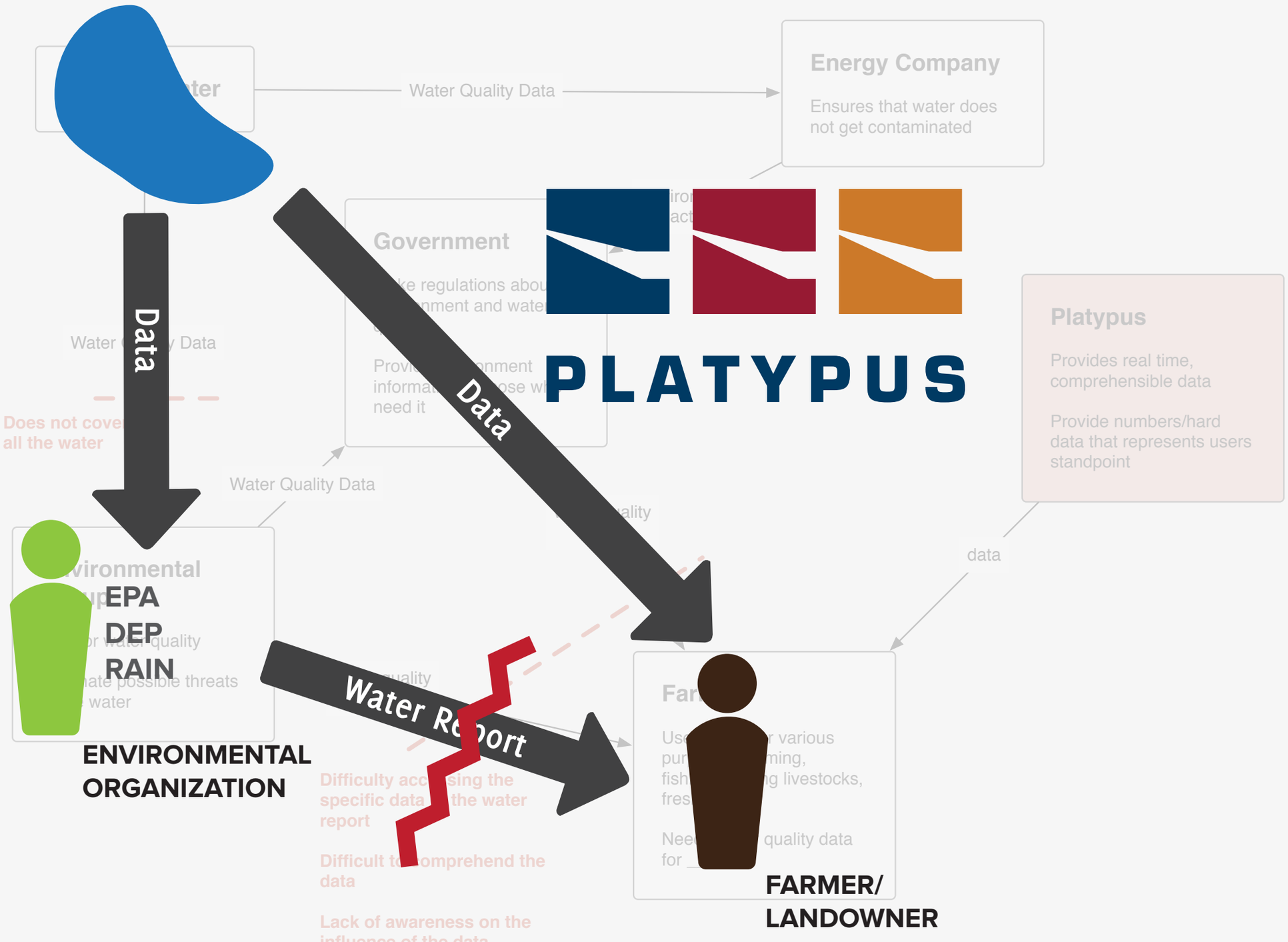
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FARMER/ LANDOWNER

PLATYPUS

Jan 16, 2013
Terrence McAllister Jr.
MassMutual Financial Group
11 Stanwix St., Suite 1200
Pittsburgh, PA 15222

Dear Terrence,

On November 12th, 2012 Platypus performed a check of your irrigation pond at 201 Genteel Ridge Rd. Wellsburg, WV 26070 at 9:30am. We tested for electrical conductivity, dissolved oxygen, temperature, depth and bromine. A description of the meaning of these parameters is included in Appendix 3.

Most levels were found to be normal and in healthy, safe ranges and consistent with earlier readings and other readings in the area. However dissolved oxygen levels, essential for fish life, were very low. We recommend no immediate action.

A detailed report is included in Appendices 1 and 2.

Sincerely yours,

Paul Scerri

President, Platypus LLC

3163 Beechwood Blvd. Pittsburgh, PA. 15217 T: 412 979 4629 W: www.senseplatypus.com

PLATYPUS

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Electrical Conductivity:

Average value recorded: 0.51 dS/m

Maximum value recorded: 0.56 dS/m

Value previous month: N/A

Value previous year: N/A

Typical drinking water: 0.05 – 0.5 dS/m

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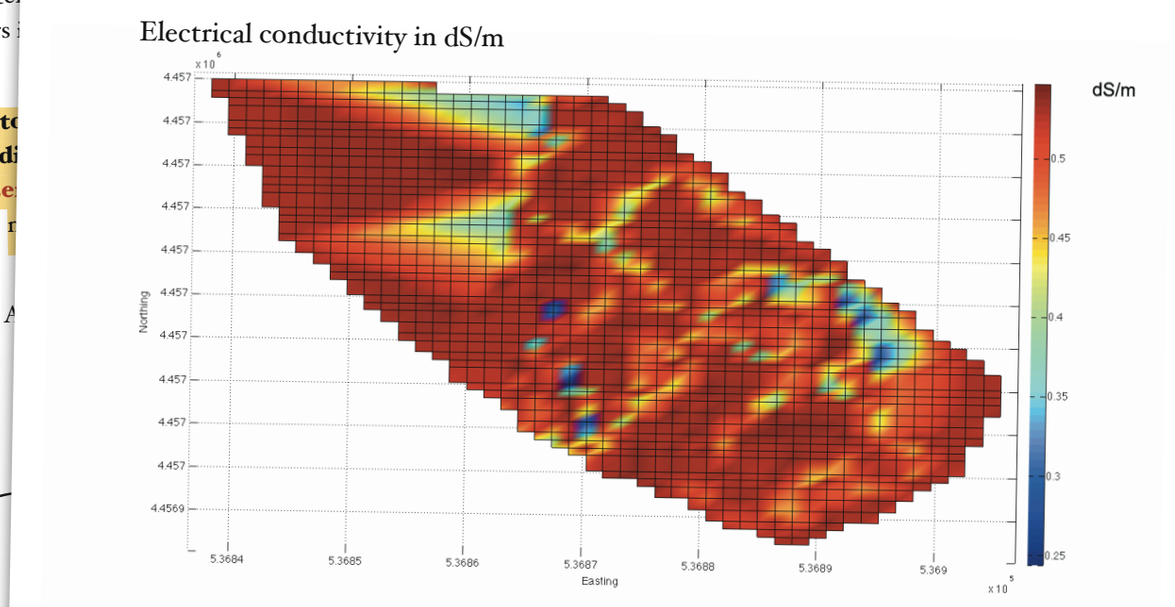

