M2M UCSB TEAM FIELD UPDATE

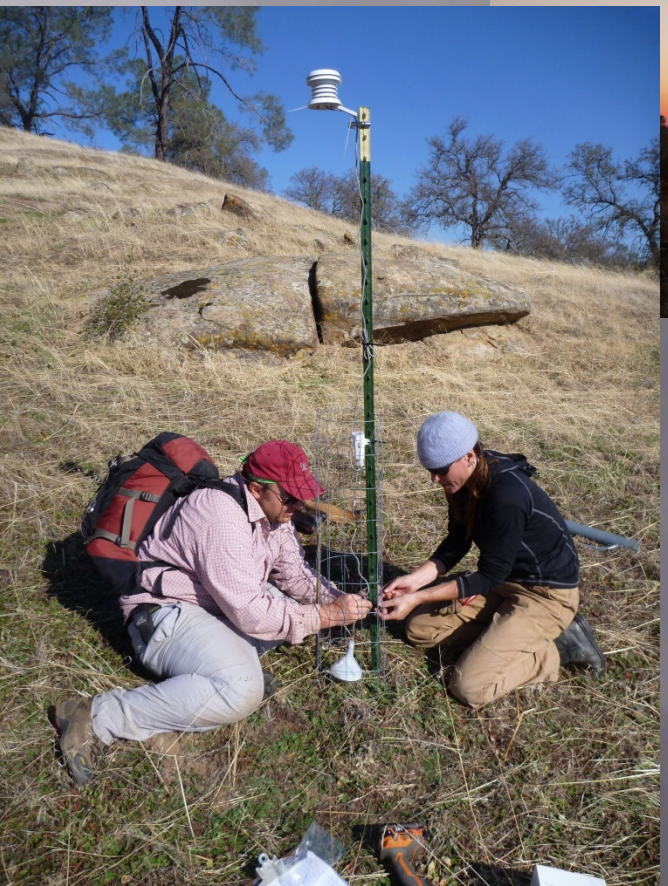
Grant Objectives

- 1d: Measurement of conditions in microenvironments to validate physical model
- 2b: Determine species establishment phase sensitivities across microenvironments

December 14, 2011 Conference Call

Recent Progress

Field Installation Completed!



