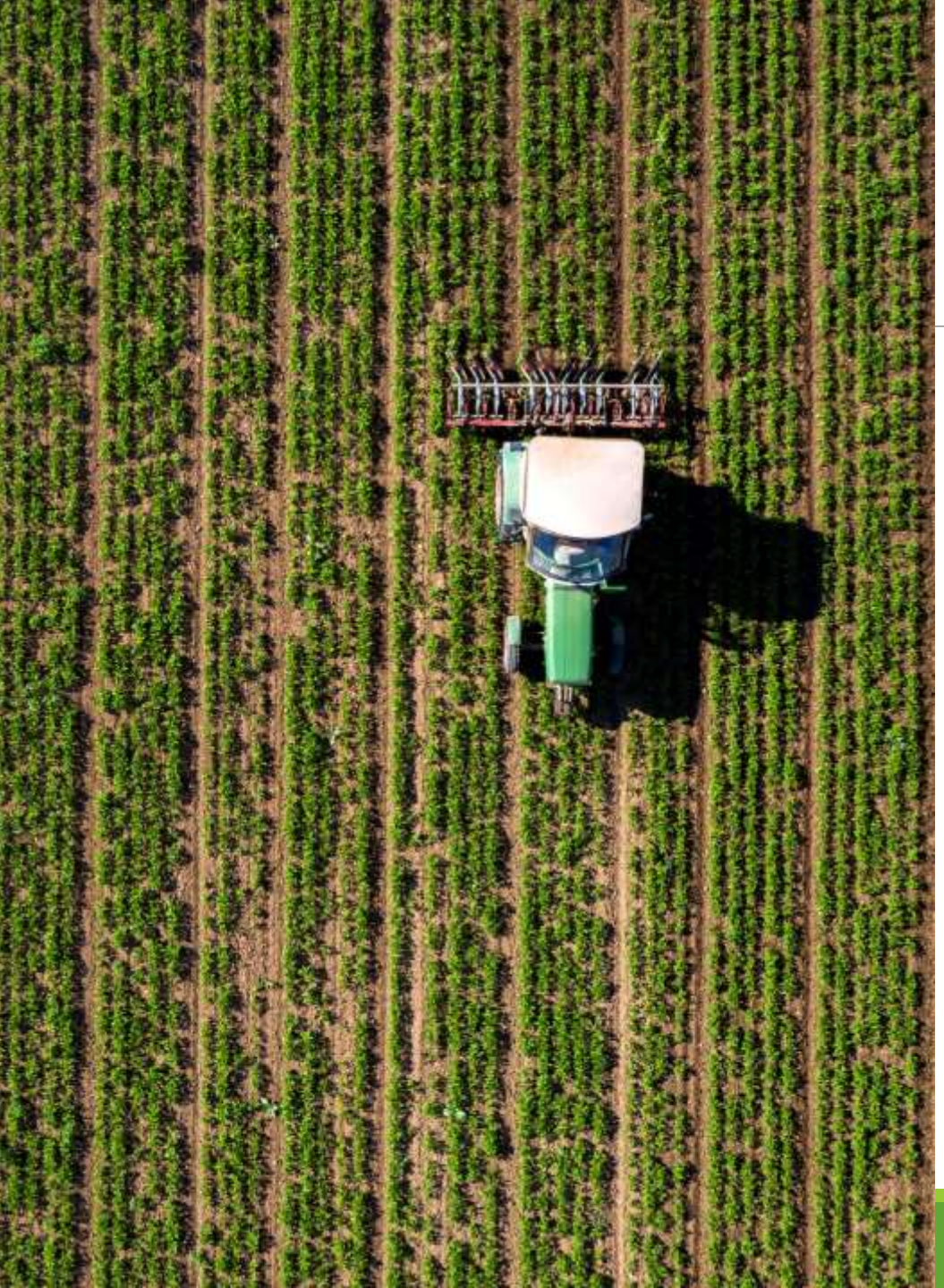
ACCELERATING SUSTAINABLE PEST MANAGEMENT IN CALIFORNIA USING PRESCRIBE FOR ENDANGERED SPECIES