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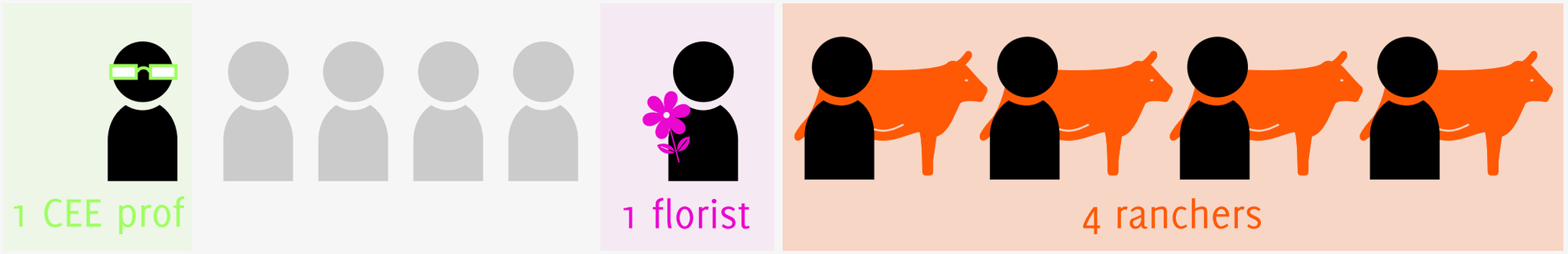
Guiding Light

Learn how agricultural and environmental efforts can be empowered by water quality data.

Design a system based on the needs of Platypus' users.

We interviewed...

38 people, 14 of which were potential Platypus users.



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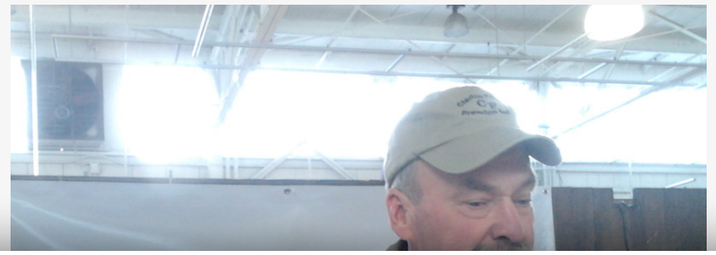
BACKGROUND RESEARCH DESIGN DEMO


Here Today!
Beef
Pork

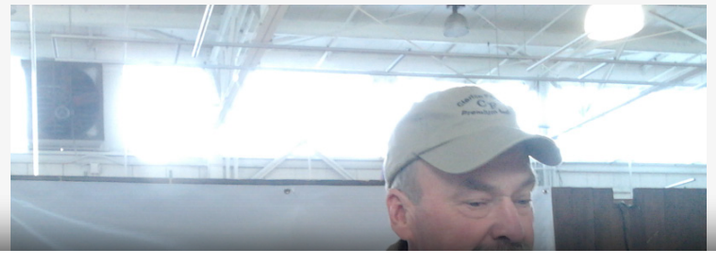

Clarion Farms
Beef Barn and
"Fresh be
(814) 764-58

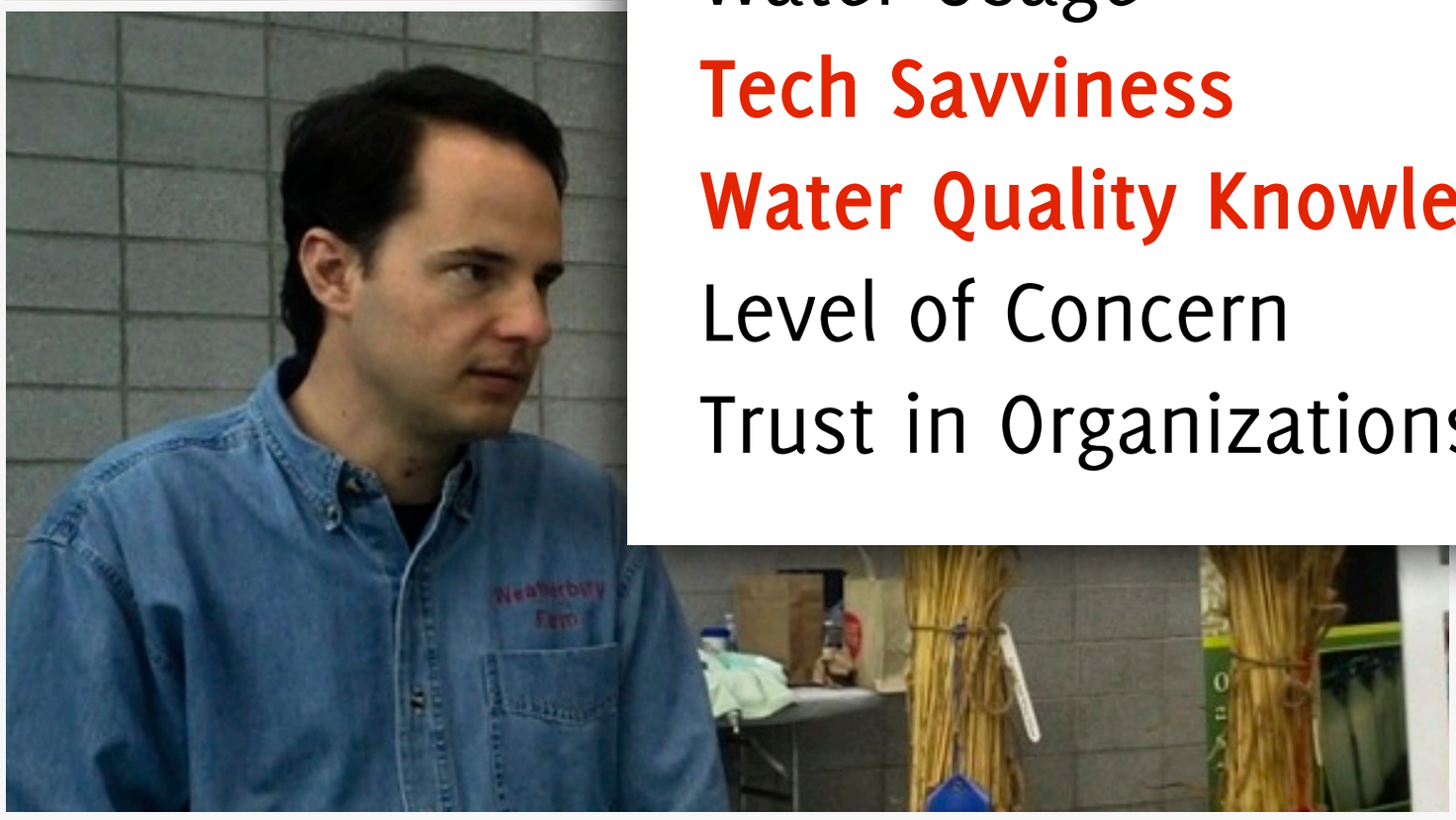

Laurel Vista Farms
Local Produce in a Jar



Varied User Base

Farm Scale
Water Usage
Tech Savviness
Water Quality Knowledge
Level of Concern
Trust in Organizations





