CALIFORNIA INSTITUTE OF ENVIRONMENTAL STUDIES

Control of invasive plants within the Scorpion Fire burn area at Santa Cruz Island

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Maps Prepared by:

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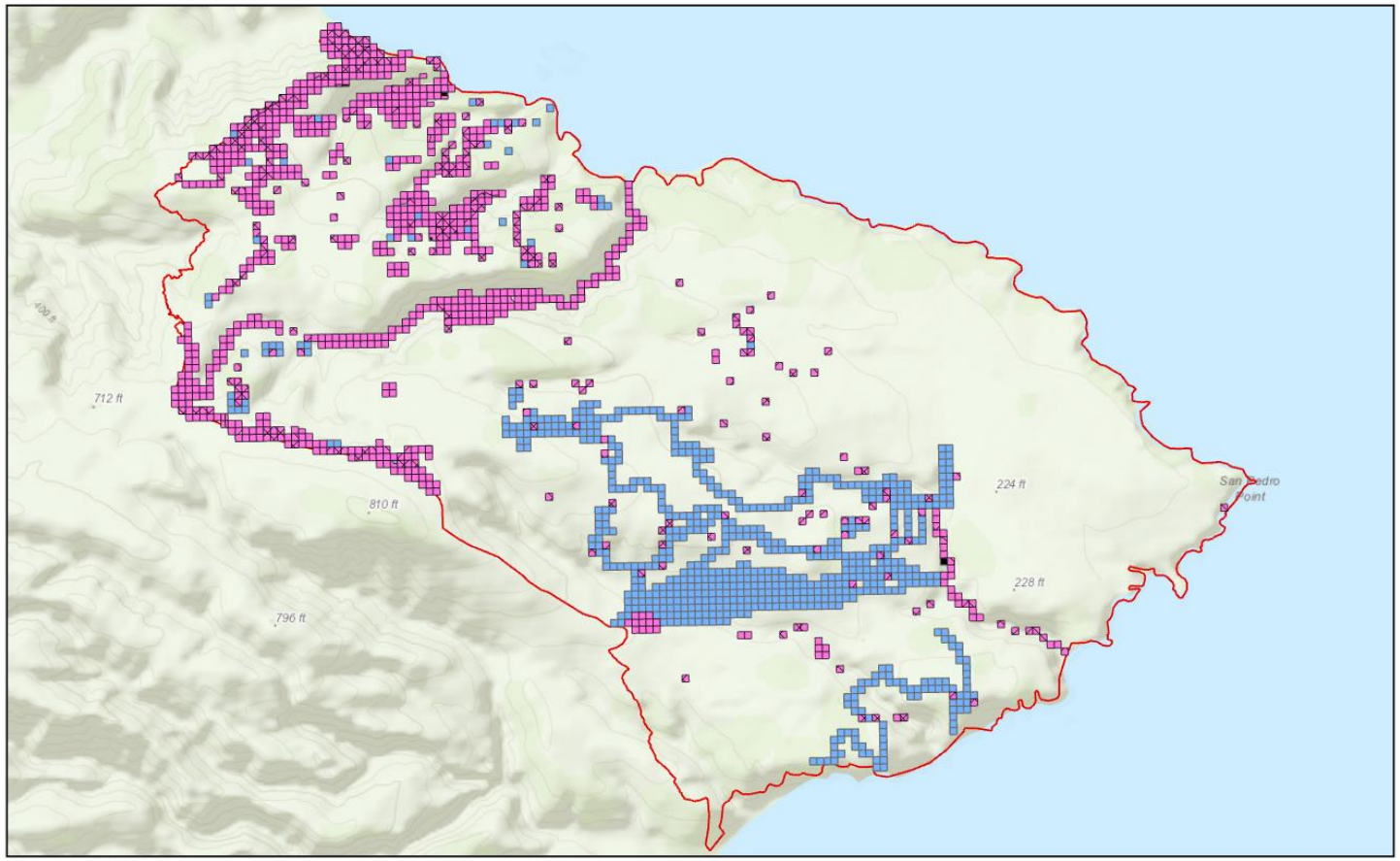
Introduction to the Project Area



2022 Season CIES Invasive Plant Treatments
Inside Burn Perimeter

National Park Service
Data Source: NPS Park Data, ESRI Basedata

Scorpion_fire_general_polygon
All_Features_Merge_2022_01_01_fire_only
Action Type
No_Target_Line
No_Target_Point
No_Treatment_Line
No_Treatment_Point
Weed_Line
Weed_Point
<all other values>

North

0 0.07 0.15 0.3
Miles

- Santa Cruz Island - Channel Islands National Park, Santa Barbra County, Ca
- The Scorpion Fire broke out May 31, 2020 near the Scorpion Anchorage Pier
- The Scorpion Fire burned a total of 1,368 acres
- Burn area is on the eastern side of the island from the Scorpion Pier east to San Pedro Point and Smugglers Cove, from Smugglers Road to the north coast
- Scorpion Fire Burn Area Restoration (BAR) Project

Purpose and Need for the BAR Project

- Fire disturbs soil allowing invasives/non-natives species to become established or expand invasive/non-native population territories
- Treatments reduce risk of natural resource damaged and restore native landscapes
- Treatments promote long term restoration and recovery processes
- Goals within the burn area
  - Provide emergency chemical and manual control of invasives/non-native flora
  - Provide conditions for post fire re-establishment of unique native island vegetation
  - Provide repeat weed treatment to control invasive/non-native species

Target Species List

Primary Tier Targets

- Black mustard (*Brassica nigra*)
- Sweet fennel (*Foeniculum vulgare*)
- Summer mustard (*Hirschfeldia incana*)
- Kikuyu grass (*Pennistetum clandestinum*)
- Harding grass (*Phalaris aquatica*)
- Smilo grass (*Piptatherum miliaceum*)

