Developing a Post-Fire Early Detection Rapid Response (EDRR) Framework

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Cal IPC Symposium
Cal Poly Pomona June 13th, 2022

CAL IPC
CALIFORNIA INVASIVE PLANT COUNCIL

EDRR

Early **D**etection - Need to know *who* to look and *where*

Rapid **R**esponse - Need to know how to prioritize treatments and species, across a landscape

Goals for the Workshop

Present a framework in order to

1. **Identify priority target species**
2. **Identify priority target areas**
3. **Provide some tools and resources**

All within a wildfire context

Timeline

Before Incident
Pre-fire Preparation

Identify priority weeds
- Home/local data
- Cal IPC Inventory etc.

Pre-establish areas
- staging/avoidance areas
- wash stations
- fill points

Gather & share information
- Priority weeds data
- Pre-established areas
- Equipment needs- weed wash, heavy equipment

Timeline

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During Incident

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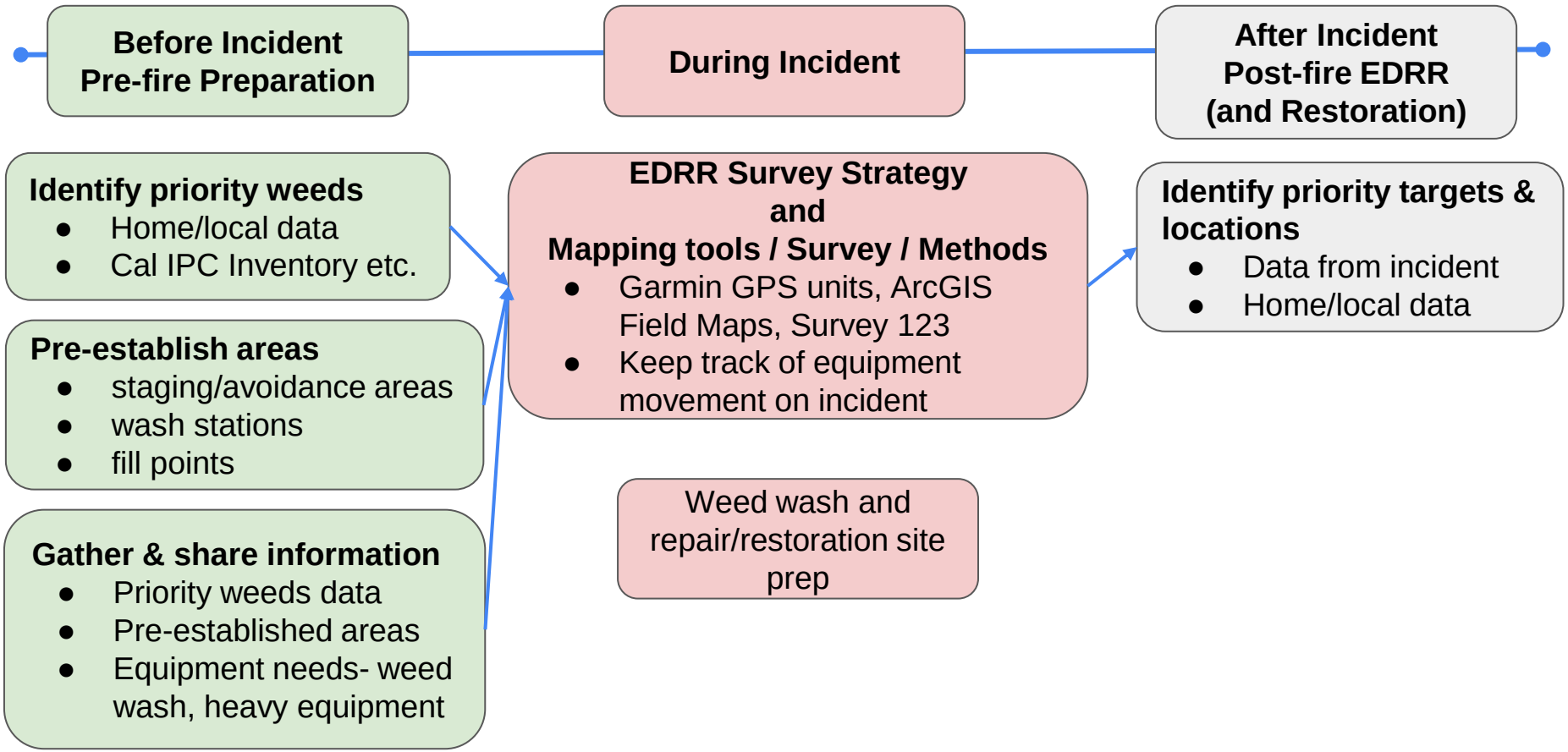
EDRR Survey Strategy
and
Mapping tools / Survey / Methods
- Garmin GPS units, ArcGIS Field Maps, Survey 123
- Keep track of equipment movement on incident

Weed wash and repair/restoration site prep

Timeline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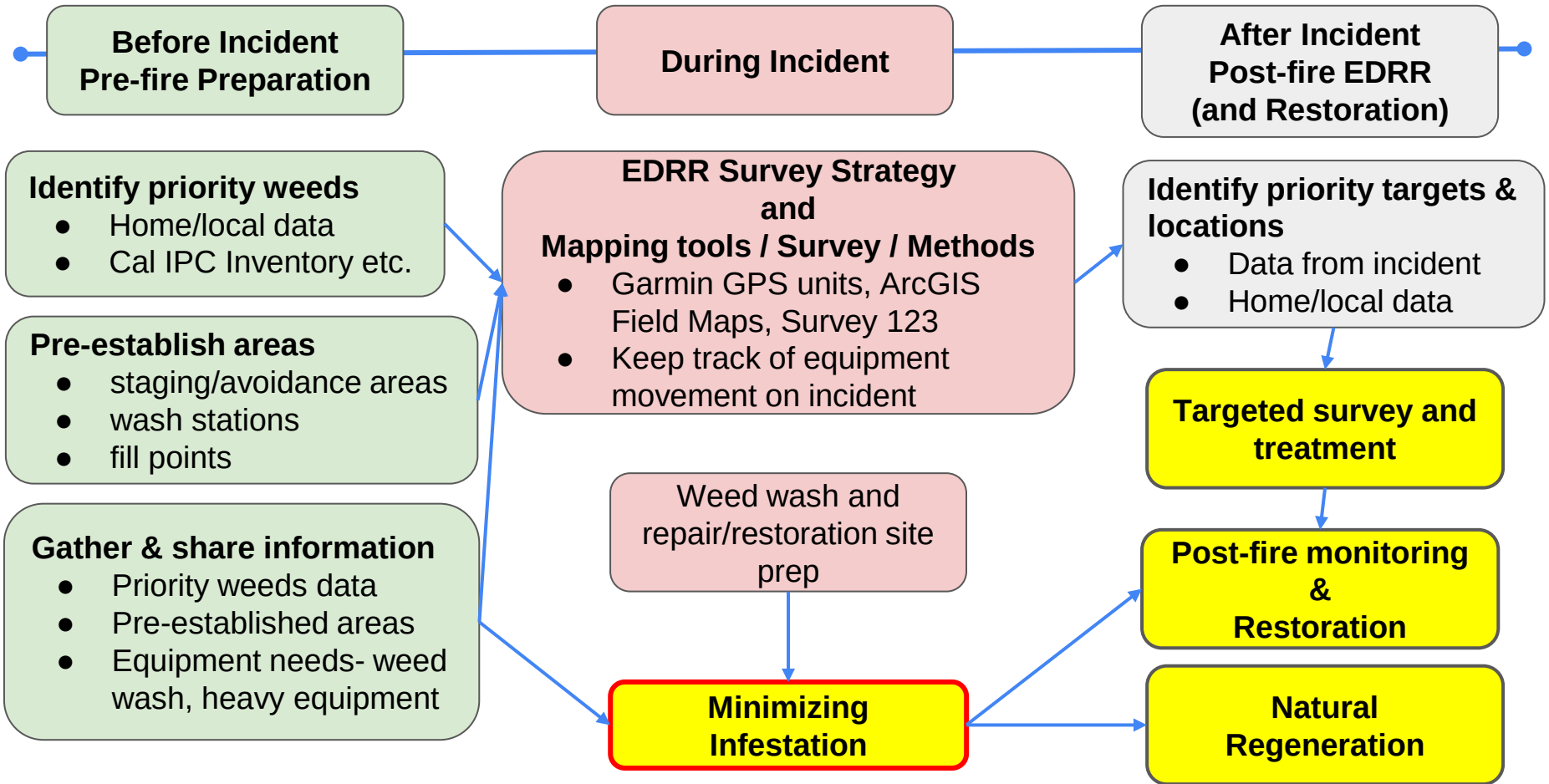
Identify priority targets & locations
Data from incident
Home/local data

