Using CalFlora to Map and Monitor Weeds

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Why Monitor?

• We monitor weeds to know how much work we have before we tackle a project
• To track our progress managing infestations
• To know what weeds are coming our way
• To follow IPM (Integrated Pest Management) methods
Water, water everywhere...

- Up until the recent past (~10 years) we did not have enough data or accessibility to data to really monitor weeds at scale.
- Before then the most reliable data was held by herbaria.
California Consortium of Herbaria (CCH)

• Holds records for over 2.2 million specimens
• Began in 2003*
• Specimens must be vouchered by an herbarium
• Includes nearly all the old specimens collected by early botanists
CCH

• It functions as a scientific repository
• Used as a way to measure what this species is (type specimen)
• Specimens do not compare to pics
Herbaria have significant limitations
Herbaria can’t take all the specimens they want
They can’t take numerous copies of every species on your preserve
You don’t want to spend the time making vouchers for every species or population on your preserve
• There’s got to be a better way!
Tools To Monitor Organisms

- iNaturalist
- CalFlora
- ESRI Collector
- iMapInvasives
- Map of Life
- Project Noah
- eBird/Merlin
- Light Pollution Map
Several Tools To Monitor Weeds

• iNaturalist – Collect all organisms, helps to ID species,
• CalFlora – Collect plant data, input data for land management
• ESRI Collector – Collect all types of field data, not just for land managers
• iMapInvasives – I don’t really know what it does, it might be good
CalFlora

• CalFlora is one of the most comprehensive and well used plant databases in the US, started in 2000.
• CalFlora is free to use
• No registration required to use the website
• Must set up a free account (email) to use CalFlora app - Observer Pro
CalFlora

• 501(c)3 non-profit with 6 team members
• Executive Director is Cynthia Powell
• Created/developed/maintained by California plant enthusiasts
• Independent from Cal-IPC, CNPS, CalPhotos, UC Jepson, herbaria, iNaturalist, ...
What Does CalFlora Do?

Search for any plant in database using common or scientific name or partial name.
What Does CalFlora Do?

Show/List plants in your county or multiple counties, or species in your county(ies).
What Does CalFlora Do?
What Does CalFlora Do?

Search for Plants

plant name

duration

status

community

result format

Search by plant type:
grass, vine, tree, ...
Search by plant classes
Monocot, dicot, bryophyte
What Does CalFlora Do?

Or a combination of these things

Cal-IPC listed Invasive perennial Poaceae in San Diego County
Cal-IPC listed Invasive perennial Poaceae in San Diego County Returns 28 species!

28 matching records.

Searching for: name like poaceae • county: San Diego • duration: Perennial • Cal-IPC listed

Click on the Scientific Name to see a Taxon Report.

**Agrostis avenacea**
*Pacific bentgrass*
*invasive non-native*
*Perennial grass*

© 2001 Joe D/Tomaso
© 2008 Zoya Akulova
© 2012 Robert Steers

**Agrostis stolonifera**
*Redtop*
*invasive non-native*
*Perennial grass*

© 2008 Kari Morse
© 2006 Barry Rice

**Alopecurus pratensis**
*Meadow foxtail*
What are some of the deeper semi-professional functions?

What plants grow in your area? “What Grows Here”
What Grows Here?

What plants grow at Torrey Pines?
What plants grow at Torrey Pines? Near the Golf Course?
What plants grow at Torrey Pines Near the Golf Course?
What plants grow at Torrey Pines? Near the Golf Course?

*Ehrhata calycina*
One more cool semi-professional function

What plants will you see on your travels?

