



Stevan Earl <srearl@asu.edu>

FW: Final REU summary

12 messages

Sally Wittlinger <salwitt@asu.edu>
To: Stevan Earl <stevan.earl@asu.edu>

Fri, Aug 25, 2017 at 1:00 PM

Hi Stevan,

Below is a final summary from Dave Nardelli, the Grimm/Palta REU this summer. When you get a chance would you please look in the Stormwater Dropbox folder and in the Dave REU folder check out the Mannings_eq and Ncentral_discharge worksheets. Does this give you what you need for the concentration data?

We will continue to record depth at the Central South and North Iscos using the updated version of Flowlink (made more convenient since it is on a laptop now).

Dan Childers attended our staff meeting yesterday and we had a discussion about the Salt River Iscos, including the difficulty of determining the correct trigger height on the two with bubblers. Dan is not at all convinced that CAP should continue Monica's project on the Salt River and is going to discuss it with Nancy. I think he would rather see us add two Iscos on the north end of IBW than continue to collect along the storm drains on the Salt River. Stand by, and I will keep you posted.

Sally

From: David Nardelli [mailto:dnardelli@s.paulsmiths.edu]
Sent: Thursday, August 24, 2017 4:08 PM
To: Monica Palta <mpalta@asu.edu>; Lauren McPhillips <Lauren.McPhillips@asu.edu>
Cc: Nancy Grimm <NBGRIMM@asu.edu>; Sally Wittlinger <salwitt@asu.edu>; Shero Holland <Shero.Holland@asu.edu>; Quincy Stewart <Quincy.Stewart@asu.edu>; Amalia Handler <amhandle@asu.edu>; Mark Watkins <Mark.Watkins@asu.edu>; Kathrine Kemmitt (Student) <kkemmitt@asu.edu>; Kody Landals <klandals@asu.edu>
Subject: Final REU summary

Hello All,

I figured I would finish off my REU experience with a bit of organization. I have learned that paying attention to

detail is huge, so I am including all of the important details of my data/work this summer, which will make future usage of this data fairly easy.

General:

1.) I have put the folder in which I have been doing all of my work (DaveFiles>**Stormwater**) onto Lauren's portable drive. It is just about 16GB in size and everything is in here.

2.) I have made a key in word document format for every file in this folder (Stormwater_key) which is also located in the folder. This will help identify all files and their content if confusion arises.

3.) Aside from the folder, I have uploaded my excel models to the drop box that Sally had shared with me along with all of the ISCO data collected during my time here (Folder is called Dave_REU). This includes three excel workbooks (Mannings_eq, Ncentral_discharge, and Flowlink_data_2017) and a folder with my R models included (R_models). They are split up because of the fact that North Central does not have a circular channel associated with it, while the other three do. Manning's equation was used on the circular pipes while a rating curve based upon manual measurements was created for North Central. **Past and present ISCO data are included in a second sheet in the Ncentral_discharge workbook, however, so that they can be coupled with the manual rating curve.**

4.) I have also uploaded a "Dave_REU" folder on the google drive (StormwaterShared) that Lauren shared with me in June. This folder includes the same materials, but also all of the raw data I have collected (Flow_data), the landcover stats I generated using the unpredictable powers of GIS (LandCover_stats), and chlorophyll/AFDM data for 3 field sites (Chl_a_afdm). On top of this, a word document is included that walks you through all of the methodology used for the GIS analysis as well as the algae sampling that I have done (Methodology_DN). This document also has the protocols that I have used for chlorophyll/AFDM /Tres_Rios WWTP sample processing.

5.) Monica, your MIMS samples are still in the freezer in the Grimm Lab. I made an excel file to keep track of them, which can also be found in "Dave_REU"

Specific:

1.) As I mentioned above, I have excel models for all pipesheds except North Central (simple rating curve). I have also made R models with the same information in code form for all models except North Central. North Central data can be brought into R to make the simple rating curve, however. R is better for visual analysis/slight of hand, which is why these were created. **The last two lines of code in the R models are used to visualize data over time as well as to create the rating curves for 7th, 35th, and South Central pipes.** Rating curves were not constructed in the excel models for two reasons. One is because of these data being in chronological order and the other is to make it easier to upload future data. These data can be sorted, however, and the curves can be very easily constructed.

2.) I have obtained past ISCO data from the StormwaterShared folder. This data was uploaded by Monica in a folder called "ISCO water level data 2015-2017". I have added these data to my models for South Central and

7th Ave. All of these data are in chronological order, making it easy to find a specific date. 35th Ave has fewer measurements than the other models because there is less data available. I did come across a gentleman working for the city of Phoenix who referred me to his supervisor when asked if there is any pre-existing water level data. His name is Jesus Portillo and his number is 602-256-3511.