Timeline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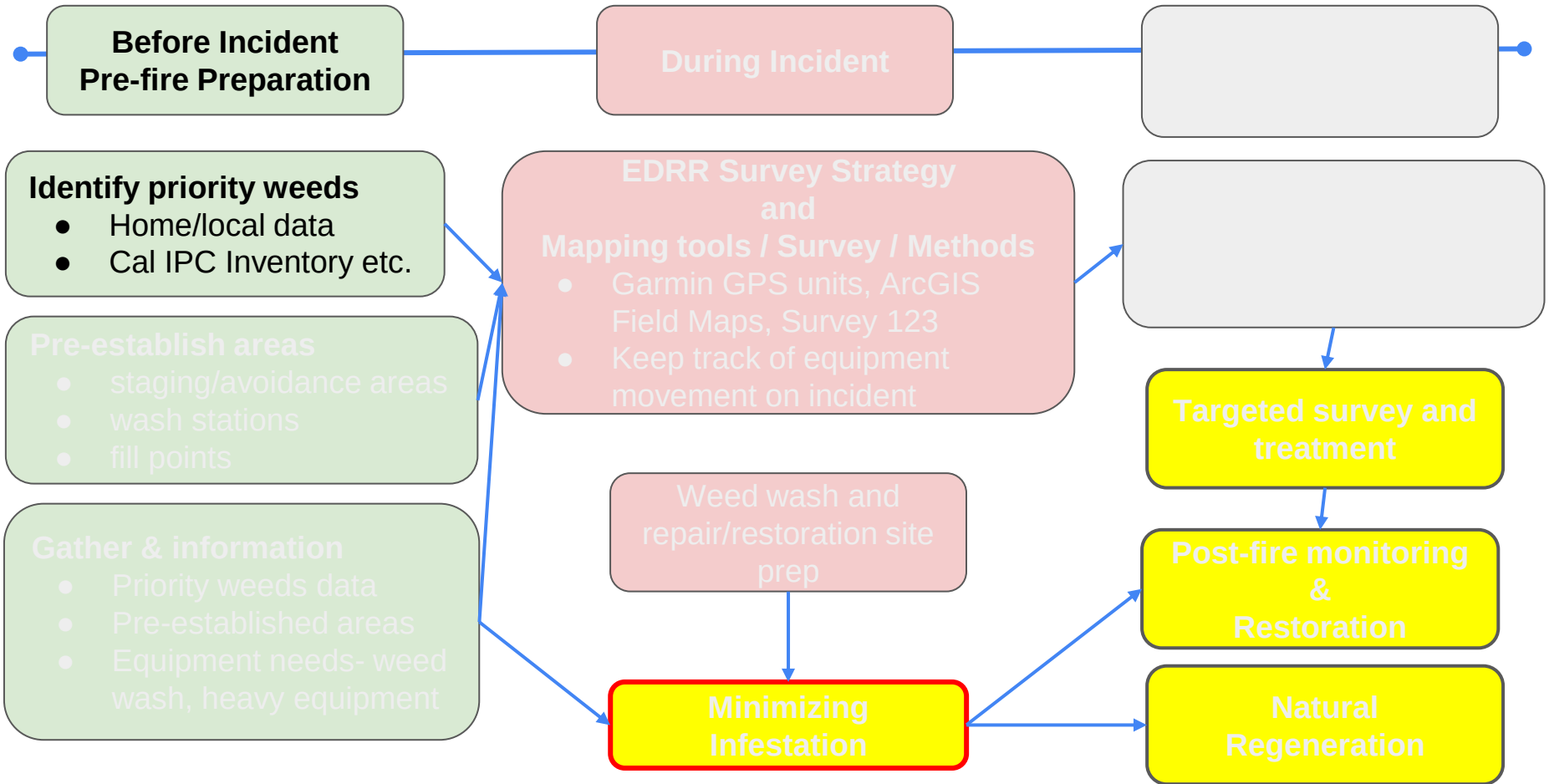
Natural Regeneration

Timeline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First Component in **ED**RR

Early **D**etection - Need to know who to look for during assessments!

Tools- Cal IPC Plant Inventory [The Cal-IPC Inventory – California Invasive Plant Council]

Plant Profiles

- Identification (*Species ID Card*)
- Ecological Impacts (*Assessment*)
- Treatment Options (*Weed Management Notes*)
- Cal-IPC Ratings

Use information to prioritize species for treatment

Plants A to Z

Browse below to see all plants on the Cal-IPC Inventory, including both invasive plants and "Watch" species. Clicking on the scientific name will take you to the Plant Profile, where you'll find links to more information on the plant.

Acacia baileyana

Acacia cyclops

Acacia dealbata

Acacia longifolia

Ailanthus altissima

Synonyms: A. glandulosa Desf.

Common names: tree-of-heaven; Chinese sumac; paradise-tree; copal-tree

Ailanthus altissima (tree-of-heaven) is a tree (family Simaroubaceae) that is widely but discontinuously distributed in California. It was introduced as a landscape ornamental but escapes gardens and spreads by seeds and creeping roots that produce many suckers. It is most abundant along the coast and in the Sierra foothills, primarily in wastelands and disturbed, semi-natural habitats.

Photo: Joseph DiTomaso

Cal-IPC Rating: Moderate

CDFA Rating: C*

Assessment(s)

Plant Assessment Form - Information gathered by Cal-IPC on the impacts, rate of spread, and distribution of invasive plants in California. Does not include management information.

Species ID Card

Invasive Species ID Card - To support field identification of early detection species, Cal-IPC has designed a set of Species ID cards that can be downloaded, printed double-sided, and trimmed to size.

Weed Management Notes

Management Notes - Information on management techniques and effectiveness from the University of California

Explanation of Cal-IPC ratings

- **High** – These species have severe ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal and establishment. Most are widely distributed ecologically.
- **Moderate** – These species have substantial and apparent-but generally not severe-ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal, though establishment is generally dependent upon ecological disturbance. Ecological amplitude and distribution may range from limited to widespread.
- **Limited** – These species are invasive but their ecological impacts are minor on a statewide level or there was not enough information to justify a higher score. Their reproductive biology and other attributes result in low to moderate rates of invasiveness. Ecological amplitude and distribution are generally limited, but these species may be locally persistent and problematic.
- **Alert** – An Alert is listed on species with High or Moderate impacts that have limited distribution in California, but may have the potential to spread much further.
- **Watch** – These species have been assessed as posing a high risk of becoming invasive in the future in California.