Secondary Tier Targets

- Tree tobacco (*Nicotiana glauca*)
- Spanish broom (*Spartium junceum*)
- Horehound (*Marrubium vulgare*)
- Cheeseweed (*Malva parviflora*)
- European olive (*Olea europaea*)
- Russian thistle (*Salsola tragus*)

Chemical Treatment: Foliar

- Primary treatment method for BAR
- Foliar applications are dependent on species, proximity to natives, and phenology
  - Completed roadside work with a spray rig
  - Completed interior work with spray packs

Chemical Treatment: Cut Stump

- In locations where native and invasive species are densely mixed it is difficult to avoid applications exclusively to the target species
- Cut stump allows the applicator to apply small amounts of herbicide to the freshly cut stump of the target species
- This reduces herbicide use and potential drift or collateral damage

Manual Removal

- On days with uncooperative weather (high winds, surrounding predicted rain events, or heavy fog), the BAR Crew performed manual removal efforts
  - Inclement weather can cause run off, drift, or leaching
    - Hand weeding
    - Dig/pull removal
    - Cut and bag seed heads
- Manual removals were also performed in areas that had nearby sensitive habitat, historical landmarks, or singular individual plants
  - Ignition Point Slope (East of the Scorpion Anchorage Pier)
  - Delphine's Grove
  - Olive trees and tree tobacco