3.) The data from the folder mentioned above included water level data with units in "mm". I have converted all of the data to meters. It is CRUCIAL that data units are in meters before entering them into the models. If not, discharge measurements will be inaccurate. It is ALSO crucial that "DateTime" data is formatted correctly (mm/dd/yyyy hh:mm). If this is not the case, R will not recognize the data as date and time, preventing temporal analysis. An ISCO collects in this format automatically but any manual measurements entered must have an exact date and time associated with them.

4.) In the R code for South Central, I have corrected the ISCO depths based upon manual measurements. I have added an additional 1.26 cm to every measurement to account for the ISCO bubbler positioning in the pipe. The bubbler does not touch the bottom of the pipe, so manual measurements were used to find that difference. This was the only pipeshed in which I was able to do this, since I had both manual and ISCO depths for a specific date and time. This can also be done for North Central, but as I mentioned before there is no R model for this pipe.

5.) Monica, velocity measurements were obtained using two methods. The float test (using mainly Palo Verde seedcoats or vegetable chips) was used in the circular channels. I calculated how fast it takes for them to travel a meter (s/m). After 3 trials, measurements were averaged. Measurements were then divided by 1 to get units into m/s. Alternatively, the FlowTracker was used to calculate velocity at North Central. 3 measurements were taken on the flat of the channel (with a corresponding depth) and then averaged together.

5.) If anyone is curious or wants to look at the FlowLink data which includes water levels and sampling events, it is all located on the laptop that I have been using since June. Data exists from June 23rd until my last download, August 24th, for North and South Central. The laptop can most likely be obtained by tracking down Quincy or Shero, my expert field buddies. They are cc'd.

6.) If anyone has questions or concerns about my methodology, please feel free to contact me. This includes any questions on pipe schematics, manning's equation, GIS layers or methods, manual measurements, R code, etc.

It has been such a great experience working with all of you and I am so thankful for this experience. Monica, thank you so much for offering me this position. I have been surrounded by the skeptics/problem solvers that I plan to surround myself with in my future, so thank you all for being the open minded individuals that you have proven yourselves to be.

ps. The picture attached is something to remember me by

Nothing but respect and best regards,

~Dave

Stevan Earl <stevan.earl@asu.edu>
To: Sally Wittlinger <salwitt@asu.edu>

Fri, Aug 25, 2017 at 1:12 PM

I would say confusion has arisen so where is the key, and is he going to generate a report?

"2.) I have made a key in word document format for every file in this folder (Stormwater_key) which is also located in the folder. This will help identify all files and their content if confusion arises."

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Sally Wittlinger <salwitt@asu.edu>
To: Stevan Earl <stevan.earl@asu.edu>

Fri, Aug 25, 2017 at 1:37 PM

Hi Stevan,

I think he put one set of files in Lauren McPhillips' "portable drive." It seems the key is in there, but I will ask Dave to drop a copy in to the Dropbox folder as well.

I checked with Mark and the REUs are not required to generate a report of their work. They just give a short presentation to summarize what they have done, which he did along with the other REUs a couple of weeks ago. I think beyond this, it is between them and their mentor(s), in this case Monica Palta and Lauren McPhillips, what they turn in.

Sally

From: Stevan Earl [mailto:stevan.earl@asu.edu]
Sent: Friday, August 25, 2017 1:13 PM
To: Sally Wittlinger <salwitt@asu.edu>
Subject: Re: FW: Final REU summary

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Stevan Earl <stevan.earl@asu.edu>
To: Sally Wittlinger <salwitt@asu.edu>

Fri, Aug 25, 2017 at 1:57 PM

Okay, sounds like we need to get that and any other materials that he has not included. Not that a report is necessarily a requirement, but I was hoping for one as it would help me document what he has one - otherwise, I have to wade through this mess.

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Sally Wittlinger <salwitt@asu.edu>
To: Stevan Earl <stevan.earl@asu.edu>

Fri, Aug 25, 2017 at 2:20 PM

Are you interested in the methods he used to create the ratings curves or parameters for Manning's equation? Maybe I could get him to write these up (or maybe he already has). I am not sure what Monica and Lauren required of him. I am assuming that Monica would need the same information from him for any forthcoming papers where she uses this information.

Sally

From: Stevan Earl [mailto:stevan.earl@asu.edu]
Sent: Friday, August 25, 2017 1:57 PM

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Stevan Earl <stevan.earl@asu.edu>
To: Sally Wittlinger <salwitt@asu.edu>

Fri, Aug 25, 2017 at 2:23 PM

Well, try to think about it from the perspective of someone (other than us) wanting to use these data - what would you want to know about how these curves were generated? That is what I need to document.

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Sally Wittlinger <salwitt@asu.edu>
To: Stevan Earl <stevan.earl@asu.edu>

Fri, Aug 25, 2017 at 2:24 PM

Just sent an email to him asking him if this document already exists. As I said, it seems Monica would need this information too.