Pre-fire Assessments: Identify Priority Weeds

- What weeds are present in my area?
- Lots of resources on species occurrences
  - Home/local data
  - Calflora data- Weed Mapper Weed Manager - Calflora
  - CCH2 records CCH2 Portal Home
  - iNaturalist A Community for Naturalists · iNaturalist
  - **Anyone Others…?**

Important fire following weeds

Brassica nigra, black mustard

Pennisetum setaceum, crimson fountain grass

Tamarix ramosissima, tamarisk/salt cedar

Oncosiphon pilulifer, stinknet

Spartium junceum, Spanish broom

Centaurea solstitialis, yellow starthistle

Ailanthus altissima, tree of heaven

Nicotiana glauca, tree tobacco

- Not responsive to fire per se, but do well in post fire areas
- Detrimental ecological impacts
- Are common in S. CA

Salt cedar

Spanish broom

Yellow starthistle

Tree tobacco

Tree of heaven

Stinknet

Fountain Grass

Black mustard

Ecological Impacts of Weeds

1. **Altered Fire Regime** -> danger of type conversion
   a. By increasing fuel load and filling in gaps between plants
   b. Plants are capable of regenerating after fire
   c. Resprouting
   d. Prolific seeder / rapidly germinating

Fire Effects Information System (FEIS)

Home page, Fire Effects Information System (feis-crs.org)

Salt cedar

Spanish broom

Fountain Grass

Stinknet

Ecological Impacts of Weeds

2. Shift Plant Community

a. Decrease forage quality, allelopathic, chemically defended
b. Monocultures of plants
c. Crowding out native species

Black mustard

Yellow starthistle

Stinknet

Tree of heaven

Ecological Impacts of Weeds

3. **Riparian Zones-** alter ecosystem functions
    a. High water use, form dense stands
    b. Lower table and replace native trees
    c. Adds fuel to riparian areas

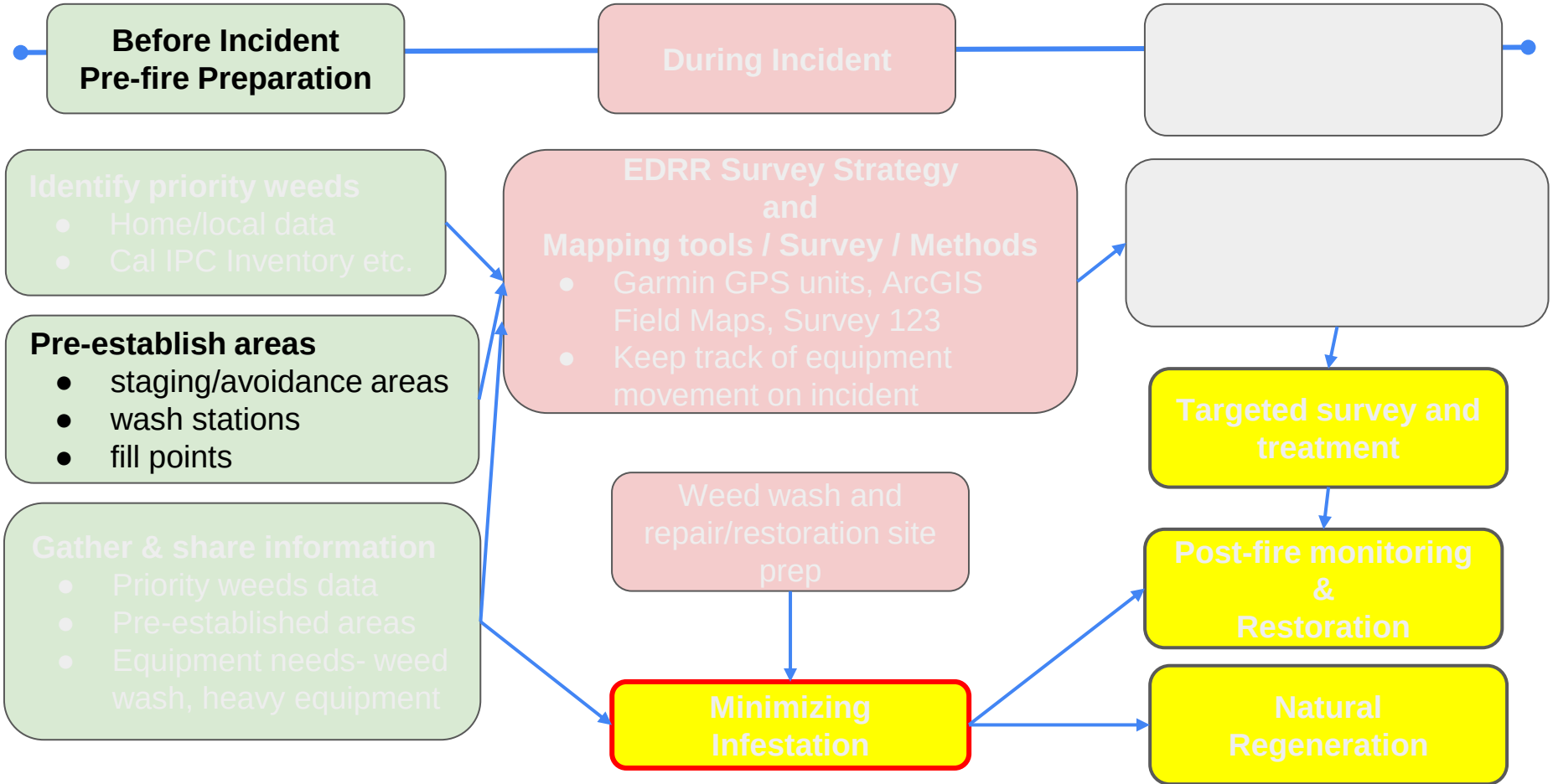
Salt cedar

Tree of heaven

What about annual grasses?

Do you prioritize or not?

Timeline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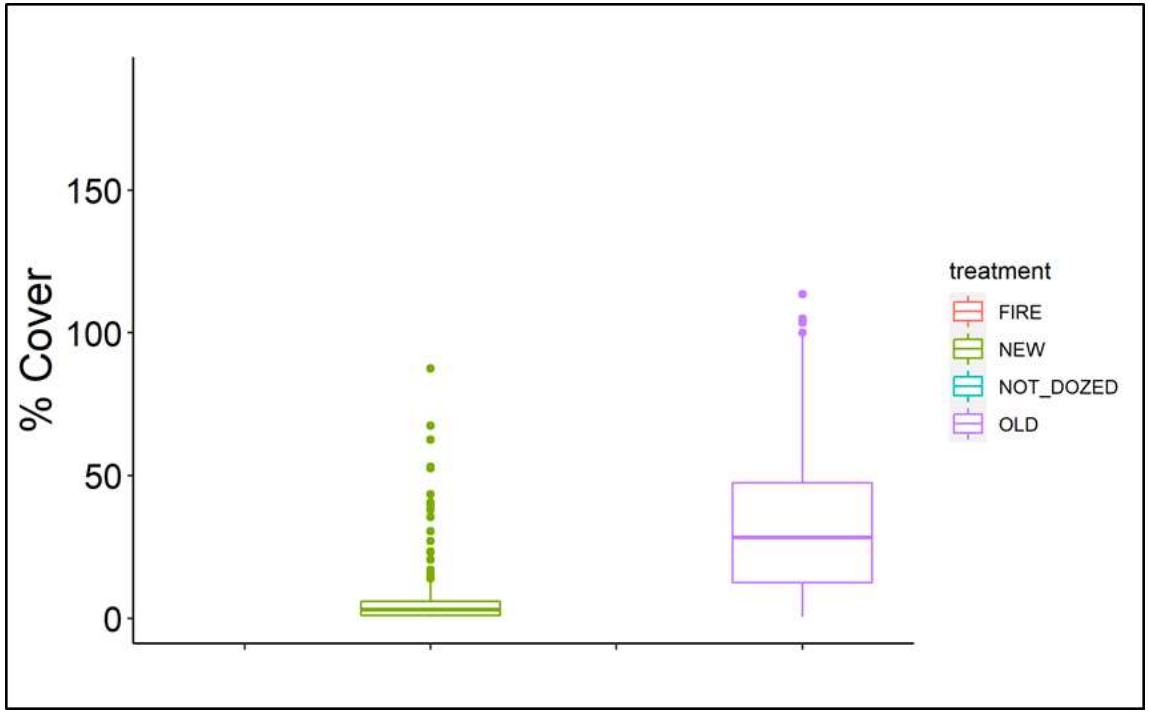
Pre-fire Assessments: How can we best prepare?

