Proposal:

Cameron Powers, 5/10/17

High-level description: I will be analyzing the prairie dog colonies data from the Boulder Open Data project in an attempt to identify prairie dog colonies via aerial images, clustering the different areas together and predict the perimeter and areas for each cluster.

I am going to be presenting my work in a presentation/slides fashion.

Possibilities:
-NAIP images which have a one-meter resolution and should contain the metadata need for the geo-reference and allow for band manipulation for easier identification of colonies and training, debating if I should use all bands or a single band (grey scale) for simplicity.

-Ping the GE URL for each coordinate and take a screenshot. This technique would result in higher resolution; it appears to be 1ft by 1ft pixels but trying to verify this.

Data:
Boulder Prairie Dog Data:
https://bouldercolorado.gov/open-data/city-of-boulder-osmp-prairie-dog-colonies/

Image Data Sets via EE:
https://earthengine.google.com/datasets/

Pipeline:

I am still trying to decide on a technique on how to identify the colonies, my first thought is to train a neural network on a large set of images containing prairie dog colonies. Please give me some insight if you feel there is a more appropriate way to

accomplish this. I want my neural network to identify these mounds in the image and return the location in the image.

Once I have these locations I will use hierarchical clustering to group together the colony/colonies. I want to use this type of clustering so I don't have to define the possible number of colonies within one photo before hand. Once they are clustered I am hoping to use shapely to define the boundaries to and ultimately calculate the perimeter and area.

Possible Issues:

There are many possible issues that could arise, for one I am not sure exactly how to get the neural network to identify these mounds. If I can get it to identify the mounds I will be using imagery that is highly magnified (containing only partial areas) when ultimately I want to predict the area of the whole group of mounds (less magnified images). I am unsure how to verify how well my neural net is classifying these mounds without visualizing conformation, would I have to count the mounds? All of these issues would have to be solved now. Training my model on less magnified images could solve the magnification issue, but this might affect the models ability to pick up mounds.

Goals:

In the time frame we have I hope to train a neural net to identify prairie dog colonies and be able to cluster the different colonies into groups at a minimum. I am shooting for a completed project, that being one which can make predictions about the area and perimeter.

	A	B	C	D	E	F	G	H	I
47	133	Eisenberg	40.06966184	40.06968383	40.06968759	40.06968232	40.06967991	40.06970101	40.06972191
48	35	East Beech -	40.10186072	40.10193767	40.10194035	40.10203325	40.10206358	40.10209744	40.10210109
49	34	East Beech	40.08931613	40.08933612	40.08938188	40.08948288	40.08974361	40.08978929	40.08975499
50	122	Waldorf	40.17454275	40.17454689	40.17456123	40.17457772	40.17457439	40.17456574	40.17456037
51	12	BLIP_ East Be	40.08686122	40.08687942	40.08689406	40.08691183	40.08693890	40.08694258	40.08694374
52	43	Gilbert	40.07997916	40.07997953	40.07997954	40.07997996	40.07998086	40.08000124	40.08000875
53	123	Bennett	40.14478437	40.14478520	40.14478730	40.14479251	40.14479408	40.14479713	40.14479723
54	75	NU West	40.05349984	40.05352389	40.05352989	40.05355686	40.05358627	40.05358760	40.05359231
55	32	Dodd	40.11456985	40.11457653	40.11458763	40.11459935	40.11460949	40.11461566	40.11461819
56	1	Abbott	40.12692566	40.12692731	40.12692910	40.12693101	40.12693830	40.12694839	40.12695905
57	107	Teller Farms	40.01900732	40.01900999	40.01919387	40.01940123	40.01942832	40.01949813	40.01951180
58	99	Superior Ass	39.93261369	39.93264159	39.93267108	39.93270084	39.93270222	39.93272220	39.93274174
59	87	Sams Lane /	39.97215193	39.97217462	39.97219030	39.97219903	39.97222864	39.97225000	39.97227792
60	112	Van Vleet - w	39.97924197	39.97925980	39.97926684	39.97927519	39.97927711	39.97927802	39.97927956
61	70	McKenzie - s	40.04052244	40.04055733	40.04059178	40.04059886	40.04063486	40.04065400	40.04080840
62	19	BVR 103 Cor	40.07345514	40.07347403	40.07348541	40.07348811	40.07350241	40.07351298	40.07351587
63	60	Johnson - Mc	40.09477090	40.09479607	40.09482303	40.09484997	40.09487635	40.09490325	40.09493010
64	37	East Rudd - s	39.94291722	39.94292360	39.94294628	39.94294635	39.94294851	39.94295257	39.94295286

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1	FID	PD_ID	Comment	Year	Name	Acres	Hectares	Plague	Manager	Perimeter	Activity	YearAcquir	sdeWildlif	Shape_area	Shape_len	
2	0	126		2009	Brewbaker	30.0137966	12.1461526		OSMP	17407.1275	2	1996	1307395.39	1307395.75	17407.1328	
3	1	26		2009	Cowels	5.45024723	2.2056368		OSMP	2875.4755	2	1991	237411.881	237411.82	2875.4755	
4	2	136		2009	Sams Lane/V	6.34678488	2.56845271		OSMP	4246.33217	2	1978	276464.844	276464.843	4246.33217	
5	3	68		2009	Marshall	47.677422	19.2943681		OSMP	10818.6033	2	1997	2076820.14	2076820.19	10818.6049	
6	4	38		2009	ERNI	16.9600379	6.86348382		OSMP	5580.87147	2	1967	738776.314	738776.295	5580.87125	
7	5	74		2009	Moore	12.1697543	4.92492484		OSMP	4263.22057	2	1974	530112.447	530112.378	4263.22126	
8	6	67		2009	Mann	4.67766033	1.89298198		OSMP	2176.65426	2	1973	203758.054	203758.069	2176.65427	
9	7	94		2009	Steele - soutl	35.0903023	14.2005415		OSMP	13426.2973	2	1999	1528527.51	1528527.45	13426.2965	
10	8	108		2009	Ute	61.6707467	24.9572657		OSMP	17969.1167	2	1995	2686366.98	2686366.98	17969.1164	
11	9	95		2009	Steinbach	14.8924383	6.02675594		OSMP	5153.90931	2	1984	648711.982	648712.016	5153.90933	
12	10	64		2009	Kolb I	4.13034287	1.67149046		OSMP	3715.88627	2	1985	179917.026	179917.016	3715.88627	
13	11	119		2009	Wood Brothe	51.1959053	20.7182478		OSMP	7820.46184	2	1974	2230084.73	2230084.71	7820.4629	
14	12	66		2009	Manchester	0.10290918	0.04164587		OSMP	320.748604	2	1999	4482.70601	4482.70601	320.748604	
15	13	83		2009	Rudd	25.1829596	10.1911822		OSMP	4958.19518	2	1975	1096965.35	1096965.33	4958.1952	
16	14	135		2009	Damyanovicl	1.4781683	0.59819349		OSMP	1997.05739	2	1995	64388.7528	64388.7536	1997.05739	

My back up project is with New Belgium:

The goal will be to identify taster flavor specializations for each employee, mapping out what compounds they struggle with and others they excel with. I would present my work in a slide/presentation style. My next step would be to obtain the data from Matt if necessary. I have spoken with Matt and he is waiting to hear from me if my other project falls through in order to obtain the data for the project.