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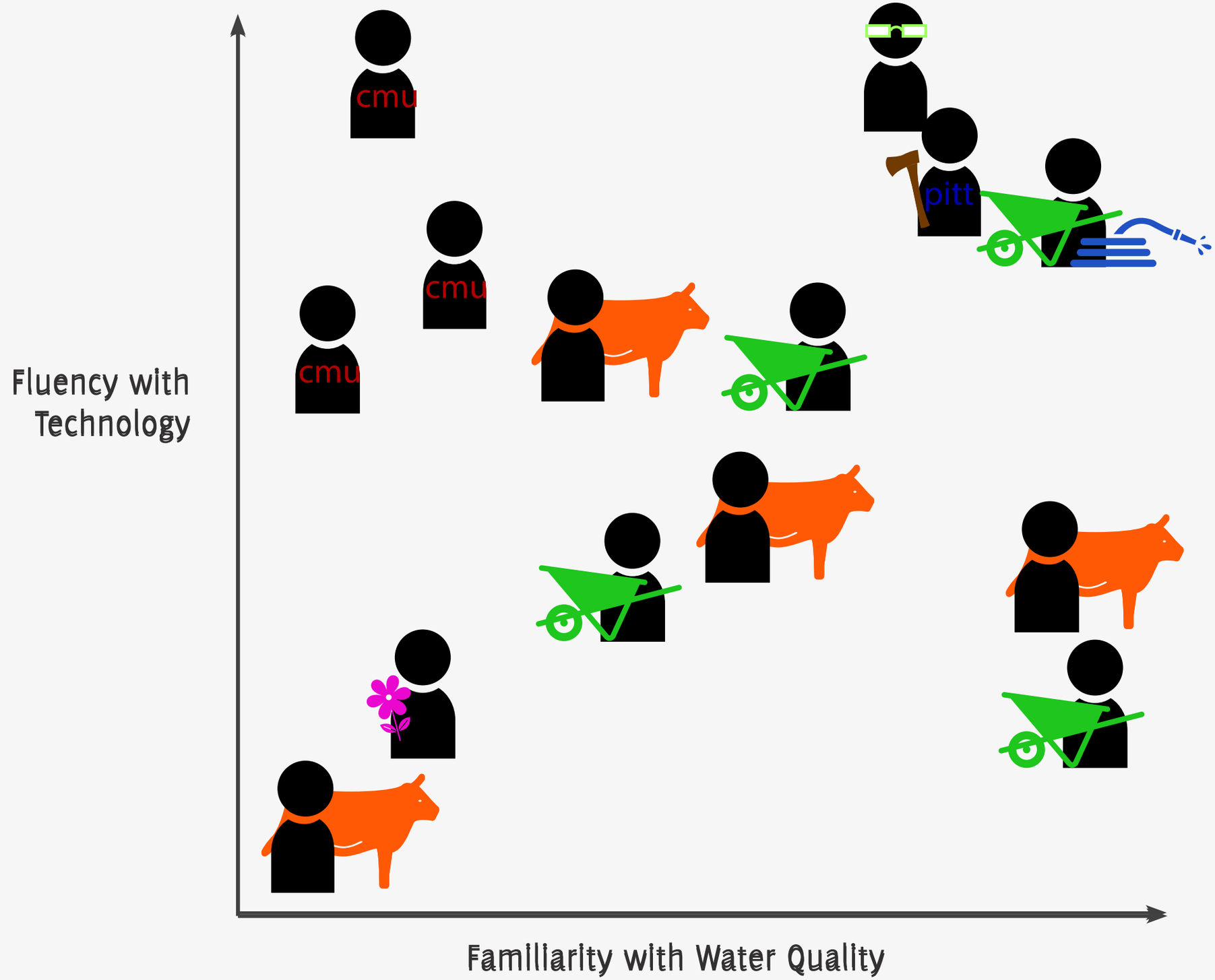
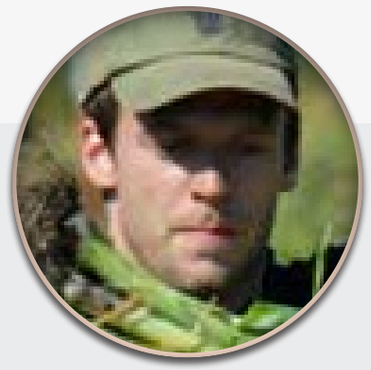

cmu
cmu
cmu
pitt
Fluency with Technology
Familiarity with Water Quality

Personas

Personas

Fluency with Technology

Jason



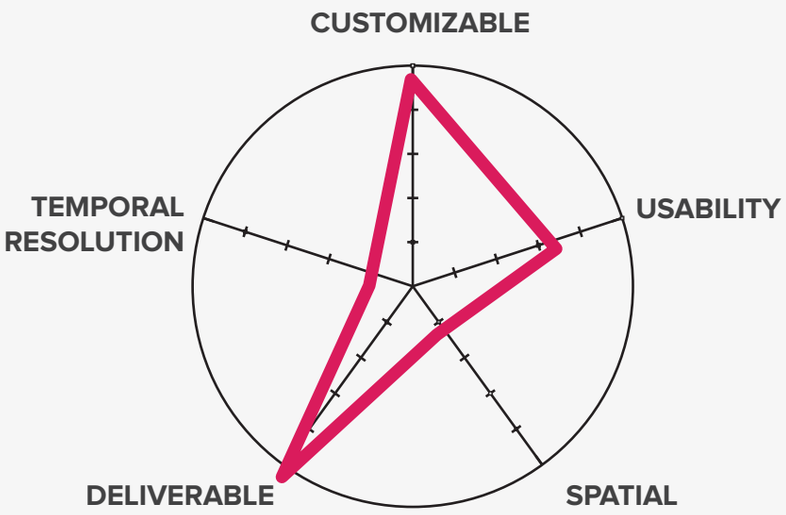
Troy

Frank

Rita

Familiarity with Water Quality

Competitive Analysis



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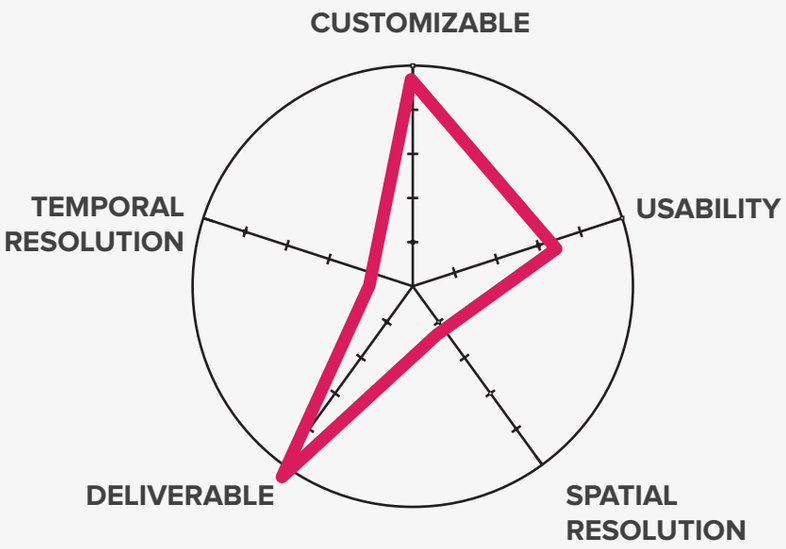
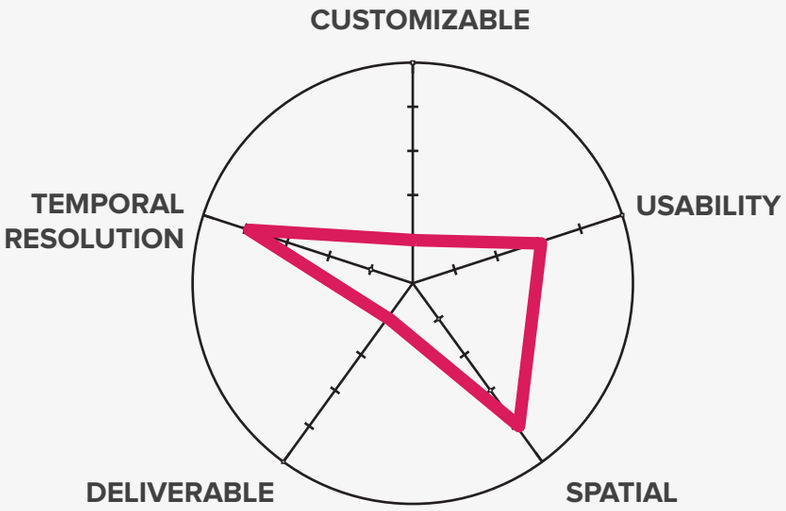
BACKGROUND **RESEARCH** DESIGN DEMO