San Joaquin Field Site

North Garden 1

Valley Garden 1

South Garden 1

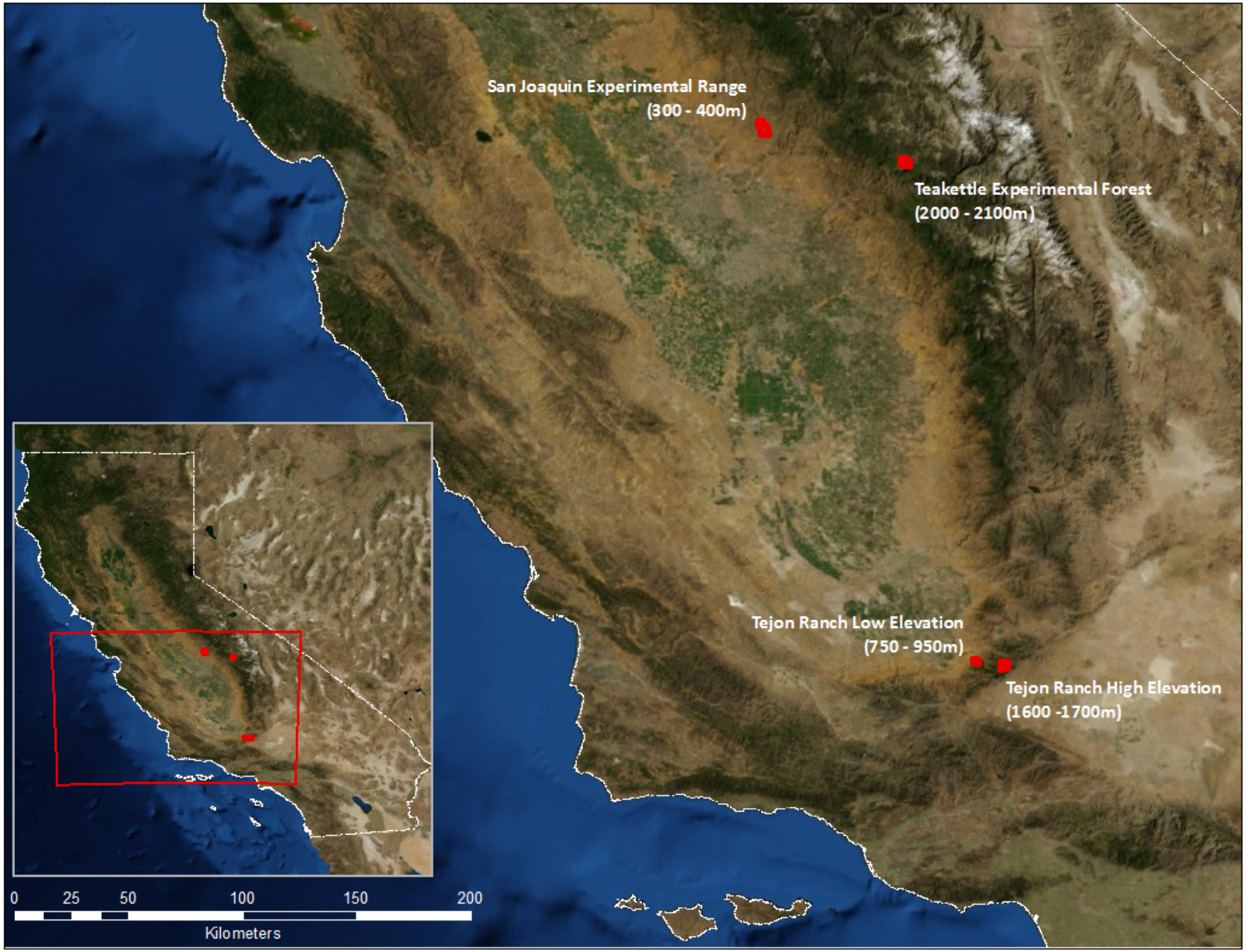
North Garden 2

Valley Garden 2

South Garden 2

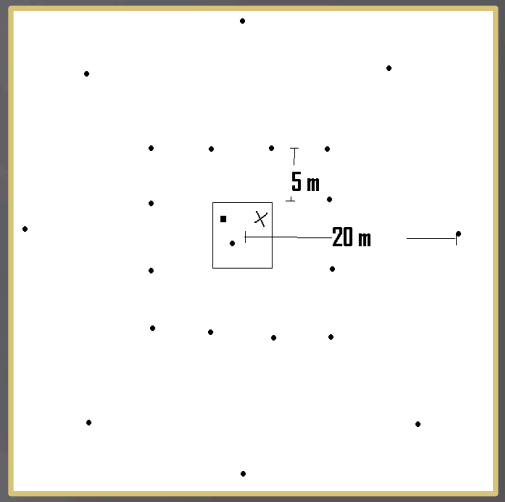
2011 Field Installation Summary

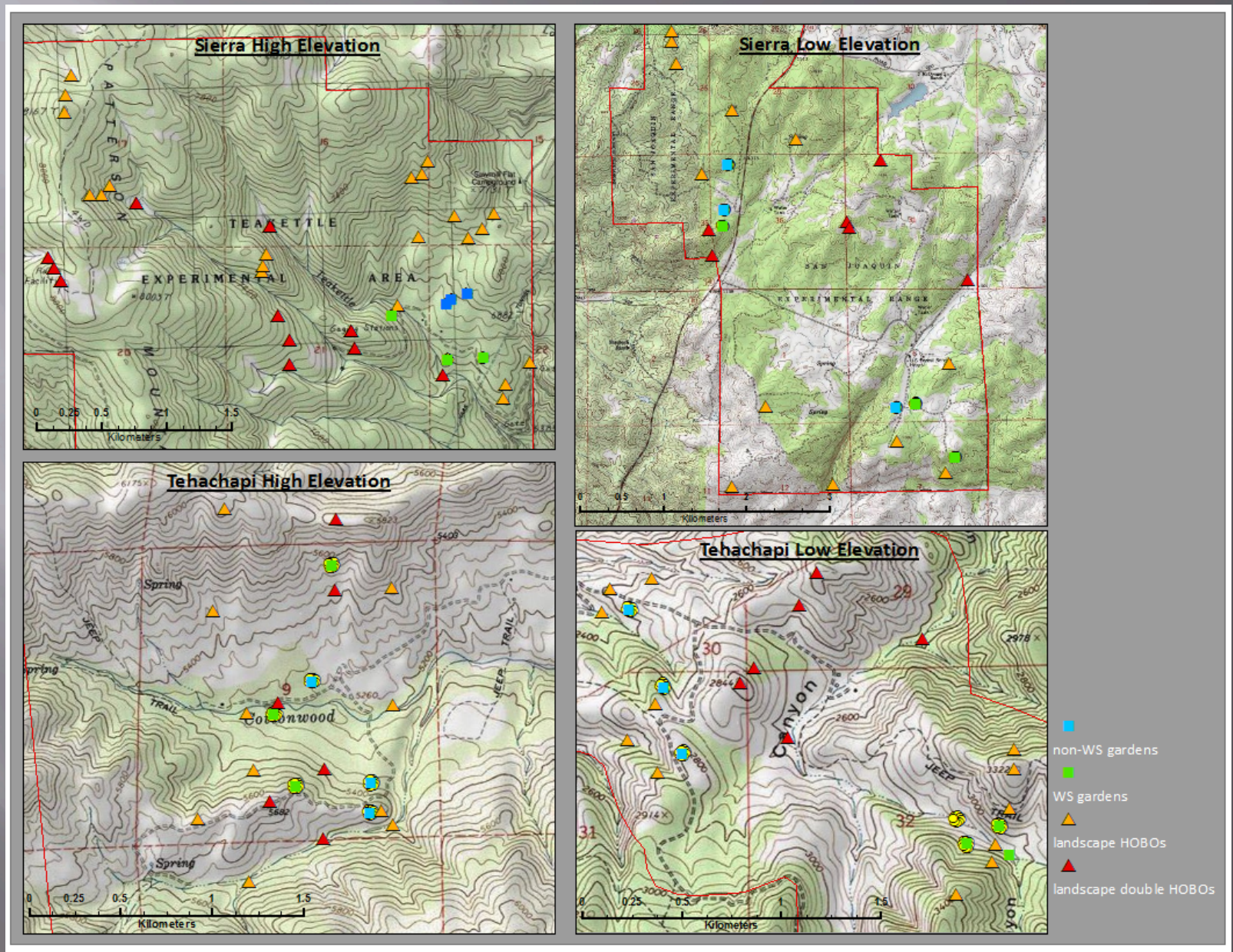
- 4 Sites
  - Tehachapi Range
    - Tejon Ranch Low Elevation
    - Tejon Ranch High Elevation
  - Sierra Range
    - San Joaquin Experimental Range– Low Elevation
    - Teakettle Experimental Forest– High Elevation


San Joaquin Experimental Range
(300 - 400m)
Teakettle Experimental Forest
(2000 - 2100m)
Tejon Ranch Low Elevation
(750 - 950m)
Tejon Ranch High Elevation
(1600 -1700m)
0 25 50 100 150 200
Kilometers