- Assessing Areas at Risk of Invasion:
  - Pre-establishing safety zones/areas
  - Pre-establishing water filling areas
  - Avoidance areas- TESP, other
  - Equipment placement/staging
- Assessing Equipment Needs
  - Weed washing
  - Equipment/resources

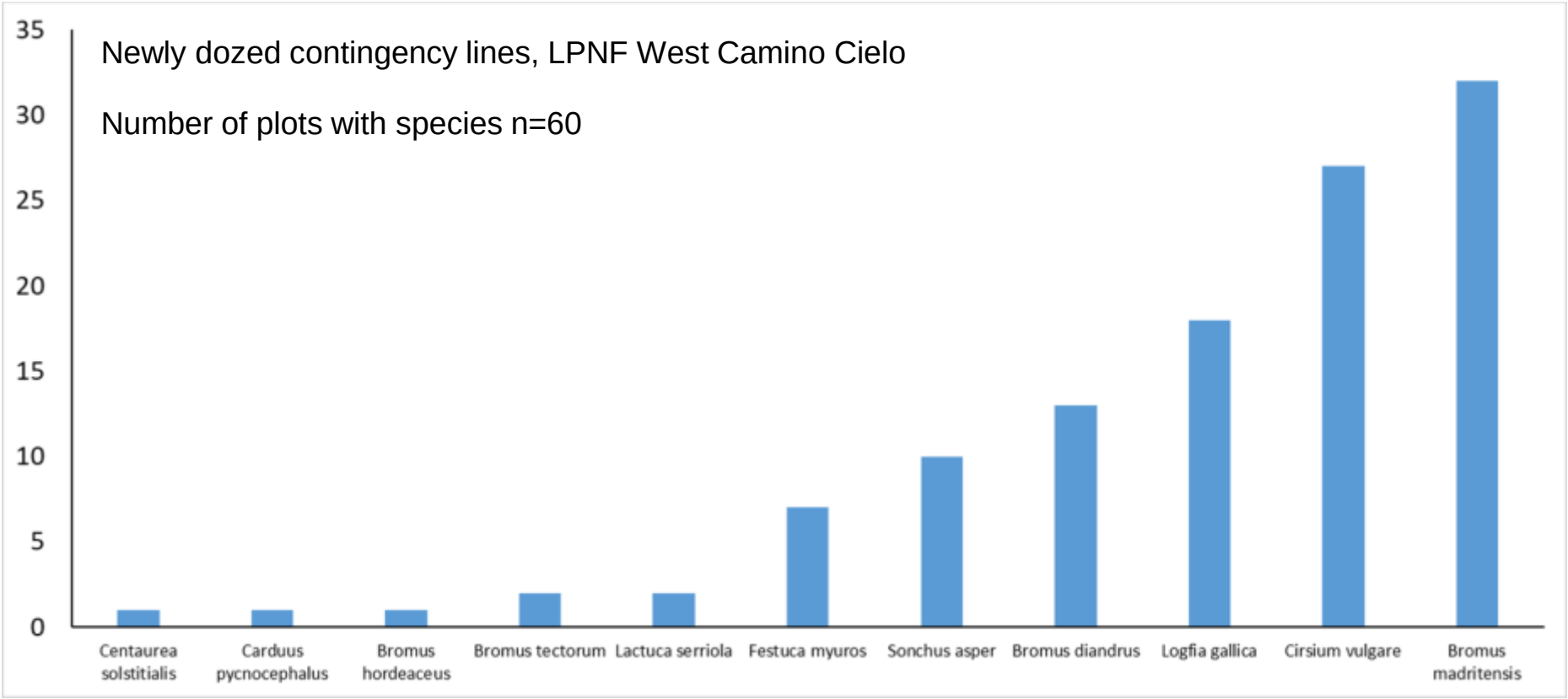
Safety zone, Valley Fire 2020, Cleveland NF

Weed wash, Google images

Fire Suppression- Old fuel breaks vs new contingency lines



Fitch et al unpublished data.



Early invaders = annual grasses and annual asters (sunflowers)

Fitch et al unpublished data.

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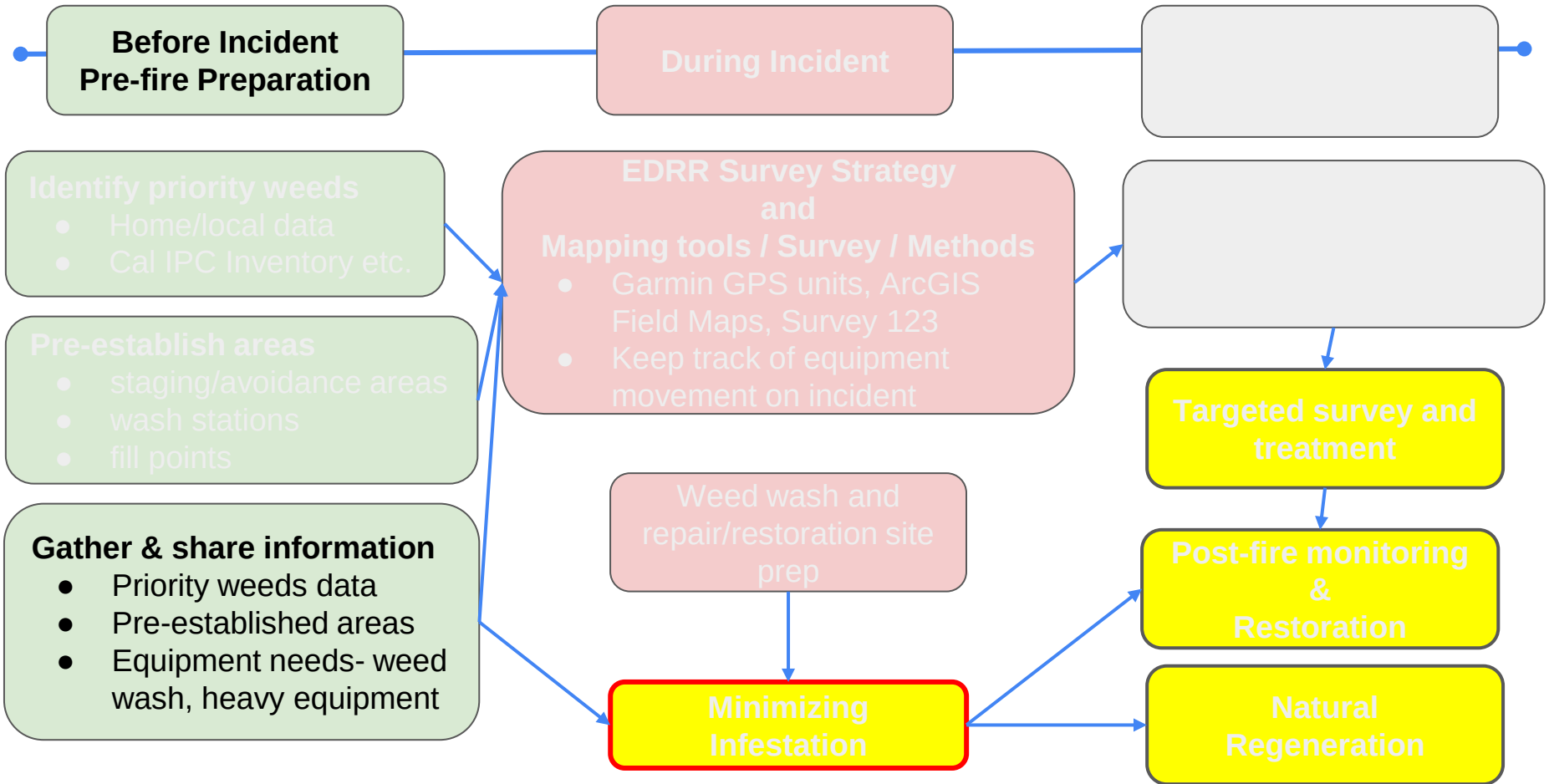
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Pre-fire Assessment: Management Plans and Support