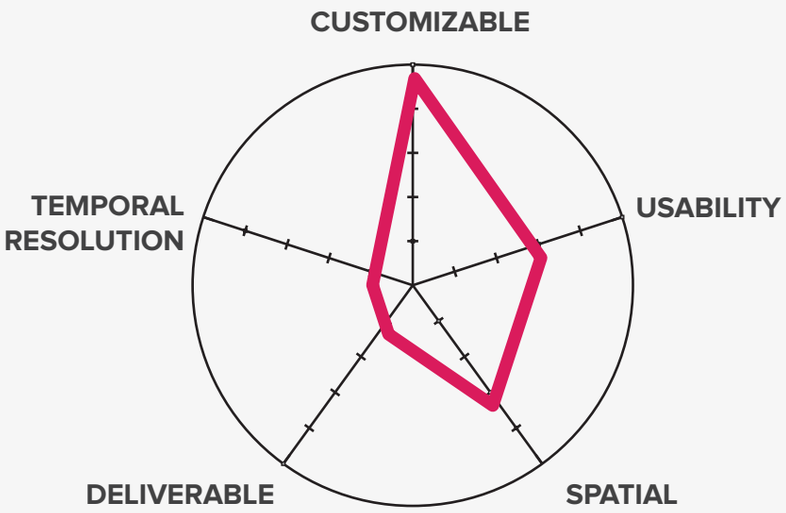
The Climate Corporation

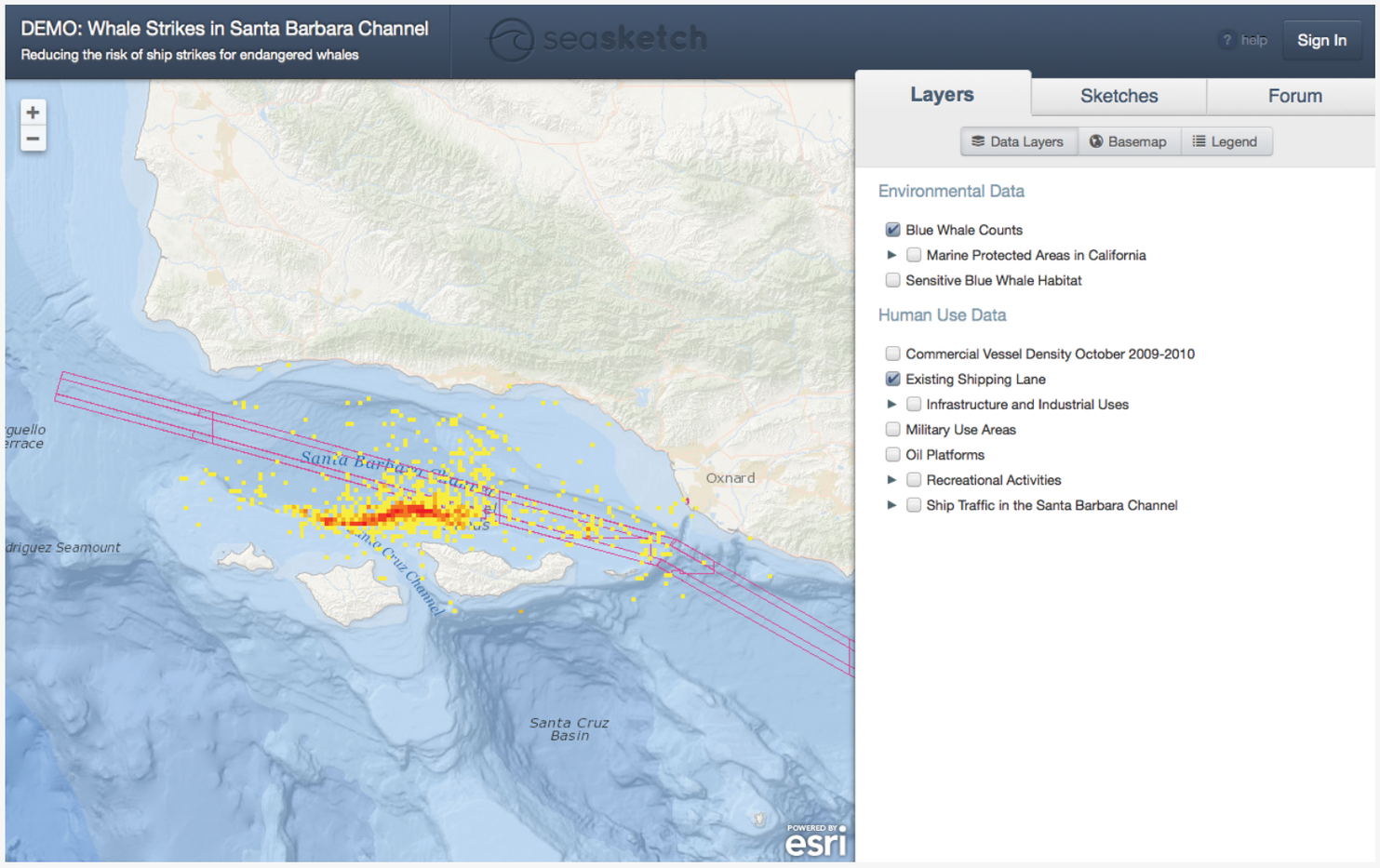


Planetary Skin Institute



Sea Sketch


CUSTOMIZABLE
TEMPORAL RESOLUTION
USABILITY
DELIVERABLE
SPATIAL RESOLUTION


DEMO: Whale Strikes in Santa Barbara Channel
Reducing the risk of ship strikes for endangered whales
seasketch
help
Sign In
Layers
Sketches
Forum
Data Layers
Basemap
Legend
Environmental Data
Blue Whale Counts
Marine Protected Areas in California
Sensitive Blue Whale Habitat
Human Use Data
Commercial Vessel Density October 2009-2010
Existing Shipping Lane
Infrastructure and Industrial Uses
Military Use Areas
Oil Platforms
Recreational Activities
Ship Traffic in the Santa Barbara Channel
Oxnard
Santa Cruz Basin
POWERED BY esri

Themes

Themes

1. Contextualize Metrics

Themes

1. Contextualize Metrics

2. Enable customized reporting

Themes

1. Contextualize Metrics
2. Enable customized reporting
3. Visualize Spatial & Temporal Dimensions

Themes

1. Contextualize Metrics
2. Enable customized reporting
3. Visualize Spatial & Temporal Dimensions
4. Provide actionable information

1. Contextualize Metrics

How can we provide numerical, historical and causal context to metrics?