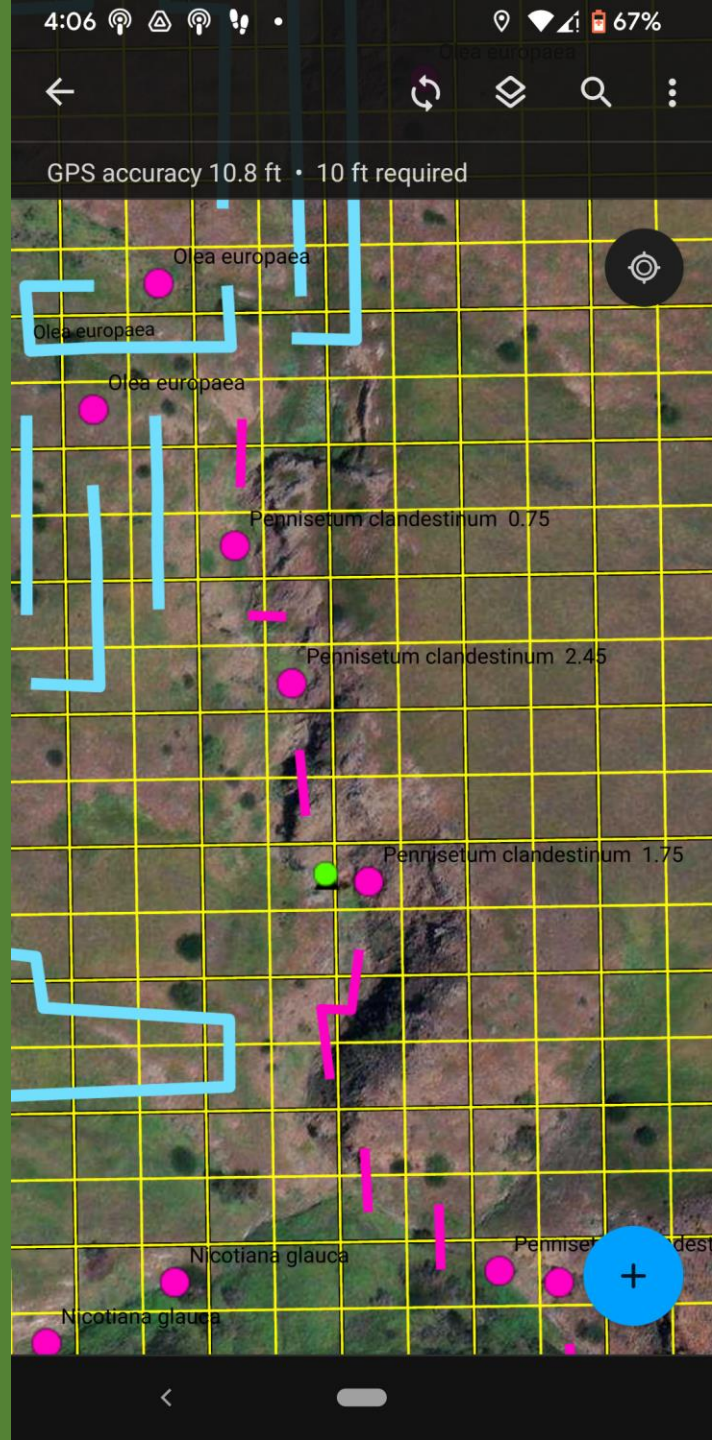
Mapping and Data Collection

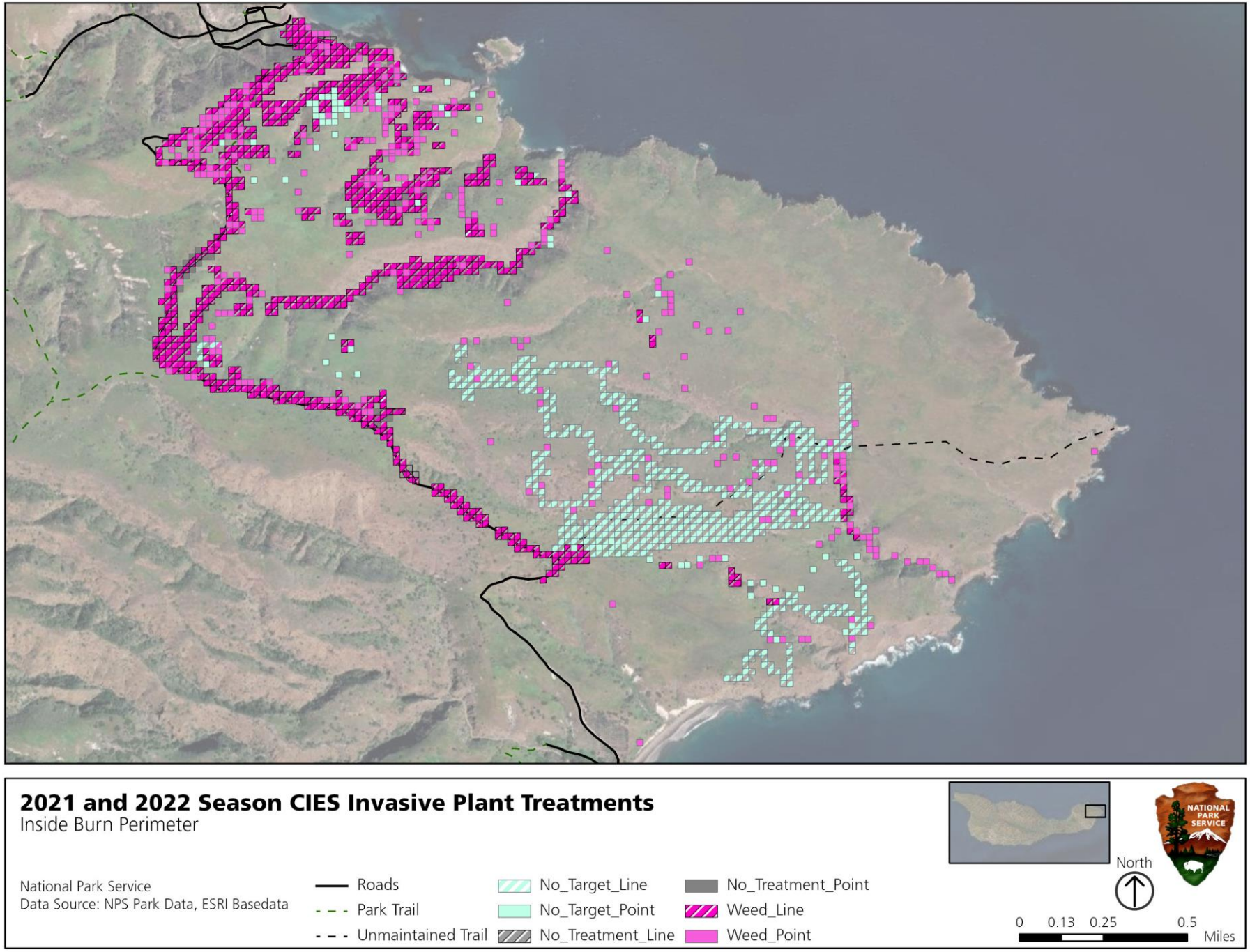
- Mapping is completed by using Arc Field Maps
- Primary Functions
  - Treatment (points and lines)
  - No Target (points and lines)
  - No Treatment (points and lines)
  - Hidden Weed (points)
  - Historic Treatment Layers (points and polygons)
  - Tracks or “Breadcrumbs” (points and lines)
- The island is segmented into 25m² grid cells
  - Each grid cell contains its own data, the data is distributed across the entire cell to create a raster data set
- All data is recorded is entered into multiple places to create a cross referencing system to eliminate possibilities of errors
  - All quantities of herbicide used is recorded in the Field Maps, Notes app, and a Google Drive

Credit to Wildlands Conservation Science and The National Park Service for the foundation of this data collection system*

Mapping and Data Collection

- The grid cell system evenly distributes data across the entire cell and create a raster-based data set
  - Line features distribute data evenly across all cells the line feature touches, all cells must be uniform to do a line feature
  - If you use 4 gallons of pre-mix across 4 cells, you will enter 1 gallon in ‘finished gallons applied’ on the line feature, this number gets multiplied by 4 for how many cells it touches equaling a total usage of 4 gallons