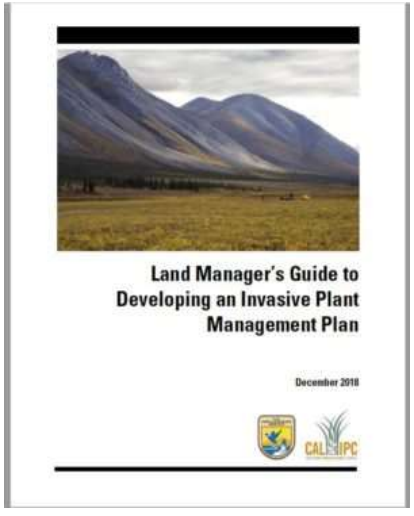
- Review your local land management and/or weed management plan(s)
- Reach out to other agencies / other land managers for support if needed
- Pre-season review sessions and learning sessions
- Past incident reports (where staging areas were located etc.)
- **Work with staff and share information prior to AND during the incident**

Last Component in ED**RR**

CAL-IPC resources:

Land Manager's Guide to Developing an Invasive Plant Management Plan

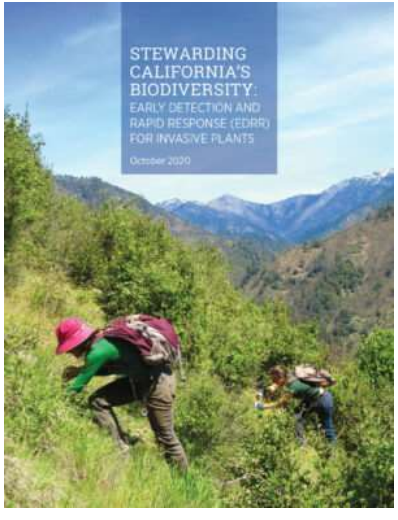
Stewarding California's Biodiversity: Early Detection and Rapid Response (EDRR) for Invasive Plants



Cal-IPC

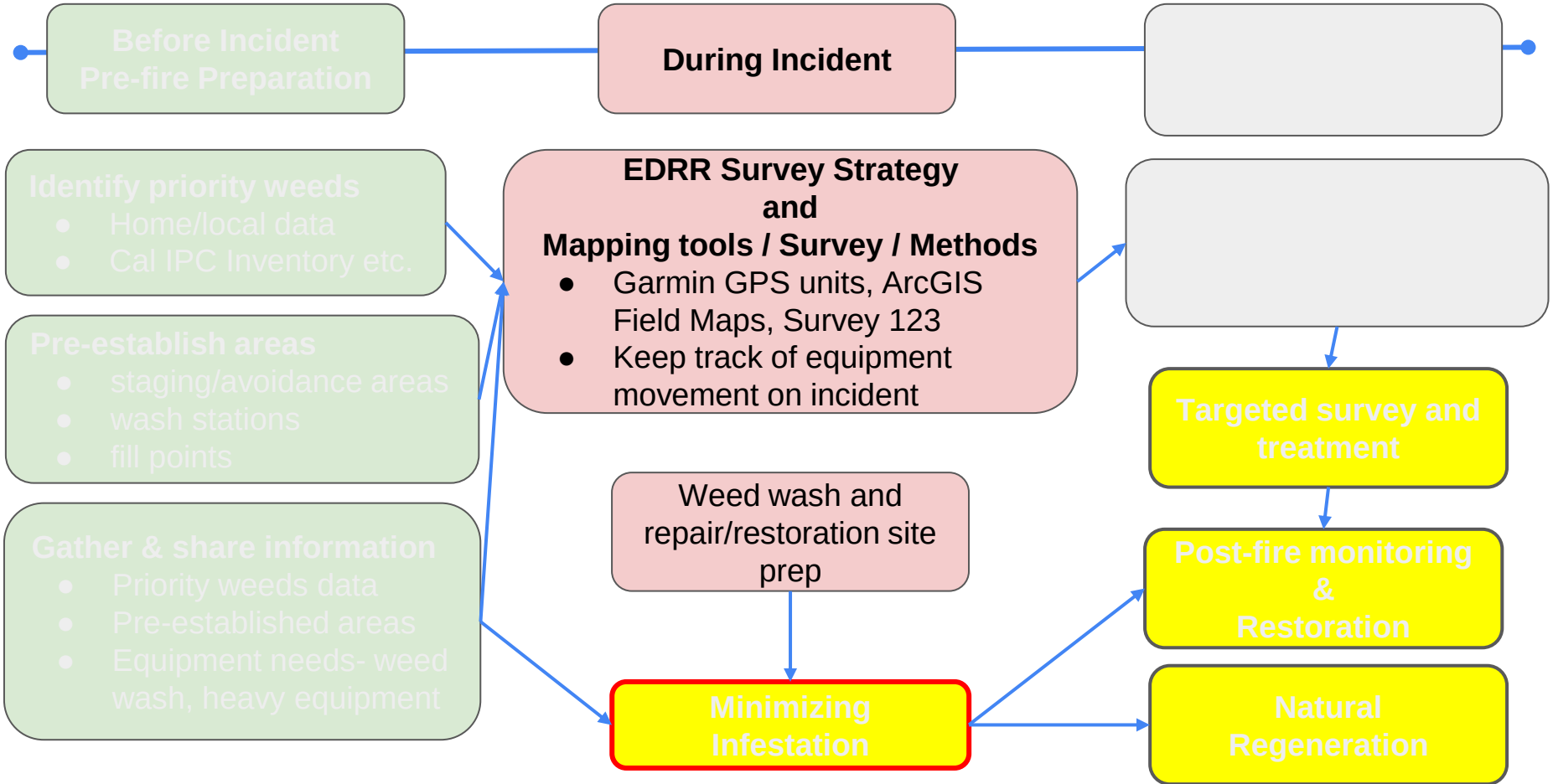
Tools-

- Local land management/weed management plans
- Home/local data (pre-fire assessments, seed needs, equipment inventory)
- Incident data



Prioritizing locations and treatments

Timeline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EDRR Survey Strategy

1. Use pre-fire assessment information to guide EDRR survey strategy
2. Target priority areas
    a. Areas with T&E species, dozer lines, blue lines, hand lines, staging areas, high traffic areas (Visitor Centers, parking lots, etc.), road sides
3. Have an understand of existing resources, assess opportunity/capacity to obtain additional resources (volunteers, staffing)
4. Prioritize the priority areas…
    a. Provides contingency for large landscapes and limited resources
    b. Break down the priority areas into units/subunits/blocks/plots