“Great Places”
<table>
<thead>
<tr>
<th>NAME</th>
<th>AREA</th>
<th>DENSITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Riverside-Corona Resource Conservation District LandUse</td>
<td>3 acres</td>
<td></td>
</tr>
<tr>
<td>native habitat demonstration garden</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blue Lake</td>
<td>823 acres</td>
<td>0.015</td>
</tr>
<tr>
<td>Lassen National Forest, Rhodes Meadow, Chummy Meadows, Spencer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sugarloaf Ridge State Park (CDPR)</td>
<td>2,907 acres</td>
<td>0.150</td>
</tr>
<tr>
<td>Redwood forest, headwaters of Sonoma Creek</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kaweah Oaks Preserve</td>
<td>317 acres</td>
<td>0.647</td>
</tr>
<tr>
<td>Gold Bug Park - Placerville, CA</td>
<td>58 acres</td>
<td>0.296</td>
</tr>
</tbody>
</table>
GREAT PLACES TO VIEW NATIVE PLANTS

CNPS Chapter Sierra Foothills

- Torrey Pines State Reserve (CDPR)
  chaparral, ocean, bluffs
  1,442 acres

- Grizzly Gulch Road
  Whiskeytown NRA
  321 acres

- Caspers Wilderness Park
  Orange County Regional Parks, Oak woodlands, Coastal Sage Scrub
  7,617 acres

- Millville Plains
  vernal pools, layia fremontii, private property, driving tour
  4,499 acres

- Knowland Park
  City of Oakland, Valley Needlegrass Grassland, Maritime Chaparral
  458 acres

- Iron Mountain and Ellie Lane Trails
  Poway, chaparral
  1,646 acres

- Horsetail Falls Pyramid Creek
  easy hike children-friendly gorgeous
  547 acres

- Azalea Hill to Carson Falls
  Mount Tamalpais, Marin Municipal Water District, serpentine
  154 acres

- Los Penasquitos Canyon Preserve
Iron Mountain and Ellie Lane Trails

ABOUT
A nice hike through chaparral with a good diversity of plants and some great views.

THE PLACE

View from Ellie Lane Trail 2016 Keir Morse

View from Ellie Lane Trail 2016 Keir Morse

THE PLANTS

Grasslike 4
Annual Herb 47
Perennial Herb 48
Shrub 39
Tree 7
Vine 5
Fern 8

† indicates a reference photo of the plant from CalPhotos, not taken at this location.
What are some of the deeper ‘professional’ functions?

• When you register with CalFlora you can:
  • Add your own observations (public or private observations)
  • Form a group so your group can share observations
  • Form a group so you can be alerted to new observations
  • Receive email alerts about a species observation in a specific area or the entire state
  • Show species observations on your smart phone so you can go walk to it in the field
  • And many more...
Observations to help management priorities

• Looking up observations (made in the past)
  I am concerned about a particular species
  I am concerned about a place

• Adding observations - you would do this, most likely on your smart phone,
  can be done online
  I want to record a species that I am seeing
The Observation Hotline is the main page for accessing observation data from CalFlora.
The Observation Hotline is the main page for accessing observation data from CalFlora.
Search for *Oncosiphon piluliferum* aka Stinknet in map area
I entered stinknet in the plant name search box and this page comes up.
I entered stinknet in the plant name search box and this page comes up

Oncosiphon piluliferum

invasive non-native
Annual herb
Oncosiphon piluliferum, a dicot, is an **annual herb** that is **not native** to California. There is a high risk of this plant becoming invasive in California according to Cal-IPC.
Oncosiphon piluliferum, a dicot, is an annual herb that is not native to California. There is a high risk of this plant becoming invasive in California according to Cal-IPC.
Scientific Name
Oncosiphon piluliferum

Status (native or not)
any

Common Name
Stinknet

Start Date
End Date
Observer

Other Sources
include surveys/checklists

Location Description

Columns
Basic Data

customize

Click on ID to select a record. Click on column title to sort.

ID
Plant
Photo
Observer
Source
Date
County
Location Description

io12951
Oncosiphon piluliferum
Stinknet
Charles Adams
2019-05-23
San Diego
<table>
<thead>
<tr>
<th>ID</th>
<th>Plant</th>
<th>Photo</th>
<th>Observer</th>
<th>Source</th>
<th>Date</th>
<th>County</th>
<th>Location Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>io12951</td>
<td>Oncosiphon piluliferum</td>
<td><img src="image1" alt="Plant Image" /></td>
<td>Charles Adams</td>
<td></td>
<td>2019-05-23</td>
<td>San Diego</td>
<td>Stinknet</td>
</tr>
</tbody>
</table>
**Plant Name**: Oncosiphon piluliferum  
*Stinknet*