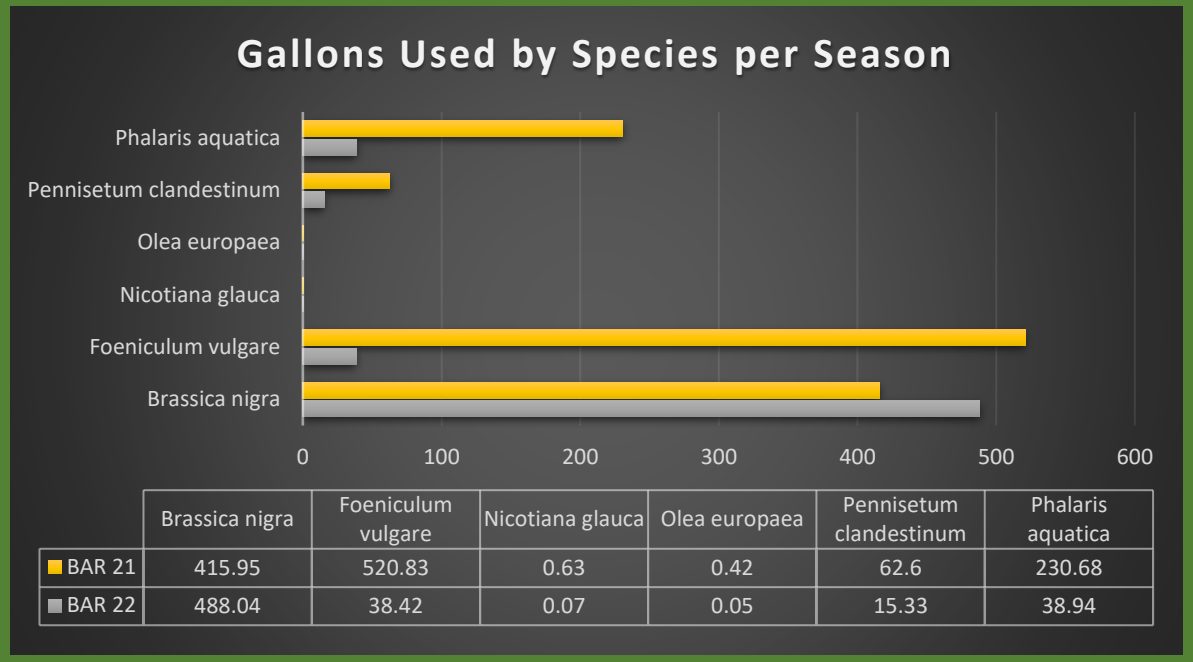


Results & Discussion

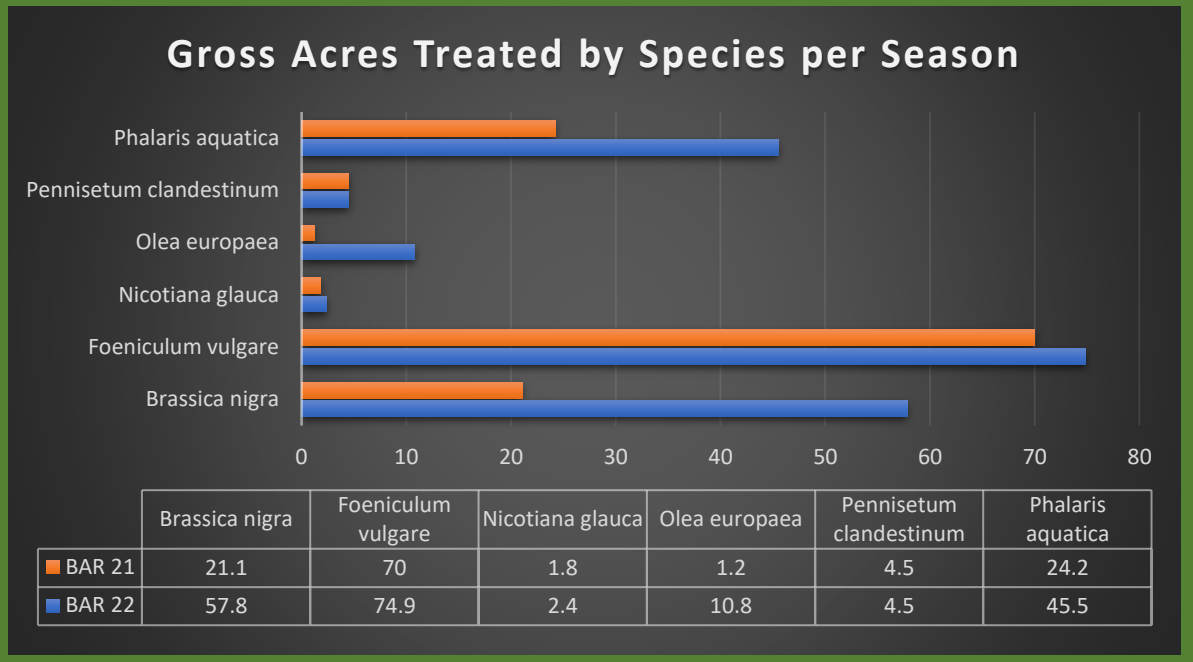
BAR 2021 and 2022

- Reduction of herbicide usage by 63.1%
- Increase in gross acreage by 54.4 gross acres
- Manual treatment gross acres increased 600%
- All points displayed are 25m² grid cells

Results: BAR 2021 v BAR 2022



	Brassica nigra	Foeniculum vulgare	Nicotiana glauca	Olea europaea	Pennisetum clandestinum	Phalaris aquatica
BAR 21	415.95	520.83	0.63	0.42	62.6	230.68
BAR 22	488.04	38.42	0.07	0.05	15.33	38.94



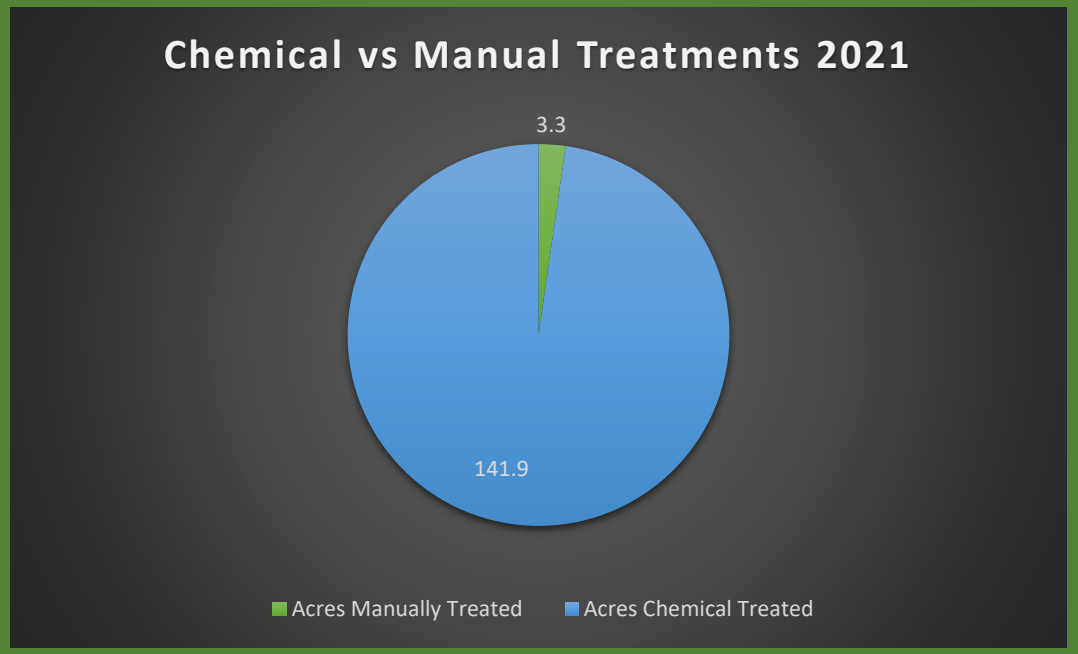
	Brassica nigra	Foeniculum vulgare	Nicotiana glauca	Olea europaea	Pennisetum clandestinum	Phalaris aquatica
BAR 21	21.1	70	1.8	1.2	4.5	24.2
BAR 22	57.8	74.9	2.4	10.8	4.5	45.5