During Incident

- Open Communication with Incident Command
  - Attend briefings to understand fire spread, new lines created, cold lines
  - Keep in contact with Forester (CAL FIRE) or become a Resource Advisor (READ)
  - Share invasive plant information with Foresters or READs

READs and Incident staff from NPS, Google images

Mapping Tools

- Garmin GPS Units
  - Pros: Higher GPS accuracy
  - Cons: Not accessible to everyone
- Avenza (Phone app)
  - Pros: Mostly free, upload georeferenced georeferenced maps, offline use
  - Cons: Limited saved maps capacity (more storage requires license/app purchase)
- Gaia GPS (Phone app)
  - Pros: Mostly free, route tracking with waypoints
  - Cons: Limited data entry, unable to create polygons
- ArcGIS Field Maps (Phone app)
  - Pros: Likely incorporates existing mapping foundation, offline use, create groups
  - Cons: Requires license
  - Bonus: Tracking License – Track steps to help show area covered
- Calflora post-fire form (Phone app)
  - Pros: Free, Create project groups, accessible to volunteers
  - Cons: Can’t control drop downs, some post-processing to share data

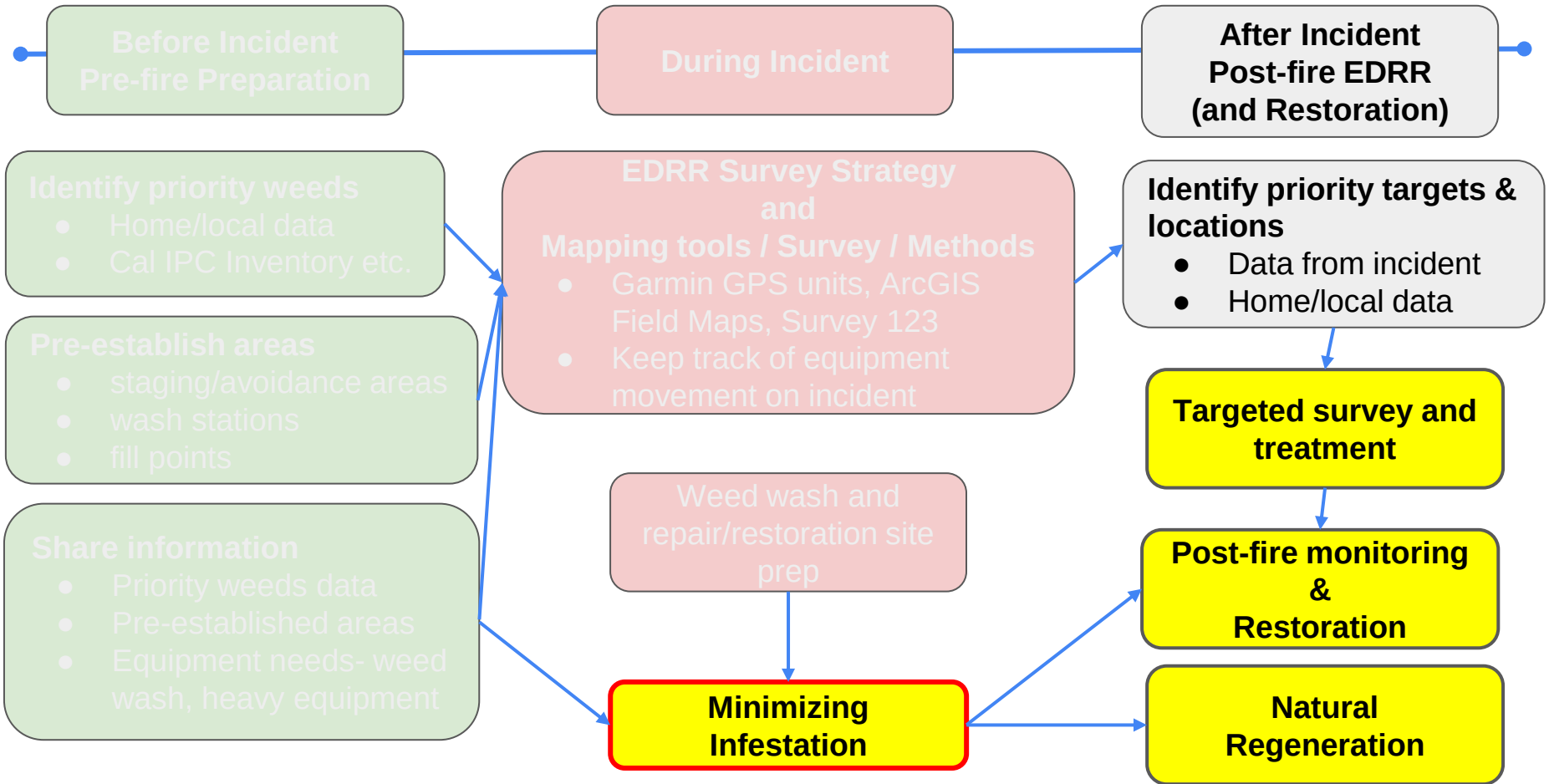
Other Data Collection Tools

- Survey 123
  - Collect GPS data and also input data into a form that creates a report
- Offline Google Sheets
  - Keep track of miscellaneous information in the field that can then be synced and shared with other staff/volunteers/partners
- Photo point monitoring phone apps or GPS Cameras
  - Track treatments, track untreated areas, monitor recover of dozer lines, hand lines, etc.

Attributes to Collect during Survey Effort

- Pre-plan what information is important to collect that is also helpful for long-term monitoring
  - Important to also consider time to record the data
- Point vs. Polyline vs. Polygon
- Species
- Date
- Phenology
- Approximate number
- Survey Year
- Mapped, Treated (type of treatment), Revisited
- Who recorded the data

Timeline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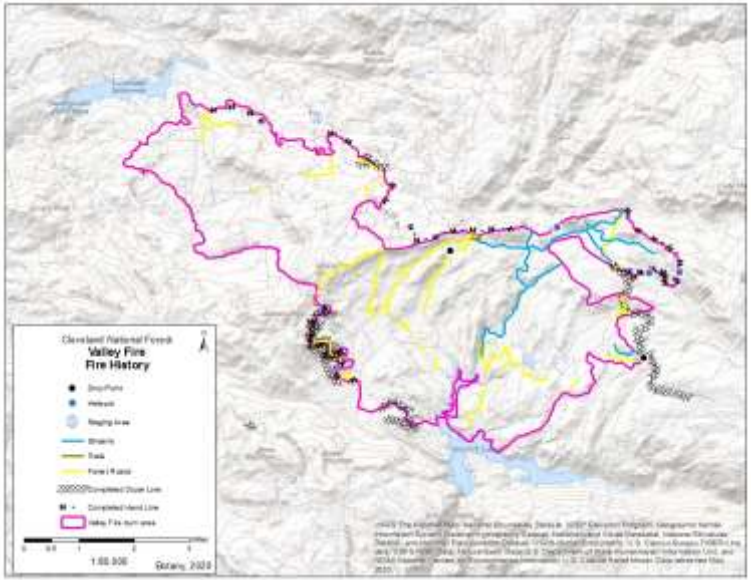
Post-fire Assessments: EDRR (and Restoration)

- Accessing and reviewing incident spatial data- looking at travel routes, previous weed infestations, erosion potential and soil burn severity
- Prioritizing target species for survey and treatment
- Prioritizing target areas for weed work or restoration (seeding, hydromulching, etc.)
- Developing feasible goals for implementation



Example map showing burn footprint and priority survey and treatment areas

Post Fire: Long-term Monitoring EDRR Sites

- Use photo point monitoring to track treatments, vegetation recovery on fire fighting lines
  - Prioritize photo point monitoring over the years
- Use attribute data in maps to track treatments and/or survey efforts
- Aerial Imagery

Dozerlines across a post-fire area, Cleveland NF 2020.