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How can we provide numerical, historical and causal context to metrics?

"What does it mean for the pH to be too low? For instance, the pH has to be kept around 3 for chickens and other livestock, but traditionally the standard is 7."

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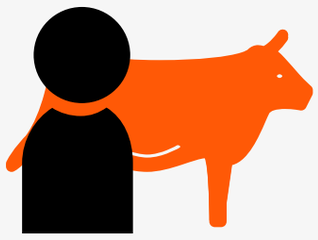
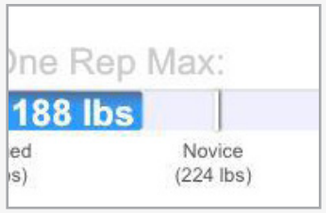


"What does it mean for the pH to be too low? For instance, the pH has to be kept around 3 for chickens and other livestock, but traditionally the standard is 7."

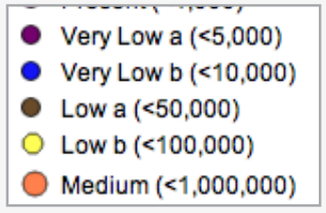
"I think you could...show fracking, pollution, climate, whether it's in a suburban or rural community..."

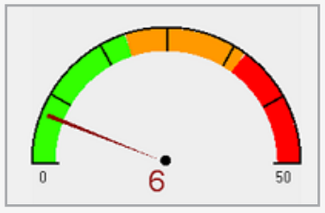
1. Contextualize Metrics

Ranges



Color codes

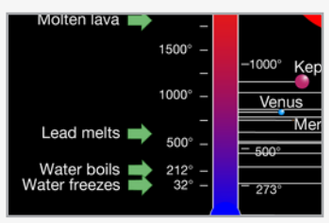


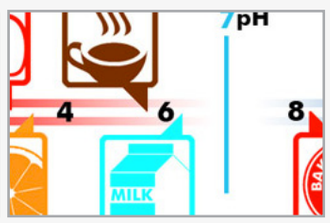


Analogies

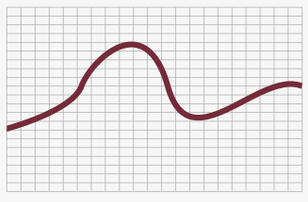
water safe for drinking

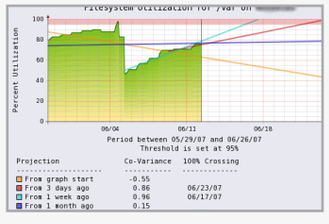
pH 6.5





Trend Lines





2. Enable Customized Reporting

What metrics do users want to see, and in what level of detail?

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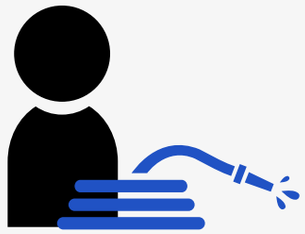

"Dissolved oxygen is an irrelevant metric unless you're a fish farmer"

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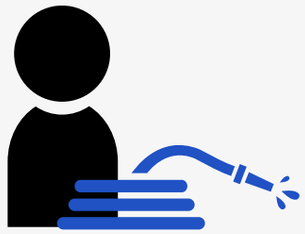


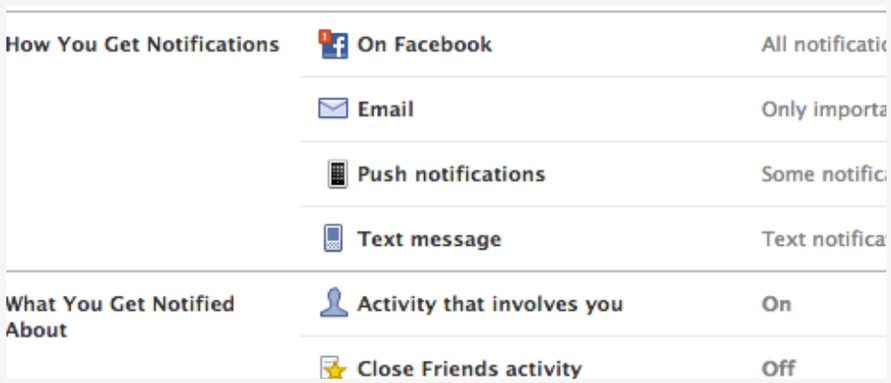
"Dissolved oxygen is an irrelevant metric unless you're a fish farmer"

"If the information is emailed to those farmers every day or every week, that would be enough."

2. Enable Customized Reporting

Customizable Dashboards

Alert Customization



3. Visualize Spatial & Temporal Dimensions

How can spatial and temporal dimensions aid understanding?

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How can spatial and temporal dimensions aid understanding?

"I would really want to know exactly where the problem is...the particular point of discharge if something is leaking in"

3. Visualize Spatial & Temporal Dimensions

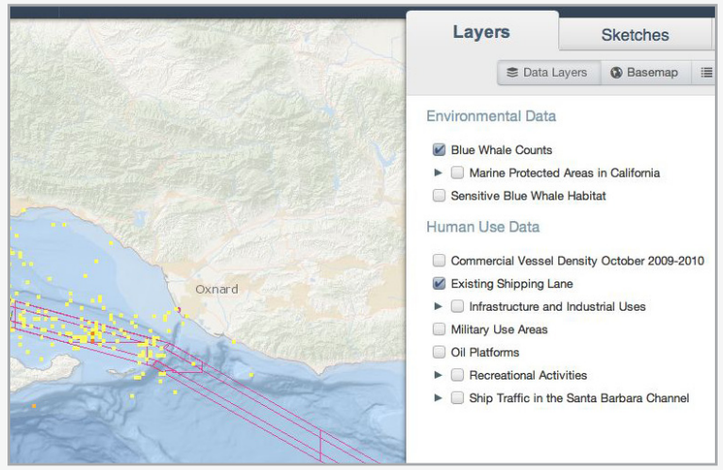
How can spatial and temporal dimensions aid understanding?

"I would really want to know exactly where the problem is...the particular point of discharge if something is leaking in"

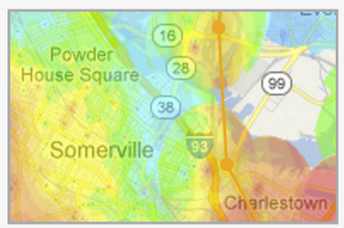
"[I'd like to know] what the pH is over here versus someplace else in the pond"

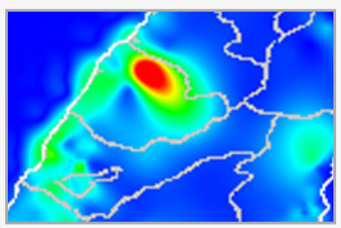
3. Visualize Spatial & Temporal Dimensions

Data Layers



Heatmaps





Timelines

4. Provide Actionable Information

How do we bridge the gap between understanding and acting on data?

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4. Provide Actionable Information

How do we bridge the gap between understanding and acting on data?

