GAINING GROUND

The fight against invasives in a changing climate

By Cheryl Duarte

Wild Taro – Jacksonville, FL USA

THE OVERVIEW

- Background
- Data
- Methods
- Expected Results
- Resources

Kudzu – Atlanta, GA USA

INVASIVE PLANTS

- Introduced by:
  - Agriculture
  - Landscaping
  - Gardening
  - Shipping
- Dominate the landscape
- Decrease biodiversity

Calling all Stream Teams and volunteers to...

Be a Honeysuckle Warrior

Workshop: Saturday, October 26, 2019

10:00 am to 2:00 pm, lunch provided
Weldon Spring Site Interpretive Center
7295 Highway 94 South, St. Charles
Learn invasive plant identification, removal techniques, and effects of invasion on natural communities

Field Day: Sunday, October 27, 2019

Orientations: 8:30 am; Plant removal: 9:00 am - 3:00 pm
August A. Busch Memorial Conservation Area
South on MO-94 from US 40/61, then 1.5 miles on Route D
Meet at the Fallen Oak Trail behind the Visitor Center
Work as a team to remove bush honeysuckle from area sites
Drinks and snacks provided


MDC Image


MDC Image, Paul Nelson

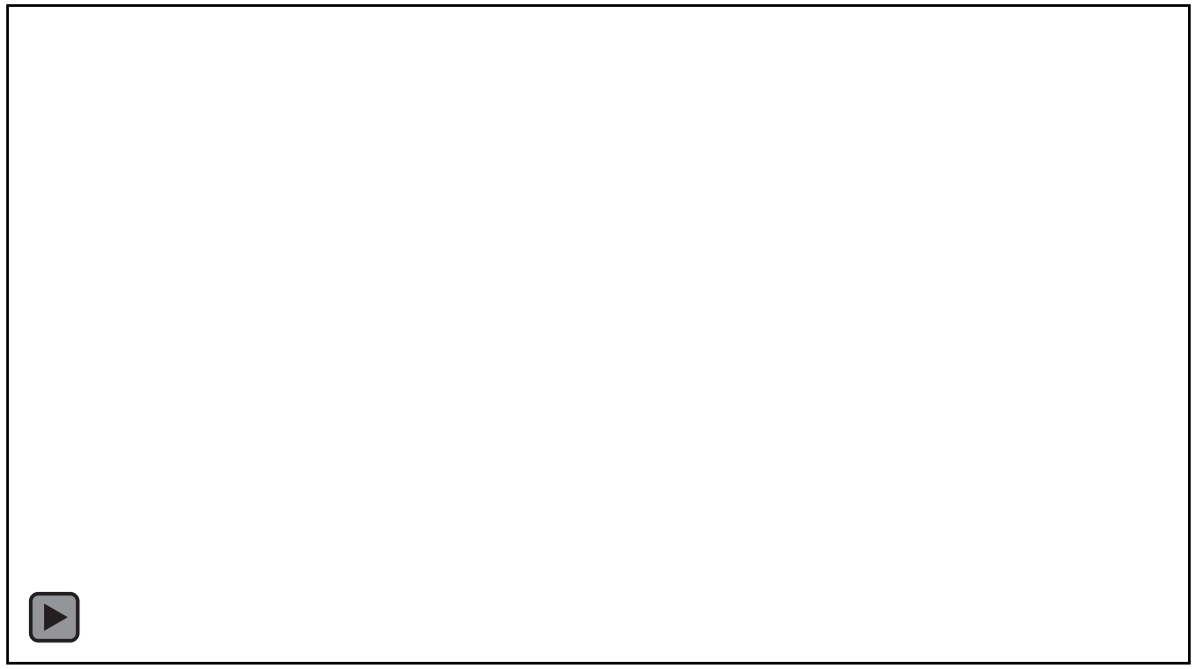

MDC Image

Bush honeysuckles invade quickly and outcompete native plants. Birds and wildlife eat the berries and deposit the seeds all over our region's natural areas, spreading these invasive species.