Post-fire: Considering Restoration

- Natural regeneration
- Identifying vulnerable areas
- Assess and plan additional restoration needs

Valley Fire, Cleveland NF 2020, picture taken June 2022

Dozerline, not repaired yet on the Chaparral Fire 2021 Cleveland NF, picture taken September 2021

How to prioritize management across a landscape?

Postfire Restoration Framework for National Forests in California

- Mapping exercise using GIS
- Informative map products (grass cover, biodiversity etc.)
- Public data
- In order to narrow scope / prioritize areas
- Full of cases studies and good information

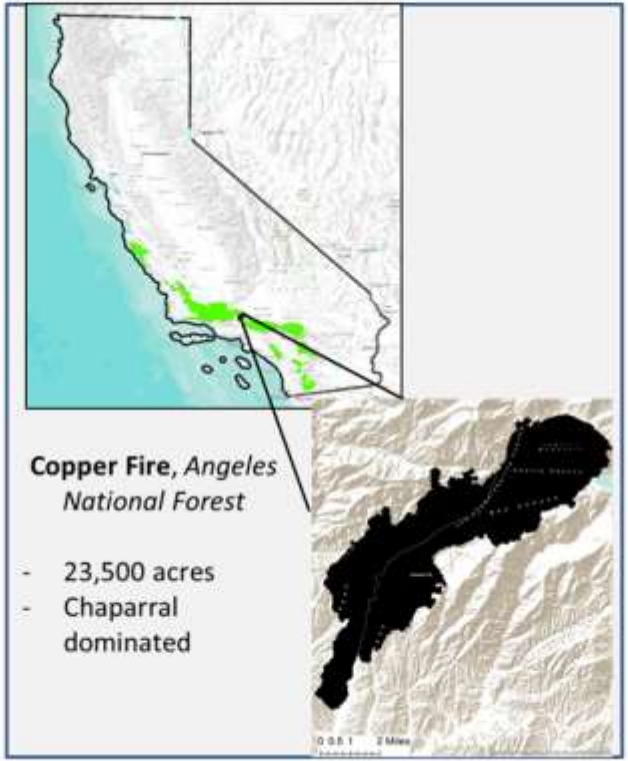
USDA Forest Service
2021
PSW-GTR-270

Post-fire restoration across large landscapes: Chaparral case study

Nicole Molinari
USFS Province Ecologist
UCSB Restoration Ecology
2 June 2022

POST-FIRE RESTORATION FRAMEWORK

FRAMEWORK APPLICATION

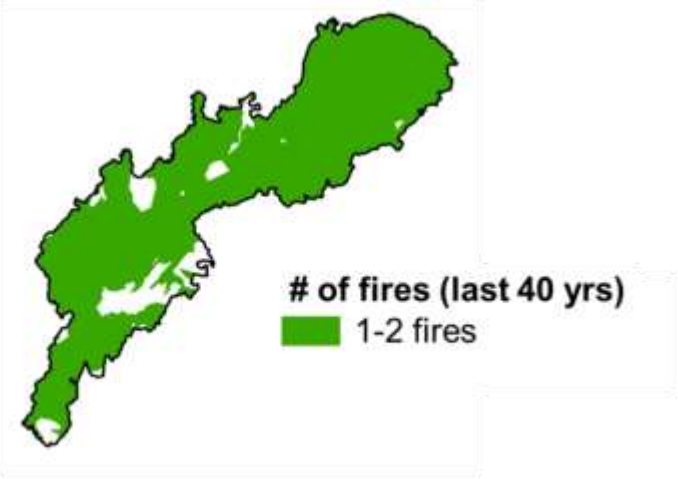


POST-FIRE RESTORATION FRAMEWORK

1. Where did fire improve, maintain or degrade ecological conditions and where are fire effects within the Natural Range of Variability?

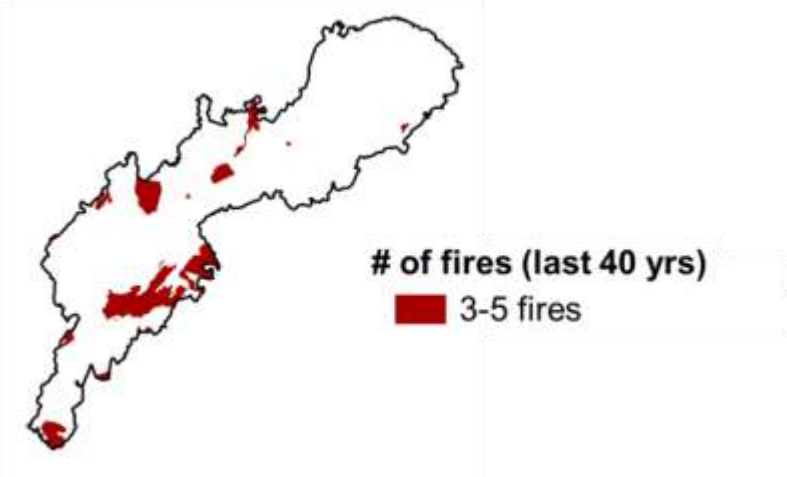
Fire within natural range of variation

Areas at low risk



Too frequent fire

Areas at high risk



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1. Where did fire improve, maintain or degrade ecological conditions and where are fire effects within the Natural Range of Variability?

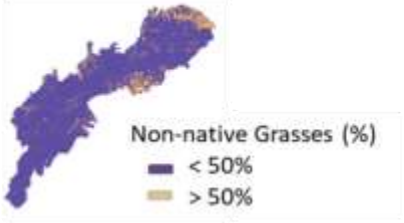
Fire within natural range of variation

Too frequent fire

2. Where do other factors threaten ecological resilience and sustainability?

Areas at high risk

Nonnative species & drought



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Nonnative species & drought

Low nonnative cover

Recovery likely

A. Maintain/promote desired conditions

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Low nonnative cover

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A. Maintain/promote desired conditions

Areas at high risk

Nonnative species & drought

Too frequent fire

Restoration need

High nonnative cover

POST-FIRE RESTORATION FRAMEWORK

1. Where did fire improve, maintain or degrade ecological conditions and where are fire effects within the Natural Range of Variability?

Where do other factors threaten ogical resilience and sustainability?

Areas at high risk

B. Where is restoration to a pre-fire condition feasible given current and anticipated future conditions?

Add climate exposure

Restoration is needed

A. Maintain/promote desired conditions

Restoration to pre-fire condition is **feasible**

II. Take management actions to restore pre-fire condition

Restoration to pre-fire condition is **infeasible**

III. Reevaluate desired conditions considering climate change & other stressors

POST-FIRE RESTORATION FRAMEWORK

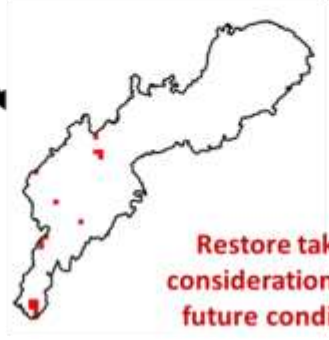
1. Where did fire improve, maintain or degraded ecological conditions and where are fire effects within the Natural Range of Variability?

2. Where do other factors threaten ecological resilience and sustainability?

B. Where is management feasible for the restoration of desired conditions given current and anticipated future conditions?