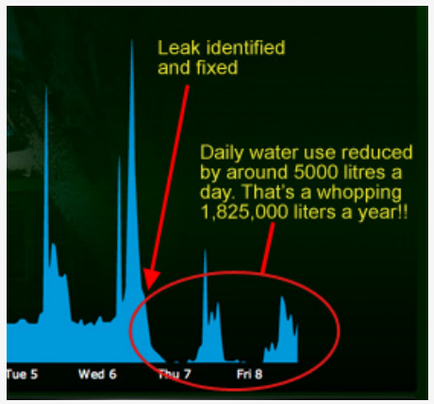
"[It'd be nice to have] a hint for what I should do next...or tell me what will happen if I don't do anything"

"I would think whoa...what does it mean for my dissolved oxygen to be low? What am I supposed to do?"

4. Provide Actionable Information

Recommendations

Annotation / sketching



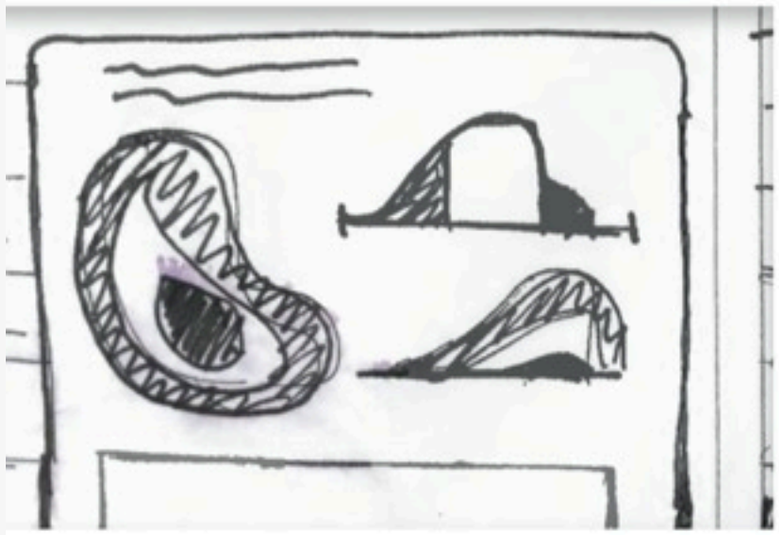
Report generation

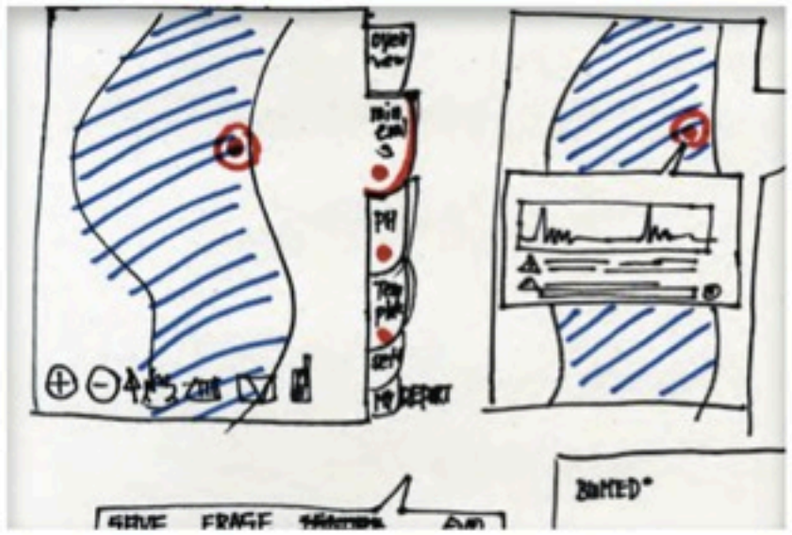
Themes

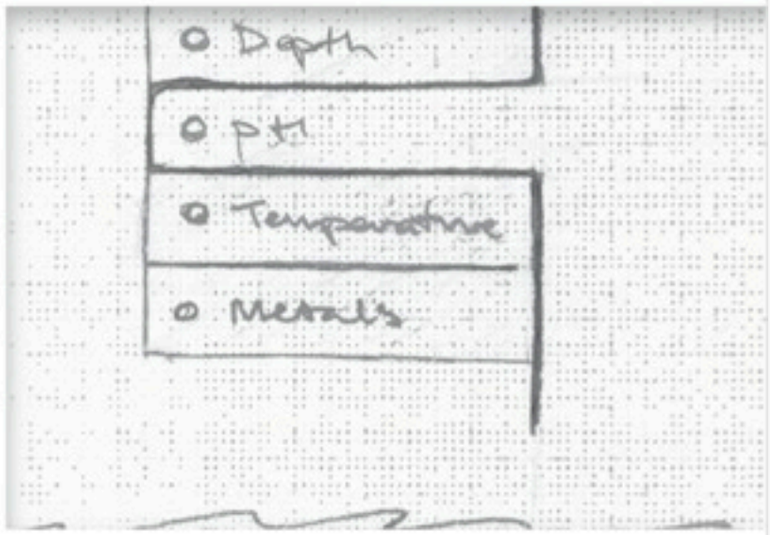
1. Contextualize Metrics
2. Enable customized reporting
3. Visualize Spatial & Temporal Dimensions
4. Provide actionable information