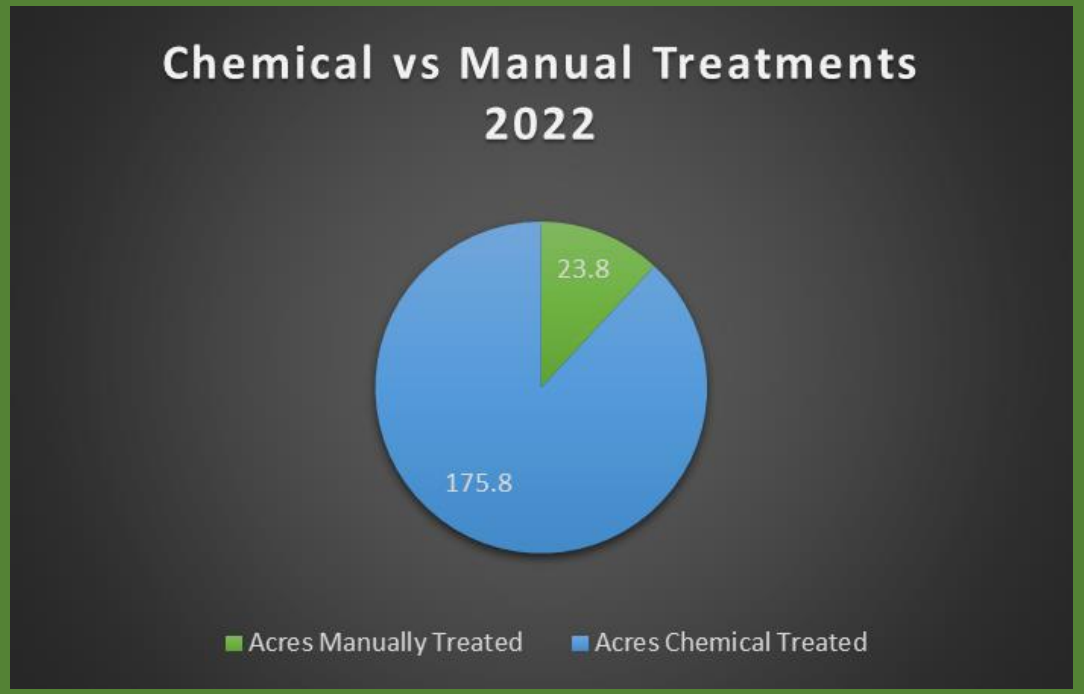
BAR 2021 Weed Target Breakdown

Weed Target	Gross Acre	Total Gallons Applied
Atriplex semibaccata	19.8	349.55
Brassica nigra	21.1	415.95
Centranthus ruber	0.3	0.02
Foeniculum vulgare	70	520.83
Mesembryanthemum crystallinum	0.2	0.05
Nicotiana glauca	1.8	0.63
Olea europaea	1.2	0.42
Pennisetum clandestinum	4.5	62.6
Phalaris aquatica	24.2	230.68
Silybum marianum	0.9	0
Tragopogon porrifolius	1.2	8
Total	145.2	1588.73

BAR 2022 Weed Target Breakdown

Weed Target	Gross Acres	Total Gallons Applied
Brassica nigra	57.8	488.04
Foeniculum vulgare	74.9	38.42
Marrubium vulgare	1.1	0
Nicotiana glauca	2.4	0.07
Olea europaea	10.8	0.05
Other	0.2	0
Pennisetum clandestinum	4.5	15.33
Phalaris aquatica	45.5	38.94
Piptatherum miliaceum	2.2	5.33
Spartium junceum	0.2	0.02
Total	199.6	586.2