**Observer**: Charles Adams  
**Date**: 2019-05-23  
**County**: San Diego  
**Coordinates**: 32.75383, -117.19842

**Number of Plants**: 2 - 10  
**Phenology**: Flowering

**Calflora ID**: io12951  
**Added**: 2019-05-23  
**Group**: State Parks Weed Managers  
**Location Quality**: HIGH (2)  
**Error Radius**: 10.0 meters  
**Context**: Other Plant Observations at this location

**What Grows Here?**
Let's learn more about this observation.
Viewing io12951

entered on 2019-05-23 by Charles Adams

Group
State Parks Weed Managers

Access by others
published

Project
Advanced data collection

Shape
none

Point Location

ADVANCED DATA COLLECTION

Scientific Name *
Oncosiphon piliferum

Common Name
Stinknet

Observer *
Charles Adams

Observation Date *
2019-05-23 09:24:46

Notes

Radius / Buffer (meters)

Location Description

Habitat

Number of Plants
2 - 10

Distribution
Isolated Patch

Percent Cover

Management Status

[Map] Satellite
Group: State Parks Weed Managers

Project: Advanced data collection

Photos:

© 2019 Charles Adams

Natural Status: WILD

Collection / Survey #: recognized from prior determination

Plant Identification: Gross Area

Ownership: Elevation

Region: Map Data

Terms of Use | Report a map error

© 2019 Charles Adams

© 2019 Calflora

© 2019 California Native Plant Society

Chris McDonald EDIT - SIGN OUT

Map Layers

Satellite

32.75383, -117.19842
If you are concerned about a particular species

This is the way to find out the details of its current spread and extent

Adding management data to your observations will help others just like you
Observations to help management priorities

- Looking up observations (made in the past)
  - I am concerned about a particular species
  - I am concerned about a place

- Adding observations (you would do this, most likely on your smart phone)
  - I want to record a species that I am seeing
What is on my preserve?
What is on my preserve?

I zoomed in the map to Mission Trails Regional Park
Over 800 species observed on, or near Mission Trails
Where are the weed species?
Where are the weed species?
Click icon palette, set to status, Click display on invasive
We now see the location of every invasive species with an observation.
Click on the map to choose a location.

Record Details:
- Taxon: *Centaurea solstitialis*
- Date: 2017-01-01
- Source: San Diego County Ag (SDMMP)
- Observer(s): Giessow, Jason
- Location: 2: Mission Trails

**Plants with Icons**
- Rare
- Native
- Non-native
- Invasive

**ICON PALETTE**
- Rare
- Native
- Non-native
- Invasive

**LOCATION**
- Enter location name

**FORMAT**
- photo

**ORDER BY**
- Scientific Name

**LOCATION QUALITY**
- Any

**MINIMUM RECORDS / PLANT**
- 1 record

**RESULTS**

**AREA**

**POINTS**
- 532 points
- CLEAR POINTS
- STOP
Over 800 species observed on Mission Trails

Another way to look at just the weeds
Another way to look at just the weeds
Another way to look at just the weeds
Last recorded Arundo location on lower portion of MT is from 2012! Is there more?
Observations to help management priorities

• Looking up observations (made in the past)
  I am concerned about a particular species
  I am concerned about a place

• Adding observations (you would do this, most likely on your smart phone)
  I want to record a species that I am seeing
Observations to help management priorities

• Adding observations
• Why do you want to add observations?

• Track progress of a management or restoration project
• Track spread of a species
• Record diversity at a site
Observations to help management priorities

• Adding observations
• Why do you want to add observations?

• Track progress of a management or restoration project
• Track spread of a species
• Record diversity at a site
Volutaria tubuliflora

• Documented in Borrego Springs in 2010
• Highly invasive, 4 locations in US
• Native to Mediterranean, North Africa, Middle East
• Grows in semi-arid and arid landscapes
Searched all locations through 2015
22 records!