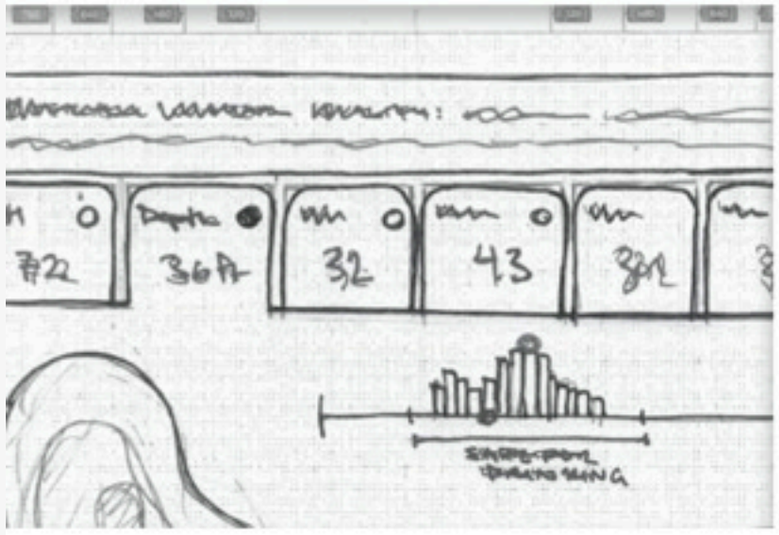
Design Process

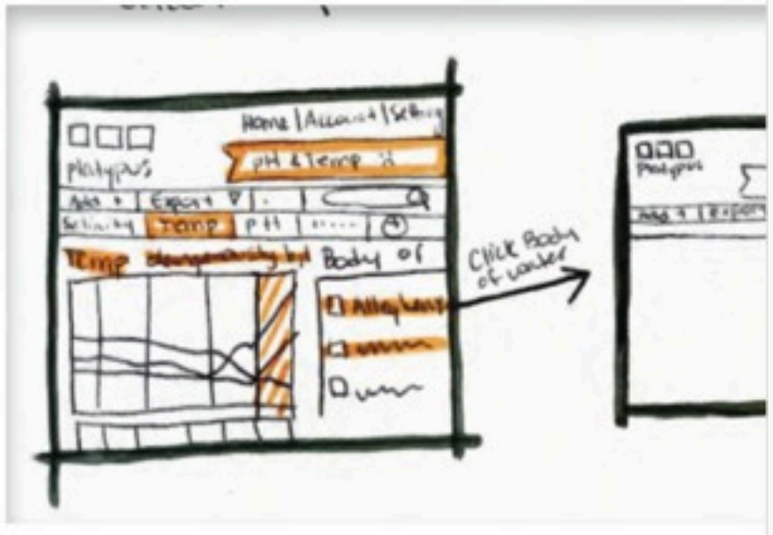
Parallel Sketching





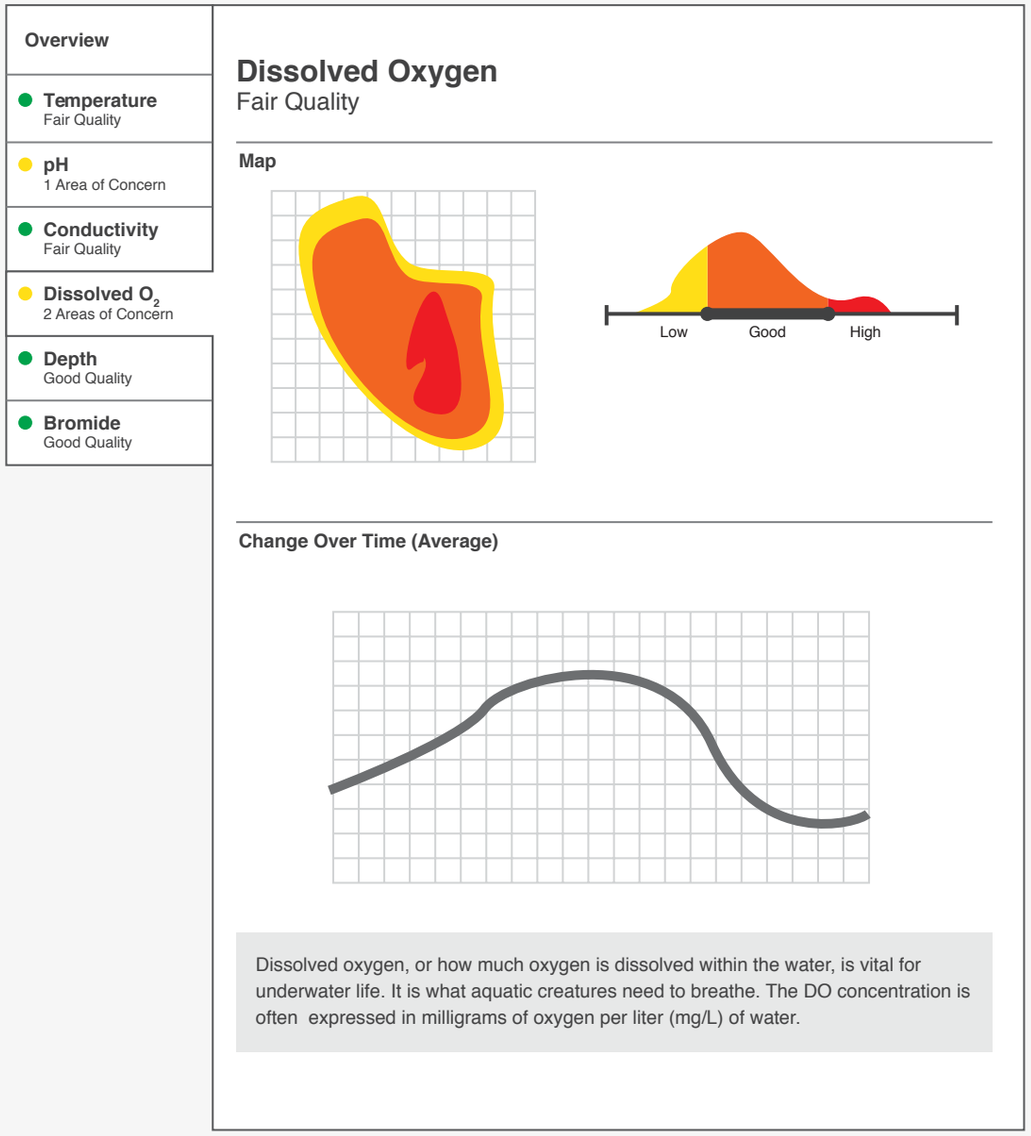


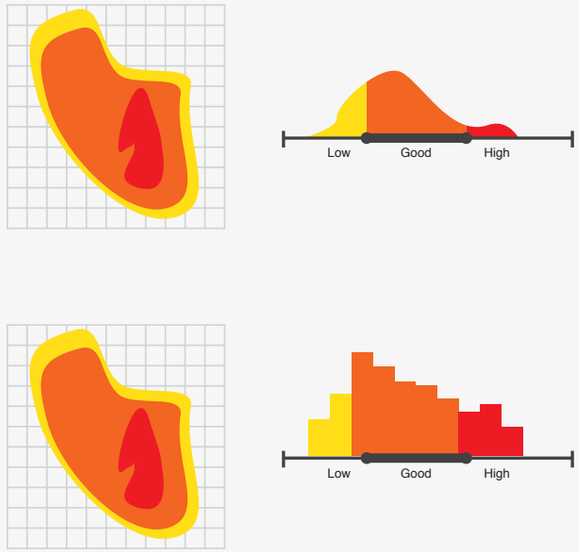


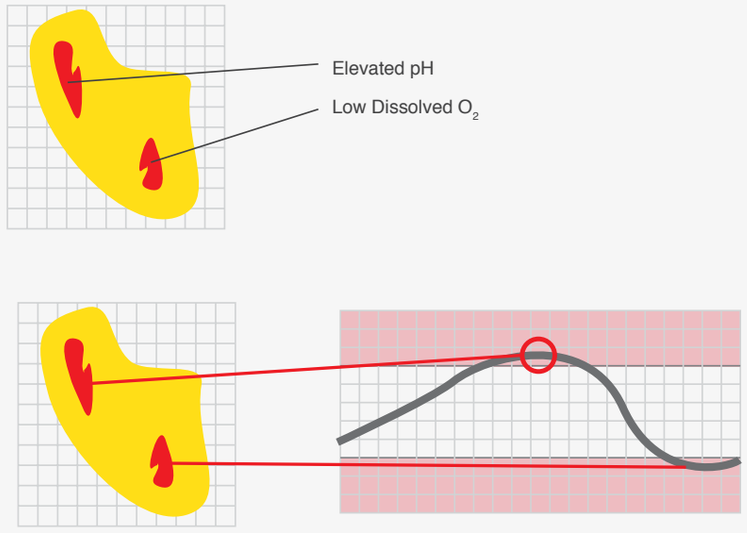


Design Process

Lo-Fi Prototyping

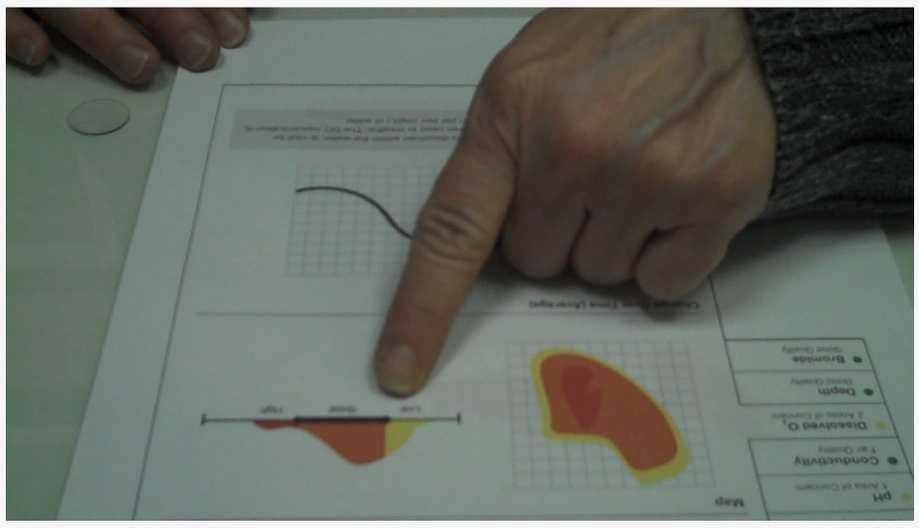


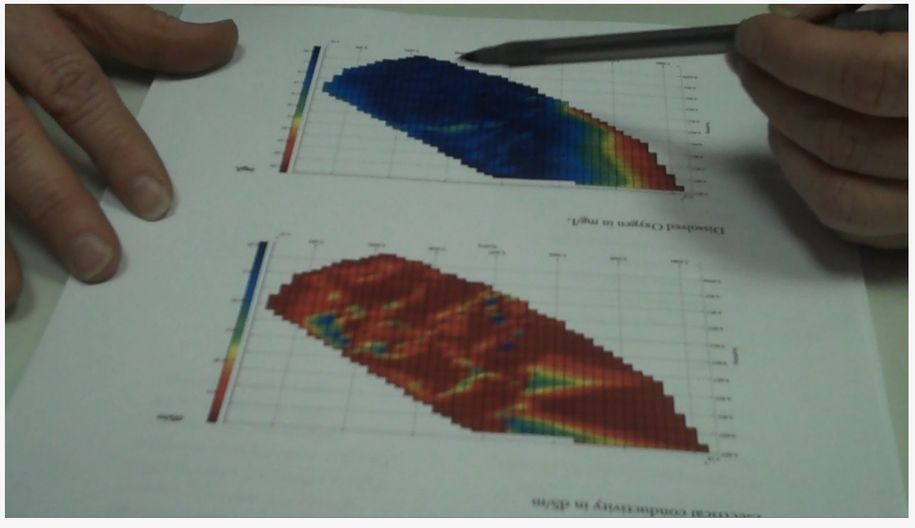




Design Process

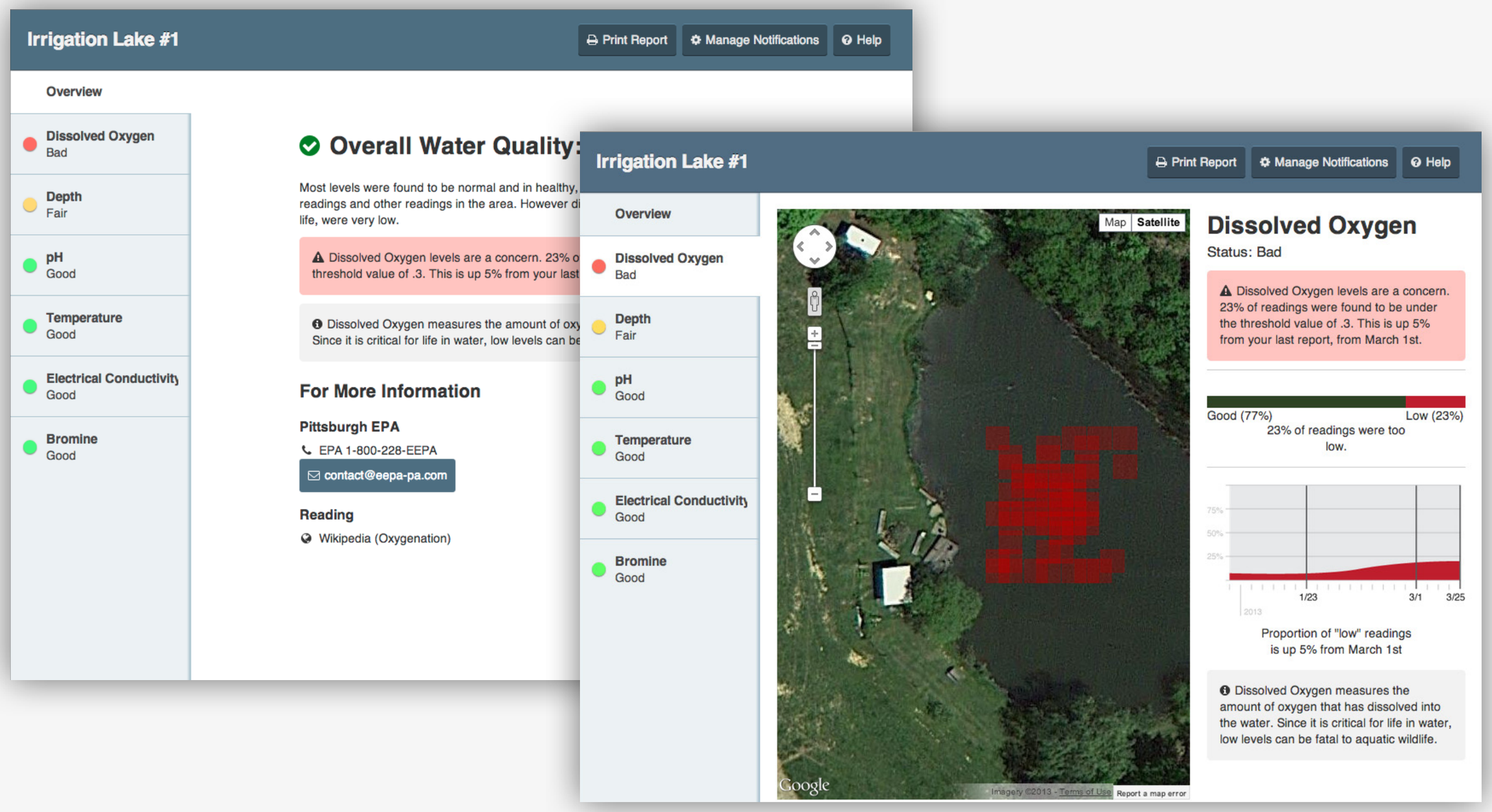
Lo-Fi Testing





Design Process

v1 Interactive Prototype



Design Process

Testing Interactive Prototype

Demo

Personas

Fluency with Technology

Jason

Troy

Frank

Rita

Familiarity with Water Quality

Personas

Fluency with Technology

Troy

Familiarity with Water Quality

Demo

Troy schedules a report with Platypus.

A couple days later, he gets an email with a report summary.

He wants to learn more, clicks a link to the Platypus dashboard.

Implementation

Backend: Node.js Express server, Google Fusion Table, Heroku, SciPy Interpolation.

Frontend: Backbone, CoffeeScript, Jade, Stylus, Google Maps API.

Future Directions

Integrate external data sources: weather, fracking locations, crowdsourced notes

Support viewing and comparing multiple locations

Support viewing a more continuous data stream

Present more user-centric view of data

Thank you's