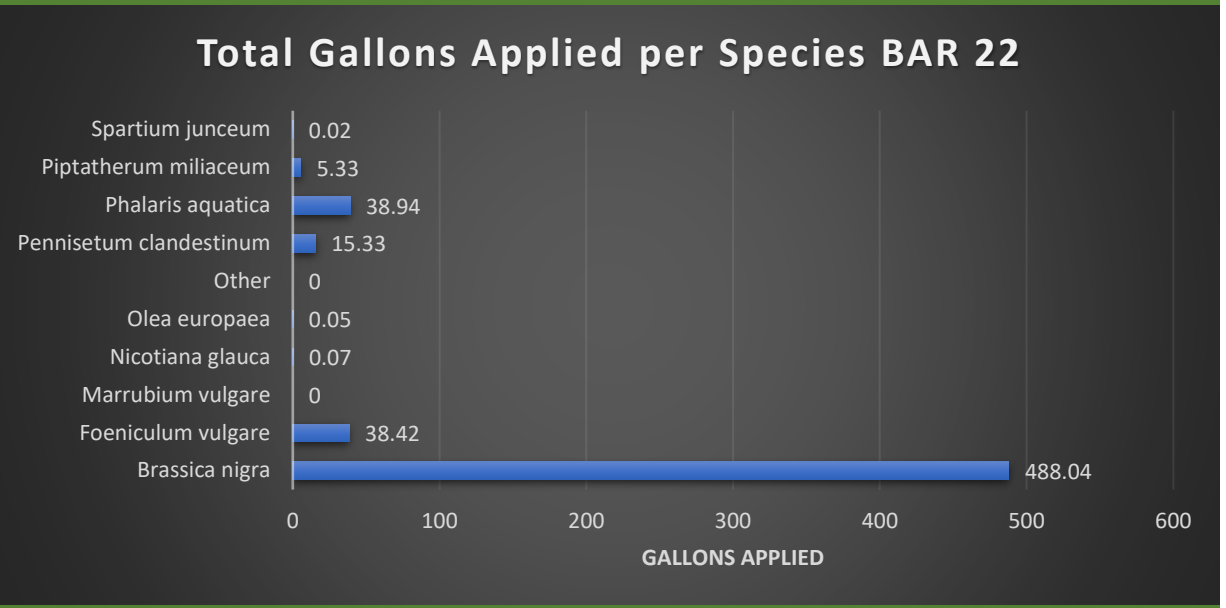


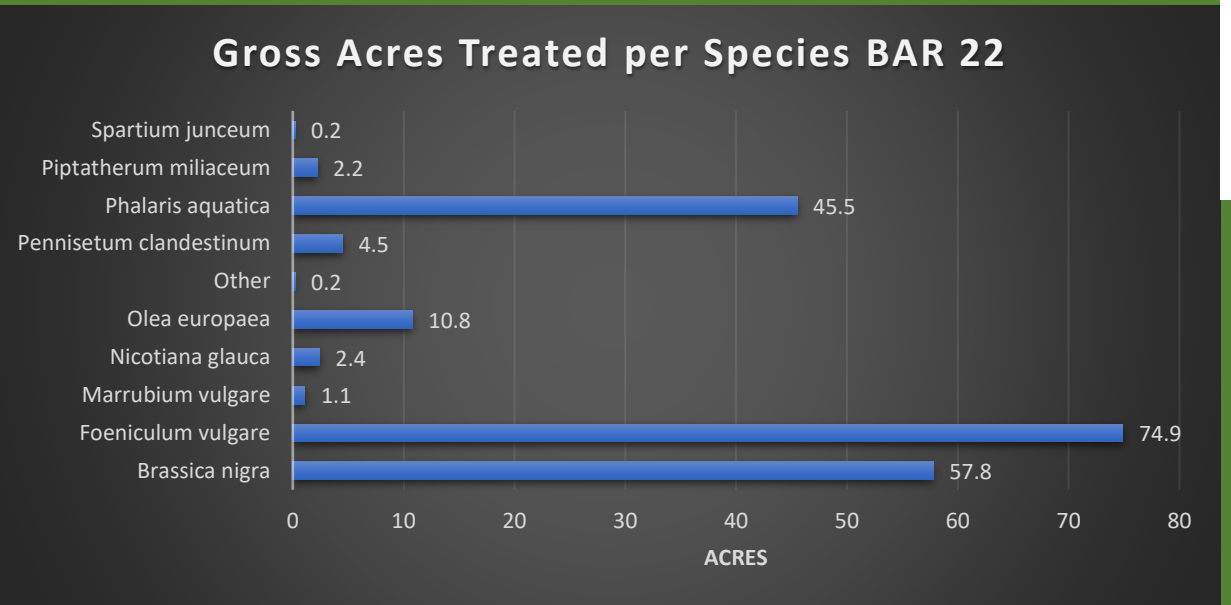
Discussion: BAR 2021/22

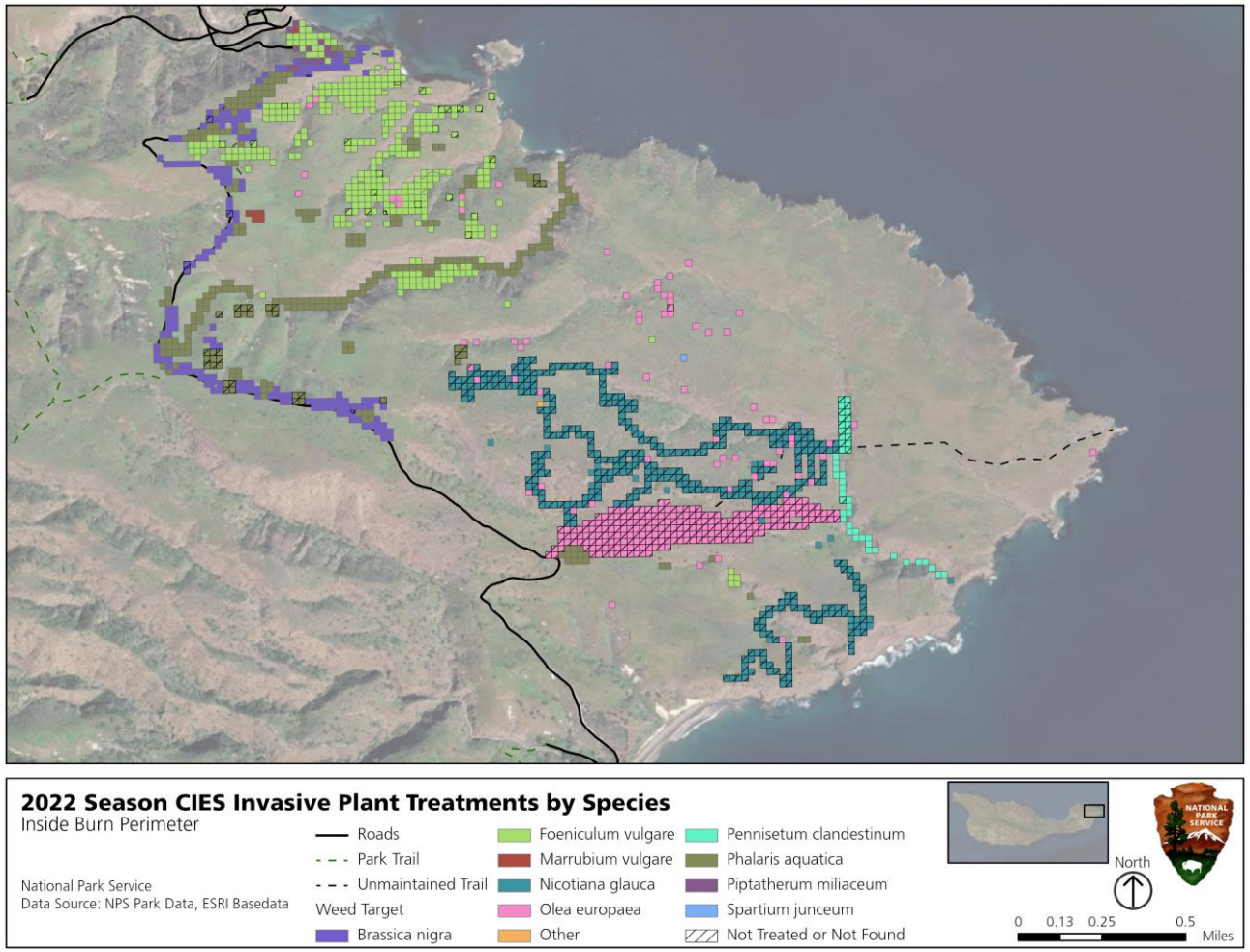
Manual removals

- 20.5 gross acre increase in manual removals from 2021 to 2022
- 12% of all 2022 treatments were manual removal
- Primary manual removal species
  - Black mustard
  - Horehound
  - Olive trees
  - Tree tobacco