From: Stevan Earl [mailto:stevan.earl@asu.edu]
Sent: Friday, August 25, 2017 2:23 PM

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Sally Wittlinger <salwitt@asu.edu>
To: Stevan Earl <stevan.earl@asu.edu>

Fri, Aug 25, 2017 at 2:40 PM

Is this helpful? I'll get the Stormwater key from Lauren next week.

Sally

From: David Nardelli [mailto:dnardelli@s.paulsmiths.edu]

Sent: Friday, August 25, 2017 2:36 PM
To: Sally Wittlinger <salwitt@asu.edu>
Subject: Re: Final REU summary

Hi Sally,

I actually left the office and am in the middle of packing for my early depart tomorrow. Lauren has the stormwater key on her drive and can send it early next week upon request.

I do not have methodology for the rating curves. But I can break things down right now for you:

1. Diameter and radius was measured at each pipe system.
2. Angle theta was then calculated by using the law of sines for each pipe system (Radius-depth gives us the necessary height of the hypothetical triangle in the circle sector).
3. It was then a matter of filling in pieces of the puzzle. Wetted width was calculated from the law of sines. Area, wetted perimeter, and the hydraulic radius was calculated using standard equations from a civil engineering guide that Lauren can also provide to you when she returns.
4. Slope was measured manually using a level and a meter stick in each pipe. 3 measurements were taken in order to be more certain of an accurate slope.
5. The roughness coefficient, n , was then estimated based upon pipe material (guide was online also). I used the depth and velocity measurements to double check that I was close to the appropriate value. Estimations are on the StormwaterShared google drive.
6. All parameters were plugged into excel as formulas and the model was calculated (if you click on the cells you can see the equations used as well as the constants)

~Dave

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From: Sally Wittlinger <salwitt@asu.edu>
Sent: Friday, August 25, 2017 1:39:52 PM
To: David Nardelli
Subject: RE: Final REU summary

Hi Dave,

Would you please put a copy of the Stormwater_key document in to the Stormwater Dropbox folder. I sent your email on to the CAP LTER Information Manager, Stevan Earl, and he is asking for it.

Thanks so much.

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Stevan Earl <stevan.earl@asu.edu>
To: Sally Wittlinger <salwitt@asu.edu>

Fri, Aug 25, 2017 at 2:42 PM

Thanks, Sally. Every bit helps! S
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Sally Wittlinger <salwitt@asu.edu>
To: Stevan Earl <stevan.earl@asu.edu>

Thu, Aug 31, 2017 at 12:25 PM

Hi Stevan,

The Stormwater_key document is now in the Dropbox folder. Lauren is just starting to look over the documents Dave left and will let us know if there is anything else that we need. Let me know if you find there is something else you need.

Sally

From: Lauren McPhillips
Sent: Thursday, August 31, 2017 12:14 PM
To: Sally Wittlinger <salwitt@asu.edu>
Subject: Re: Final REU summary

Hi Sally,

I added the Stormwater_key document to the Dave_REU folder in the Storm water dropbox.

Once I get a chance to delve through Dave's files a bit more, I'll see if there's anything else that makes sense to add.

-Lauren

--

Lauren McPhillips
Postdoctoral Research Fellow

[Urban Resilience to Extremes Sustainability Research Network](#)

Julie Ann Wrigley Global Institute of Sustainability

Arizona State University

P.O. Box 875402 | Tempe, Arizona | 85287-5402

Cell: 607-269-7732

Email: Lauren.McPhillips@asu.edu

lmcphillips.weebly.com

From: Sally Wittlinger
Sent: Monday, August 28, 2017 10:40:08 AM
To: Lauren McPhillips
Subject: FW: Final REU summary

Hi Lauren,

Can we please get a copy of the Stormwater_key document in case we need it. I asked Dave on Friday, but he was already gone from the office and packing. You could either send it directly to me or put it in the Stormwater Dropbox folder and let me know, whichever is easier for you.

Thanks so much.

Sally

Sally Wittlinger

Site Manager

Central Arizona-Phoenix Long-Term Ecological Research Program, caplter.asu.edu

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Stevan Earl <stevan.earl@asu.edu>
To: Sally Wittlinger <salwitt@asu.edu>

Thu, Aug 31, 2017 at 12:29 PM

Awesome, thank you. I am meeting with Lauren in just a bit and will try to remember to ask her about this.

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Sally Wittlinger <salwitt@asu.edu>
To: Stevan Earl <stevan.earl@asu.edu>

Thu, Aug 31, 2017 at 12:33 PM

Ok, great.

From: Stevan Earl [mailto:stevan.earl@asu.edu]
Sent: Thursday, August 31, 2017 12:30 PM
To: Sally Wittlinger <salwitt@asu.edu>
Subject: Re: FW: Final REU summary

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