Natural recovery likely (80%)

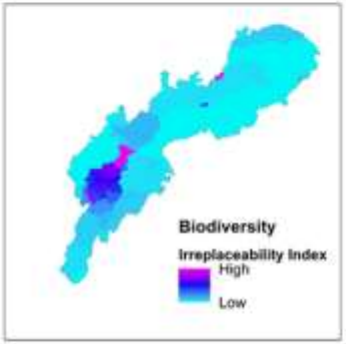
Restore to pre-fire condition (18%)

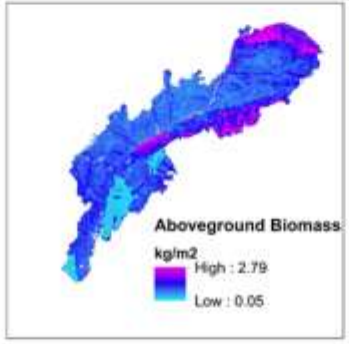


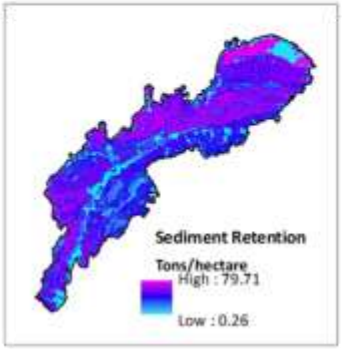
Restore taking into consideration current & future condition (2%)

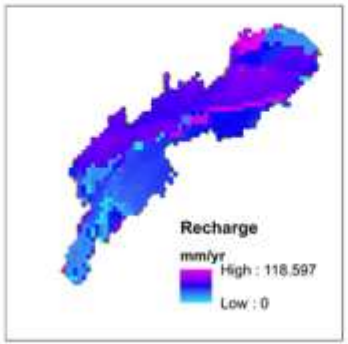
Prioritizing areas based on ecosystem service values

INDIVIDUAL SERVICES

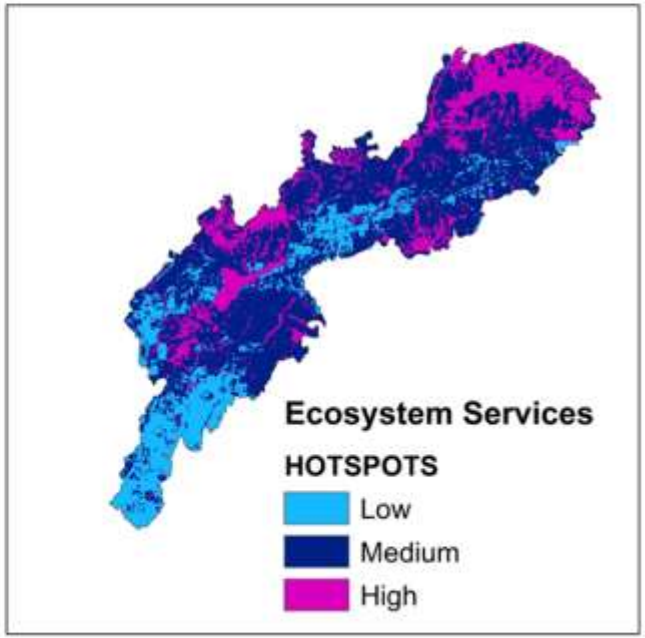








COMBINED SERVICES ("HOTSPOTS")



OPEN FOR DISCUSSION

Questions or thoughts?

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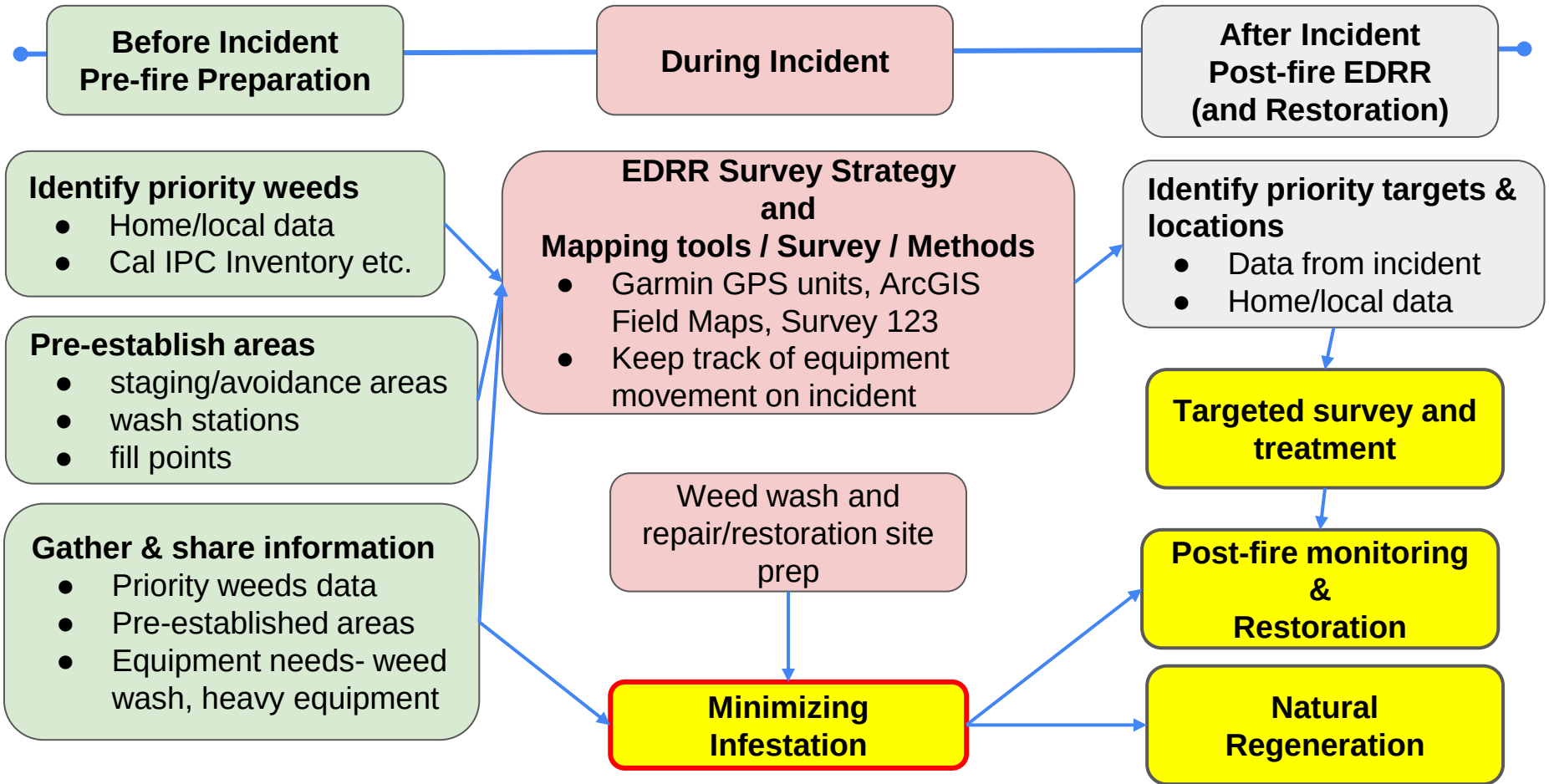
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Cal IPC Inventory etc.
Pre-establish areas
staging/avoidance areas
wash stations
fill points
Gather & share information
Priority weeds data
Pre-established areas
Equipment needs- weed wash, heavy equipment
EDRR Survey Strategy
and
Mapping tools / Survey / Methods
Garmin GPS units, ArcGIS Field Maps, Survey 123
Keep track of equipment movement on incident
Weed wash and repair/restoration site prep
Minimizing Infestation
Identify priority targets & locations
Data from incident
Home/local data
Targeted survey and treatment
Post-fire monitoring & Restoration
Natural Regeneration