Imazapyr (Stalker* or Chopper* herbicide);

Considerations for the Control of Invasive Plants

CalEPPC 2003
R. K. Brenton
Vegetation Management Considerations

- **Purpose**
  - Fuels
  - Access (ROW)
  - Facility integrity
  - Habitat restoration/creation
  - Noxious and exotic weed control

- **Ecosystem**
  - Forest
  - Grass land
  - Riparian
Vegetation Management Considerations

- **Legal use sites** (Labeled and purpose)
  - Roadside/trail/ROW (transportation/recreation)
  - Riverbank (water conveyance/habitat/recreation)
  - Pasture (grazing/wildlife habitat)
  - Potential disturbance

- **Target Species**
  - Grass/ broadleaf
  - Family/genus/species
  - Annual/perennial
Imazapyr

At a Glance

- **Stalker, Chopper**
  - 2 lb ai. Imazapyr
  - Imidazolinone
  - Broadleaf and grass activity
  - Broad spectrum/use sites
  - Category III
    - Caution label
Imazapyr

Mode of Action

- Pre & Post-emergent
- Amino Acid Synthesis Inhibition
  - AHS inhibitor
  - Growth stops and growing point becomes chlorotic
  - Plants die as result of AHS inhibition
- Very systemic/phloem mobile
- Slow metabolism in plants
- Moderate soil persistence
Imazapyr

Toxicity

- **Stalker, Chopper**
  - rat, Oral LD$_{50}$ > 5000mg/kg
  - rabbit, dermal LD$_{50}$ >2000 mg/kg
  - eye irrit., rabbit, moderate
  - NOEL, 24 months, 500-1500 mg/kg/d
  - Not an oncogenic (E rating)
  - Not a teratogen
  - Not A reproductive toxin
  - Not a mutagen
Imazapyr

Wildlife Toxicity

- Stalker, Chopper
  - Quail 8 day diet $\text{LC}_{50} > 5000\text{ppm}$
  - Duck 8 day diet $\text{LC}_{50} > 5000\text{ppm}$
  - Honey bees $\text{LD}_{50} > 100\text{ mg/bee}$
  - Earth worm 14 day $\text{LC}_{50} > 132.5\text{ppm}$
  - Daphnia 48 hr-$\text{LC}_{50} > 100\text{ppm}$
  - Bluegill 96 hr-$\text{LC}_{50} > 100\text{ppm}$
  - Trout 96 hr-$\text{LC}_{50} = > 100\text{ppm}$
  - Catfish 96 hr-$\text{LC}_{50} = > 100\text{ppm}$
Imazapyr
Environmental Fate

- **Stalker**
  - Soil half life ~ 25-142 days
    - Microbial Degradation
  - Water half life 2-3 days
    - Light
    - Temperature
  - Soil mobility
    - 12-18 inches vertically/no lateral movement
    - Binding is a factor of
      - OM and clay content (more = less movement)
      - pH (lower = less movement)
      - Moisture (less = less movement)
**Imazapyr**

*Spectrum*

- Alder
- Arundo
- Castor Bean
- Eucalyptus
- Fennel
- German Ivy
- Madrone
- Maple
- Manzanita
- Oaks
- Pepper (Brazilian)
- Other exotic grasses
- Other Brush

- Spartina
- Tamarix (salt cedar)
- Tanoak
- Tree of Heaven (Ailanthus)
- Willow sp.

*Weak on Berries, Broom, Mustards and Thistles*
Imazapyr; Pros for Habitat restoration

- **Spectrum**
  - Arundo
  - Tamarisk
  - Tree Of Heaven
  - Weak on legumes

- **Characteristics**
  - Phloem mobile
    - Very systemic
    - Persistent in the plant
  - Low volume capable/spot treatments
    - Little goes a long way
Imazapyr; Cons for Habitat restoration

- Spectrum
  - Grasses
  - Willows
  - Oaks
  - Weak on Thistles

- Characteristics
  - Soil active
    - Persistence
    - Undesirable selection
  - Phloem Mobile
    - Root Grafting
Imazapyr; Why Consider it for Arundo Control

- **Efficacy**
  - Very sensitive
  - Systemic
  - Slow to act
  - Control roots

- **Applications compatible with restoration**
  - Low Volume Foliar
    - Easy to direct
  - Backpack or ATV
  - Spot treatments avoid soil contact

- **Growth characteristics of Arundo**
  - Wide leaf
  - Extensive root system
  - Site Dominate
    - Non-target impact minimized
Imazapyr: Arundo Control Application Basics

- Rate or Concentration
  - 3% Stalker or Chopper
  - 5% MSO

- Volume and Coverage
  - 20% coverage of the upper portions of the plant
  - Uniform distribution of the applied material
  - 8-10 gpa max

- Application tips; back pack or Sure flow pump assist
  - Nozzle; X -1 or 2, 4003
    - Low volume
    - Focused pattern
    - Apply April thru October
  - Resprouts should be 3 to 5 feet tall and a majority of the site should have sprouted
Imazapyr; Precautions for Arundo Control

- Arundo density
- Proximity of desirable species to arundo
- Presence and density of undesirable species
  - YST,
- Proximity of water
- Revegetation plans
Imazapyr: Why Consider it for Salt Cedar Control

- **Efficacy**
  - Sensitive
  - Systemic
  - Persistent in plant
  - Tolerant of leaf residue

- **Applications compatible with control**
  - Low volume foliar
  - Basal
  - Backpack or ATV

- **Growth Characteristic of Salt Cedar**
  - Extensive canopy
  - Extensive root system
  - Site dominate

  - Impurities in surrounding soil reduce significant of imazapyr soil activity

Imazapyr: CalEPPC 2003
Imazapyr; Salt Cedar Control
Application Basics

- Rate or Concentration
  - 1% Stalker or Chopper
  - 5% MSO

- Volume and Coverage
  - 60% coverage of the entire plant
  - Uniform distribution of the applied material
  - 20-25 gpa max

- Application tips; back pack or Sure Flow pump assist
  - Nozzle; X -8 or, 6504
    - Slightly higher volume
    - Wider pattern
  - Apply leaf out through early color change
  - Resprouts should be 3 to 5 feet tall and should have true lateral branching
Imazapyr; Precautions for Salt Cedar Control

- Proximity of desirable species to Salt Cedar
- Proximity of water
- Revegetation plans
- Type of application
  - Poor cut stump treatment
Imazapyr; Why Not Consider it for Fennel Control

- Controls grass
- Weak on YST and mustards that may invade
- Label restricts foliar applications
- Soil activity may restrict plant back options.
- Better alternatives
Imazapyr;

- Make sure product fits the job
- Don’t broadcast
- Minimize soil contact when not dealing with monoculture
- Species efficacy is secondary to habitat restoration goals
- Must be part of an integrated approach