<table>
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<tr>
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<th>Source</th>
<th>Date</th>
<th>County</th>
<th>Location Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>wb1441-6</td>
<td>Volutaria tubiflora</td>
<td>none</td>
<td>Frank Harris</td>
<td></td>
<td>2015-02-13</td>
<td>San Diego</td>
<td>Borrego Springs area</td>
</tr>
<tr>
<td>wb1441-7</td>
<td>Volutaria tubiflora</td>
<td>none</td>
<td>Frank Harris</td>
<td></td>
<td>2015-02-13</td>
<td>San Diego</td>
<td>Borrego Springs area</td>
</tr>
<tr>
<td>wb1441-6</td>
<td>Volutaria tubiflora</td>
<td>none</td>
<td>Frank Harris</td>
<td></td>
<td>2015-02-13</td>
<td>San Diego</td>
<td>Borrego Springs area</td>
</tr>
</tbody>
</table>
### 2016

110 records!
(pink dots are polygons)

<table>
<thead>
<tr>
<th>ID</th>
<th>Plant</th>
<th>Photo</th>
<th>Observer</th>
<th>Source</th>
<th>Date</th>
<th>County</th>
<th>Location Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>wb1729-20</td>
<td>Volutaria tubiflora Egyptian knapweed</td>
<td>none</td>
<td>Frank Harris</td>
<td>Jason Giessow</td>
<td>2016-03-01</td>
<td>San Diego</td>
<td>17</td>
</tr>
<tr>
<td>wb1729-44</td>
<td>Volutaria tubiflora Egyptian knapweed</td>
<td>none</td>
<td>Frank Harris</td>
<td>Jason Giessow</td>
<td>2016-03-01</td>
<td>San Diego</td>
<td>4</td>
</tr>
<tr>
<td>wb1729-82</td>
<td>Volutaria tubiflora Egyptian knapweed</td>
<td>none</td>
<td>Frank Harris</td>
<td>Jason Giessow</td>
<td>2016-03-01</td>
<td>San Diego</td>
<td>20</td>
</tr>
</tbody>
</table>
2017
1045 records!

ID     Plant                      Photo      Observer      Source      Date      County      Location Description
--     -------------------------------------            -------      --------      -------      ----------
2018
1391 records
(2018 was a drought year)

<table>
<thead>
<tr>
<th>ID</th>
<th>Plant</th>
<th>Photo</th>
<th>Observer</th>
<th>Source</th>
<th>Date</th>
<th>County</th>
<th>Location Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>6805</td>
<td>Volutaria tubuliflora</td>
<td></td>
<td>Joe Woods</td>
<td></td>
<td>2018-12-25</td>
<td>San Diego</td>
<td>Unbuilt subdivision in Borrego Springs Resort</td>
</tr>
</tbody>
</table>
### Current Records

**2647 records**

<table>
<thead>
<tr>
<th>ID</th>
<th>Scientific Name</th>
<th>Photo</th>
<th>Observer</th>
<th>Source</th>
<th>Date</th>
<th>County</th>
<th>Location Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>wb1968-2</td>
<td><em>Volutaria tubiflora</em></td>
<td>none</td>
<td>Giessow, Jason</td>
<td>San Diego County Ag (CDFA)</td>
<td>2019-05-02</td>
<td>San Diego</td>
<td>Borrego Springs, San Diego County</td>
</tr>
<tr>
<td>wb1968-34</td>
<td><em>Volutaria tubiflora</em></td>
<td>none</td>
<td>Giessow, Jason</td>
<td>San Diego County Ag (CDFA)</td>
<td>2019-05-02</td>
<td>San Diego</td>
<td>Borrego Springs, San Diego County</td>
</tr>
<tr>
<td>wb1968-35</td>
<td><em>Volutaria tubiflora</em></td>
<td>none</td>
<td>Giessow, Jason</td>
<td>San Diego County Ag (CDFA)</td>
<td>2019-05-02</td>
<td>San Diego</td>
<td>Borrego Springs, San Diego County</td>
</tr>
</tbody>
</table>
How to make an observation?

• Open the Observer App on your smartphone
How to make an observation?

• Open the Observer App on your smartphone
• Log in with email and password
• SIGN IN BEFORE you lose cell service!
How to make an observation?

• Click select an organization – this is where groups are listed
• Most likely you are an independent
• (but if you are part of a group, this is where you enter it)
How to make an observation?

• Enter project
• Simple only has a few features
• Advanced allows to collect much more info on the plant you see
• Post-Fire (seems obvious)
How to make an observation?