2011 Field Installation Summary: Sensors

- 4 sites
  - 6 common garden locations per site sampling heterogeneity
  - At all 6 gardens
    - 20 HOBO temperature sensors total
      - Layout: inner (15x15m) and outer (40x40m) rings
      - Readings of temp at 10-minute intervals
  - 3 gardens per site
    - Onset weather stations
      - Sierra High site readings are at 3m (for snow)
      - At all other sites readings are at 2m
      - Temperature (@5cm and 2m/3m), solar radiation, wind speed, precipitation, relative humidity, soil moisture
      - Readings at 10-minute intervals
  - Remaining 3 gardens
    - 2 HOBO temperature sensors (5cm and 2m/3m)




Sierra High Elevation
PATTERSON
TEAKETTLE
EXPERIMENTAL
AREA
Teakettle
MOUNTAIN
0 0.25 0.5 1 1.5
Kilometers
Sierra Low Elevation
SAN JOAQUIN
EXPERIMENTAL RANGE
0 0.5 1 2 3
Kilometers
Tehachapi High Elevation
Spring
JEEP TRAIL
Cottonwood
Spring
0 0.25 0.5 1 1.5
Kilometers
Tehachapi Low Elevation
Canyon
JEEP TRAIL
0 0.25 0.5 1 1.5
Kilometers
non-WS gardens
WS gardens
landscape HOBOs
landscape double HOBOs

2011 Field Installation Summary: Propagules

- At each garden
  - 5 species planted into 0.5x1m single-species plots
    - 50% of seeds from Sierra and 50% from Tehachapi
  - 50 seeds per plot and two replicate plots

- *Quercus kelloggii* (black oak) (montane)
- *Quercus douglasii* (blue oak) (foothills)
- *Pinus sabiniana* (gray pine) (foothills)
- *Pinus jeffreyi* (Jeffrey pine) (montane)
- *Pinus ponderosa* (ponderosa pine) (montane)

- Year 1 planting complete
- Plots for subsequent year plantings set up

2011 Field Installation Summary:

Garden Site Selection and Layout

2011 Field Installation Summary:

Trenching and Pounding

2011 Field Installation Summary:

Fencing and Rodent-proofing

2011 Field Installation Summary:

More Fencing and Rodent-proofing

2011 Field Installation Summary:

Sensing (Weather Stations)

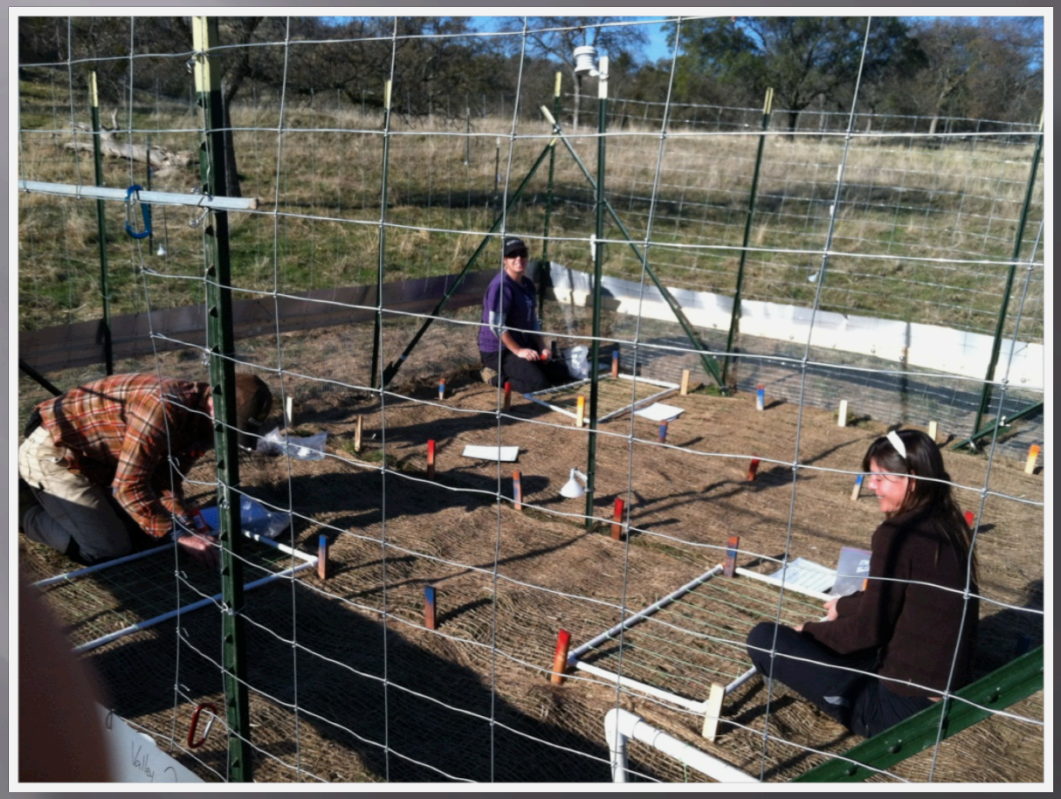
2011 Field Installation Summary:

HOBO-ing

2011 Field Installation Summary:

Vaca cages protect sensors from itchy vacas

2011 Field Installation Summary:



Planting

2011 Field Installation Summary:

Finished!!!

2011 Field Installation HOBO and Seeds Summary Table

	Garden	Site	Project
Class 1 Sensors (inside garden)	2	12	48
Class 2 Sensors (15x15m square)	12	72	288
Class 3 Sensors (40m radius circle)	8	48	192
Class 4 Sensors (site landscape array)	--	24*	117
Weather Stations	1**	3	12
Species	5	5	5
Seeds***	350	2100	8400
Grand Total Number of Sensors		156	645

* Each site had 24 landscape sensors; excepting Sierra High (Teakettle), which had 45 sensors

** Half of the gardens at a site have weather stations

*** Due to availability of seeds, Year 1 gardens missing Sierra zone black oak seeds, Tehachapi zone ponderosa and Jeffrey pine seeds

Installation Timeline

PROJECT NAME: m2M

PROJECT MANAGER: Frank Davis

	Tasks	First Day	Last Day	Cal Days
		Year		2011
		Month		Jul Jul Jul Aug Aug Aug Aug Sep Sep Sep Sep Oct Oct Oct Oct Oct Nov Nov Nov Nov Dec
		Week #		30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50
		Cal Days		7/17 7/24 7/31 8/7 8/14 8/21 8/28 9/4 9/11 9/18 9/25 10/2 10/9 10/16 10/23 10/30 11/6 11/13 11/20 11/27 12/4
1	Sierra High (Teakettle)	7/19	10/19	93
1.1	Garden Construction	7/19	8/17	10
1.2	Sensing	8/18	8/25	6
1.3	Seed Collection	10/11	10/18	4
1.4	Garden Planting	10/17	10/19	3
1.5	Data Download	10/17	10/19	3
1	Tehatchapi High (Tejon Ranch)	9/7	10/21	45
1.1	Garden Construction	9/7	9/12	7
1.2	Sensing	9/18	9/21	4
1.3	Seed Collection	10/11	10/12	4
1.4	Garden Planting	10/20	10/21	2
1.5	Data Download	10/20	10/21	2
1	Tehatchapi Low (Tejon Ranch)	10/9	11/17	40
1.1	Garden Construction	10/25	11/4	8
1.2	Sensing	11/7	11/17	5
1.3	Seed Collection	10/9	10/11	4
1.4	Garden Planting	11/15	11/17	3
1.5	Data Download			
1	Sierra Low (San Joaquin Rangeland)	10/10	12/8	60
1.1	Garden Construction	11/28	12/2	5
1.2	Sensing	11/30	12/6	7
1.3	Seed Collection	10/10	10/17	2
1.4	Garden Planting	12/6	12/8	3
1.5	Data Download