Attend one or both days:
Find out more and register at
www.streamteamsunited.org or call Mary at 573-586-0747

MISSOURI STREAM TEAM
WELDON SPRING SITE
A Legacy of Service
stream teams united
MISSOURI BOTANICAL GARDEN
Missouri Master Naturalist
Magnificent MISSOURI

This workshop and field day has been funded by a Patagonia Wholesale Impact Grant, with cooperation from area partners to "Unite Stream Teams for Watershed Restoration in Missouri River Country"



PREDICTED CHANGES

- Change in
  - Temperatures
  - Precipitation

CURRENT STUDIES

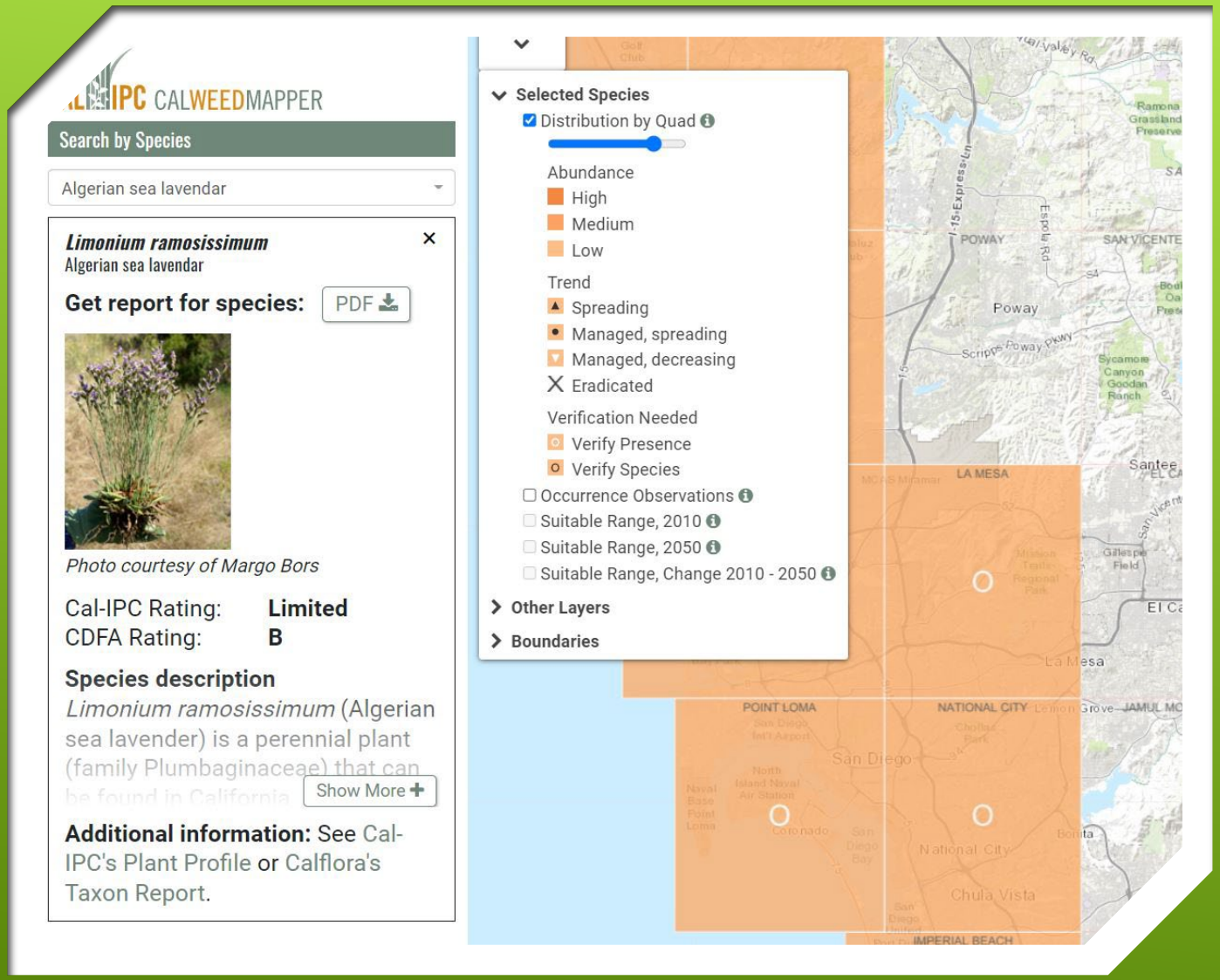
- Biological Studies
  - Controlled environments
  - Single variable
- GIS studies
  - Current extent
  - Very expensive