Discussion: BAR 22

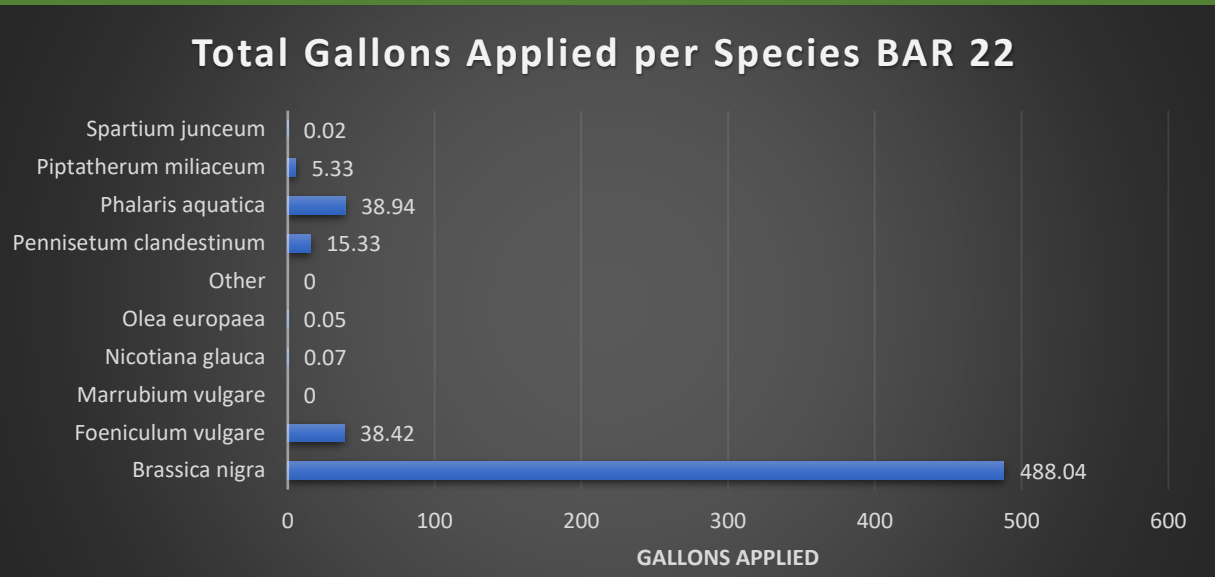


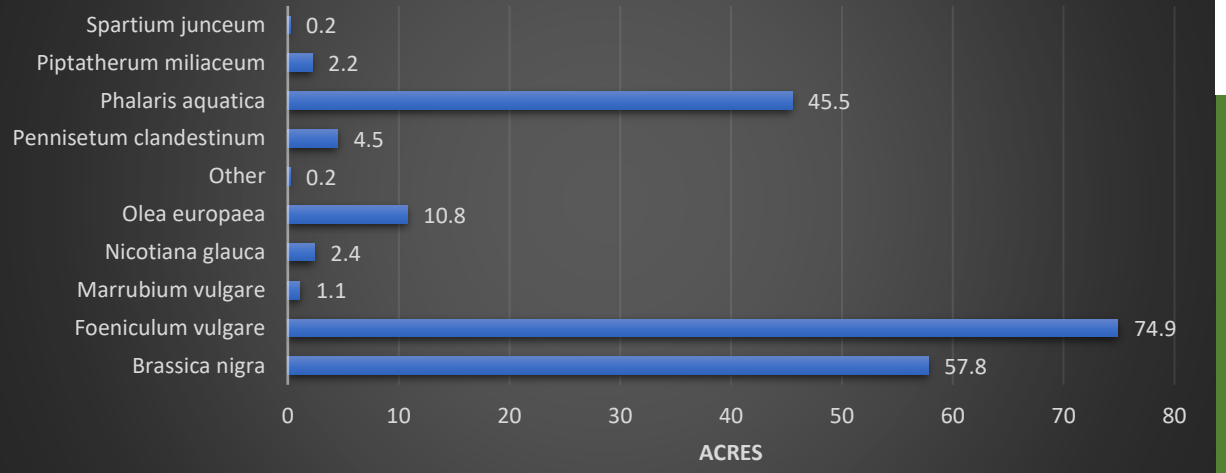


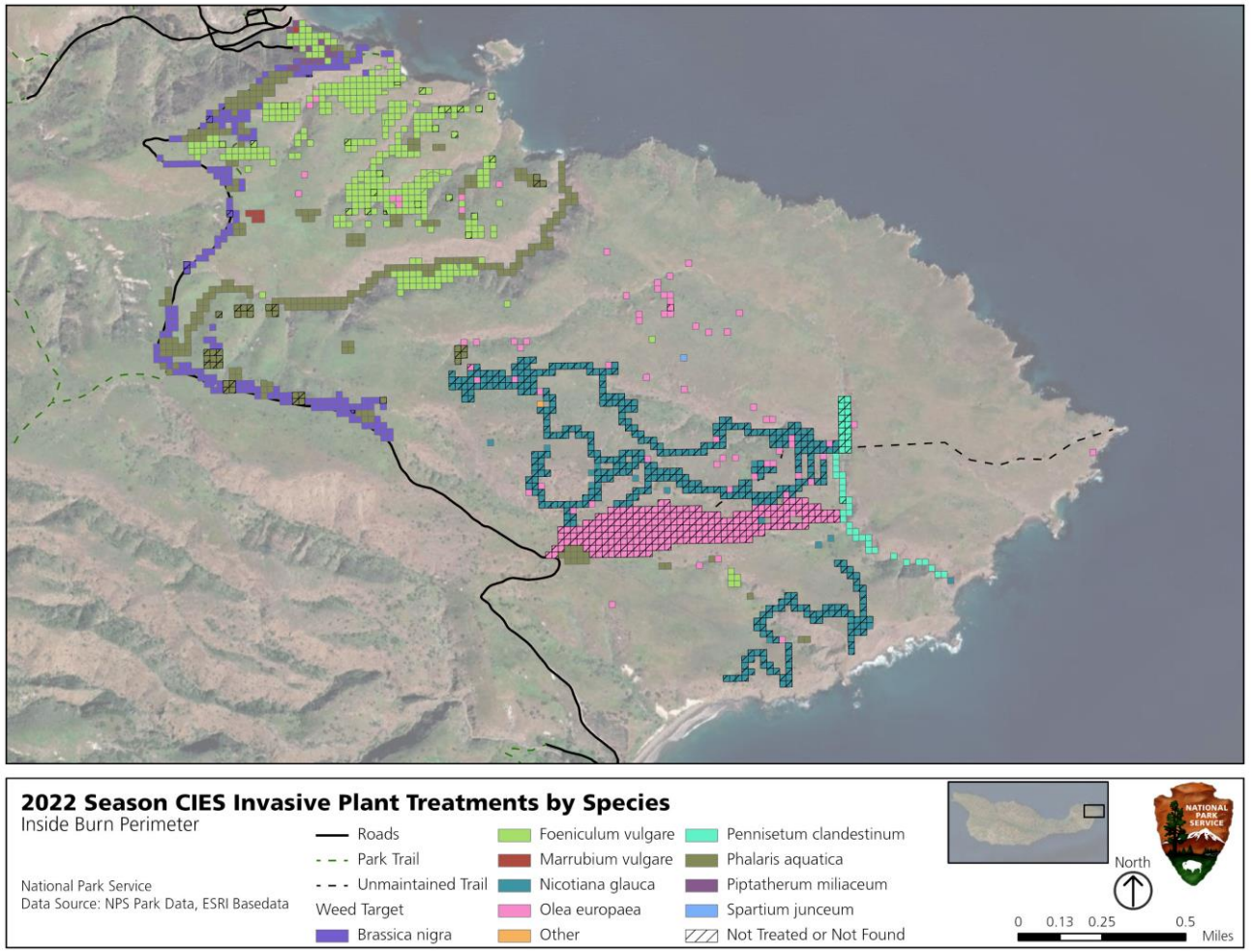


- Black mustard increase in herbicide usage and gross acres treated due to earlier start date
- Sweet fennel, kikuyu, and harding grass all decreased in herbicide usage due to 21 treatments eliminating adult individuals leaving only new growth in 22

Discussion: BAR 22







- Increase of gross acres for sweet fennel and harding grass is possibly due to new growth from the seed bank or individuals successfully reproducing and seeds moving outside previously treated cells
- The decrease in herbicide usage dictates less plant matter being sprayed

Before and After

Manual removals of black mustard in Delphine’s Grove

Before and After

Manual removal of black mustard in historic Delphine’s Grove

Before and After

Spray rig work near Delphine’s Grove

Before and After

Spray rig work near Delphine’s Grove

Questions and Comments

Thank you for your time

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