• Click “observe” on bottom
How to make an observation?

• I’m seeing Black mustard
• *Brassica nigra*
• Select “plant”
How to make an observation?

• Select plant
• On top box enter scientific or common name (use drop down to select between two options)

FYI, I don’t have an android smartphone, and the screen shot I have is for arundo.
How to make an observation?
• Select your species (*Brassica nigra* in this case)
How to make an observation?

• The Observation page will appear

I don't have an android screen shot for this
How to make an observation?

- Press “Picture” and take a GOOD picture of the plant
- Take several pictures, its ok
- If you are unsure of the species take
  - 1 Whole plant
  - 2 Flower and/or Fruit
  - 3 Leaf
How to make an observation?

• Now scroll down page

• Add notes (optional)

• You **MUST** click on the “Map*” under location
How to make an observation?

- You **MUST** click on the “Map*” under location.
- Press accept or OK if the location looks good.
How to make an observation?

• Black mustard *Brassica nigra*

• Add a location description (optional)
How to make an observation?

- Select number of plants from drop down (default is 1)
- Select “Save”
How to make an observation?

• Now the app takes me to History and shows me all the plants I have not uploaded.
• Press “Upload All” When you have cell connection!!

Sorry no android screen shot
How to make an observation?

• When you upload an observation it uploads to your CalFlora account

• You **MUST** go to the website to then publish your observation to the web

• This process allows the observation to be stored in your phone without having cell connection
How to publish your observation once you've uploaded it
Click on plant record number
Click on publish, this will make your observation public on CalFlora.
If you want to edit your observation, or keep it private, go to editor.
Access by others gives you the option to keep your observation private.
Weed Manager

• CalFlora’s program that allows users to track project management for a group of people or for large projects
• Very customizable input functions
• Enter herbicide usage (amount and name), time spent on project, stack treatment polygons, number of plants treated, bags removed, create PUR for Ag. Comm. (in development), enter volunteer hours, ...
Weed Manager: Acquiring data

Observer Pro
 android phone app

Upload shapefiles / geodatabases

iOS phone app

Geotagged Photos

Online
### You Choose Treatment Fields

#### Org A

<table>
<thead>
<tr>
<th>Treatment Method</th>
<th>Touch to select *</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mechanical Method</td>
<td>Touch to select</td>
</tr>
<tr>
<td>Chemical Method</td>
<td>Touch to select</td>
</tr>
<tr>
<td>Herbicide</td>
<td>Touch to select</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ounces of Chemical</th>
<th>Touch to set value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ounces of Water</td>
<td>Touch to set value</td>
</tr>
<tr>
<td>Concentration (%)</td>
<td>Touch to set value</td>
</tr>
<tr>
<td>Treated Surface Area, square feet</td>
<td>Touch to set value</td>
</tr>
<tr>
<td>Percent Treated</td>
<td>Touch to select</td>
</tr>
<tr>
<td>Percent Treated</td>
<td>100</td>
</tr>
</tbody>
</table>

#### Org B

<table>
<thead>
<tr>
<th>Treatment Method</th>
<th>Touch to select *</th>
</tr>
</thead>
<tbody>
<tr>
<td>Herbicide</td>
<td>Touch to select</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Concentration (%)</th>
<th>Touch to set value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ounces of Chemical</td>
<td>Touch to set value</td>
</tr>
<tr>
<td>Ounces of Water</td>
<td>Touch to set value</td>
</tr>
<tr>
<td>Concentration (%)</td>
<td>Touch to set value</td>
</tr>
<tr>
<td>Treated Surface Area, square feet</td>
<td>Touch to set value</td>
</tr>
<tr>
<td>Percent Treated</td>
<td>Touch to set value</td>
</tr>
<tr>
<td>Number of Plants Treated</td>
<td>Touch to set value</td>
</tr>
<tr>
<td>Number of Bags Removed</td>
<td>Touch to set value</td>
</tr>
<tr>
<td>Labor Hours</td>
<td>Touch to set value</td>
</tr>
</tbody>
</table>
Weed manager is not free, an annual subscription is required.
Questions?  cjmcdonald@ucanr.edu