Orchard Grass – Sierra Madrona Spain

THE GOAL

- Low/no cost
- Tijuana River NERR
  - Local
  - Data rich

Tijuana River NERR– San Diego, CA USA



Cal-IPC WeedMapper

DATA

- Current climate zones from weather sites
  - temperature
  - precipitation
- Climate predictions
  - temperature
  - precipitation
- Cal-IPC
- San Diego County Plant Atlas
  - iNaturalist locations

PROCESSES

- Use weather station data to create climate zones
- Use climate models to create new zones
  - Temperature
  - Precipitation
- Create a database
  - invasive plant species
  - Traits
  - locations
- Calculate area possible under new conditions
- Compare areas to determine species with most significant impact
  - Pre vs post climate change
  - Species vs species

THE ZONES


USDA Plant Hardiness Zone Map
California
Average Annual Extreme Minimum Temperature 1976-2005
Temp (F) Zone Temp (C)
-20 to -15 5a -28.9 to -26.1
-15 to -10 5b -26.1 to -23.3
-10 to -5 6a -23.3 to -20.6
-5 to 0 6b -20.6 to -17.8
0 to 5 7a -17.8 to -15
5 to 10 7b -15 to -12.2
10 to 15 8a -12.2 to -9.4
15 to 20 8b -9.4 to -6.7
20 to 25 9a -6.7 to -3.9
25 to 30 9b -3.9 to -1.1
30 to 35 10a -1.1 to 1.7
35 to 40 10b 1.7 to 4.4
0 15 30 60 Miles
0 25 50 100 Kilometers
Agricultural Research Service
OSU Oregon State
Mapping by the PRISM Climate Group Oregon State University
CARSON CITY
SACRAMENTO
Crescent City
Eureka
Redding
Susanville
Quincy
Oroville
Marysville
Placerville
Markleeville
Bridgeport
Ukiah
Santa Rosa
Napa
Oakland
San Jose
Stockton
Modesto
Merced
Madera
Fresno
Visalia
Salinas
Independence
Bakersfield
Ridgecrest
San Luis Obispo
Santa Barbara
Barstow
Needles
Los Angeles
San Bernardino
Palm Springs
San Diego
El Centro

Species	X	Y	High temp	Drought Tolerance	Photosynthesis pathway	Taproot
Species1						
Species2						
Species3						
Species4						

THE DATABASE

TECH

ESRI vs QGIS

EXPECTED RESULTS

- Increased clarity about which species will thrive
- Some will be killed off with high heat or low precipitation
- Criteria can be expanded

Miconia – O'ahu, HI USA

CONCERNS

- iNaturalist data is majorly biased
- Climate predictions not accurate
- Some plants are not well understood
- Cannot account for all criteria

PROJECT TIMELINE

Date Range	Project Tasks
April - May 2022	Data Collection • Weather Data • Plant Data
June - July 2022	Database • Design • Data Entry
August – September 2022	Implementation • Create climate zone layers • Plant location layers • Calculate change in area • Calculate statistical significance
October - November 2022	Analysis • Analyze data and statistics • Write presentation
December 2022	Capstone presentation • Online virtual Penn State Conference • Tijuana River NERR

RESOURCES

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PHOTOS

- Taro
  - Cheryl Duarte
- Kudzu
  - Scott Ehardt - Own work, Public Domain, https://commons.wikimedia.org/w/index.php?curid=702909
- Honeysuckle
  - Stream Teams United – Used for educational purposes only https://www.streamteamsunited.org/honeysuckle-warrior-weekend.html
- Purple Loosestrife
  - U.S. Forest Service – Used for educational purposes only https://www.fs.fed.us/wildflowers/invasives/
- Climate Model
  - NOAA – Used for educational purposes only https://www.gfdl.noaa.gov/visualizations-climate-prediction/
- Tijuana River National Estuary Research Reserve
  - Cheryl Duarte
- Orchard Grass
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- Cal-IPC WeedMapper
  - California Invasive Plant Council - Used for educational purposes only https://weedmap.cal-ipc.org/weedmapper/?species=9147&base=topo&xyz=-116.76383%2C32.81958%2C11
- USDA Hardiness Map
  - Gardening Know How - Used for educational purposes only https://www.gardeningknowhow.com/planting-zones/california-planting-zones.htm
- Miconia
  - Green Magazine Hawaii – Used for educational purposes only https://greenmagazinehawaii.com/big-bad-weeds/


QUESTIONS