CATHERINE BILHEIMER

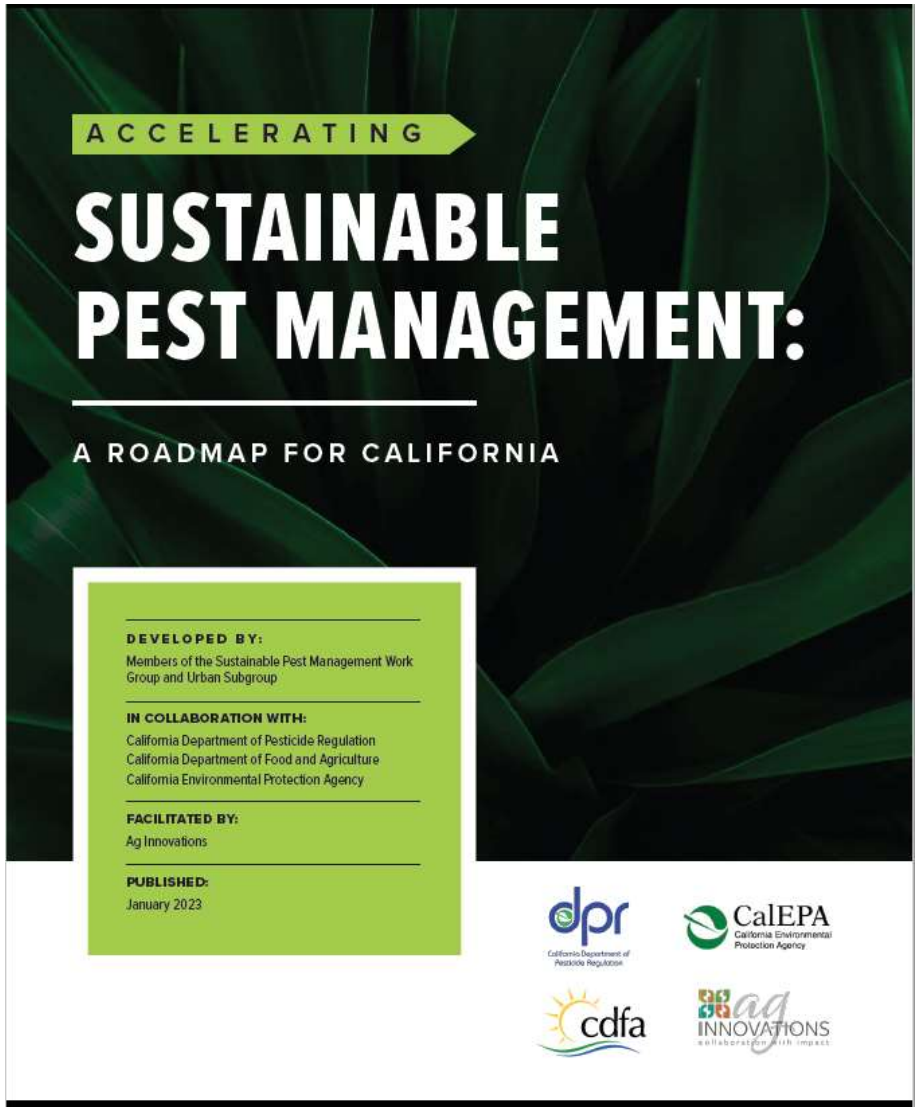


DPR's Vision

A California where pest management is safe, effective, and sustainable for everyone.

Why Sustainable Pest Management (SPM)?

- Pest management is a critical practice in agricultural for supporting a stable, healthy food supply. Pest management also necessary to protect public health.
- The way we manage pests has an impact on people and the environment.
- Need to address new and increasing pest pressures due to weather events and climate change.
- Currently available reduced-risk tools declining in efficacy.
- Develop a systemwide approach and accelerate adoption of SPM in both agricultural and non-ag urban settings.



The Roadmap for California

Diverse, cross-sector work group conducted a two-year collaborative process.

Focused on challenges/opportunities for systemwide adoption of SPM, and improving health and environmental protection while supporting healthy food production.

Builds on existing IPM and land stewardship.

Released in January 2023.

Sustainable Pest Management (SPM)

Sustainable Pest Management (SPM) is a **holistic, whole-system approach** to managing pests in agricultural and other managed ecosystems and urban and rural communities.

SPM **builds on the concept and practice of integrated pest management (IPM)** and land stewardship to include the wider context of three sustainability pillars:

- Human Health and Social Equity
- Broadened Environmental Protections
- Economic Viability

The SPM Roadmap: 2050 Goals

1

BY 2050...

California has eliminated the use of Priority Pesticides[3] by transitioning to sustainable pest management practices.

2

BY 2050...

Sustainable pest management has been adopted as the de facto pest management system in California.

Keystone Actions

- Prioritize **prevention**
- Coordinate state-level **leadership**
- Invest in building SPM **knowledge** (in agricultural and urban settings)
- Improve California's pesticide **registration** processes and bring alternative products to market
- Enhance **monitoring** and data collection

Next Steps

The transition to Sustainable Pest Management will require ongoing engagement and collaboration among all stakeholders.

Overview

- Endangered Species Introduction
- Endangered Species Program Goals
  1. Address endangered species/pesticide issues
  2. Develop Pesticide Use Limitations
  3. Behind the scenes of PRESCRIBE-Identify endangered species habitats for use in PRESCRIBE
- How to use PRESCRIBE
  - PRESCRIBE desktop and mobile

What is an Endangered Species?

Northern spotted owl

Showy indian clover

San Joaquin kit fox

A plant or animal with very few of its members left.


Northern spotted owl


Showy indian clover


San Joaquin kit fox


Behren’s silverspot butterfly


California red-legged frog


Chinook salmon

How Species Become Endangered

- Loss of the area where they live
- Loss of food/prey
- Human consumption (fish, trees)
- Environmental pollution
- Climate changes
- Other factors


Lotis blue butterfly


Contra Costa goldfields


Giant garter snake

Pesticides and Endangered Species

- Beginning in the 1940s and continuing until it was banned in 1972, the pesticide DDT affected species like the Peregrine falcon and the California brown pelican. It caused them to produce thin-shelled eggs which were crushed by adults.

- We want pesticides to be used carefully, to prevent affecting endangered species.

Endangered Species Protection Issues

- Working with federal funding since 1988.
- County Bulletins- DPR coordinated protection strategies with the Department of Fish and Wildlife, the Department of Food and Agriculture, and County Agricultural Commissioners.
- Bulletins were cumbersome to use (40-60 pages) and difficult to update in paper.


Myrtle's Silverspot Butterfly

PRESCRIBE was developed in 2005

- PRESCRIBE online database was developed to replace paper bulletins and take advantage of digital processing speed and ease to update
  - PRESCRIBE desktop went online in 2005
  - PRESCRIBE mobile available in 2013


San Joaquin Kit Fox

DPR's Endangered Species Program Goals

1. Address endangered species/pesticide issues resulting from the use of rodenticides, insecticides, herbicides, or fungicides.

2. Develop Pesticide Use Limitations to reduce effects of pesticides on endangered species.

3. Identify endangered species habitats for use in PRESCRIBE.


Stephen's Kangaroo Rat

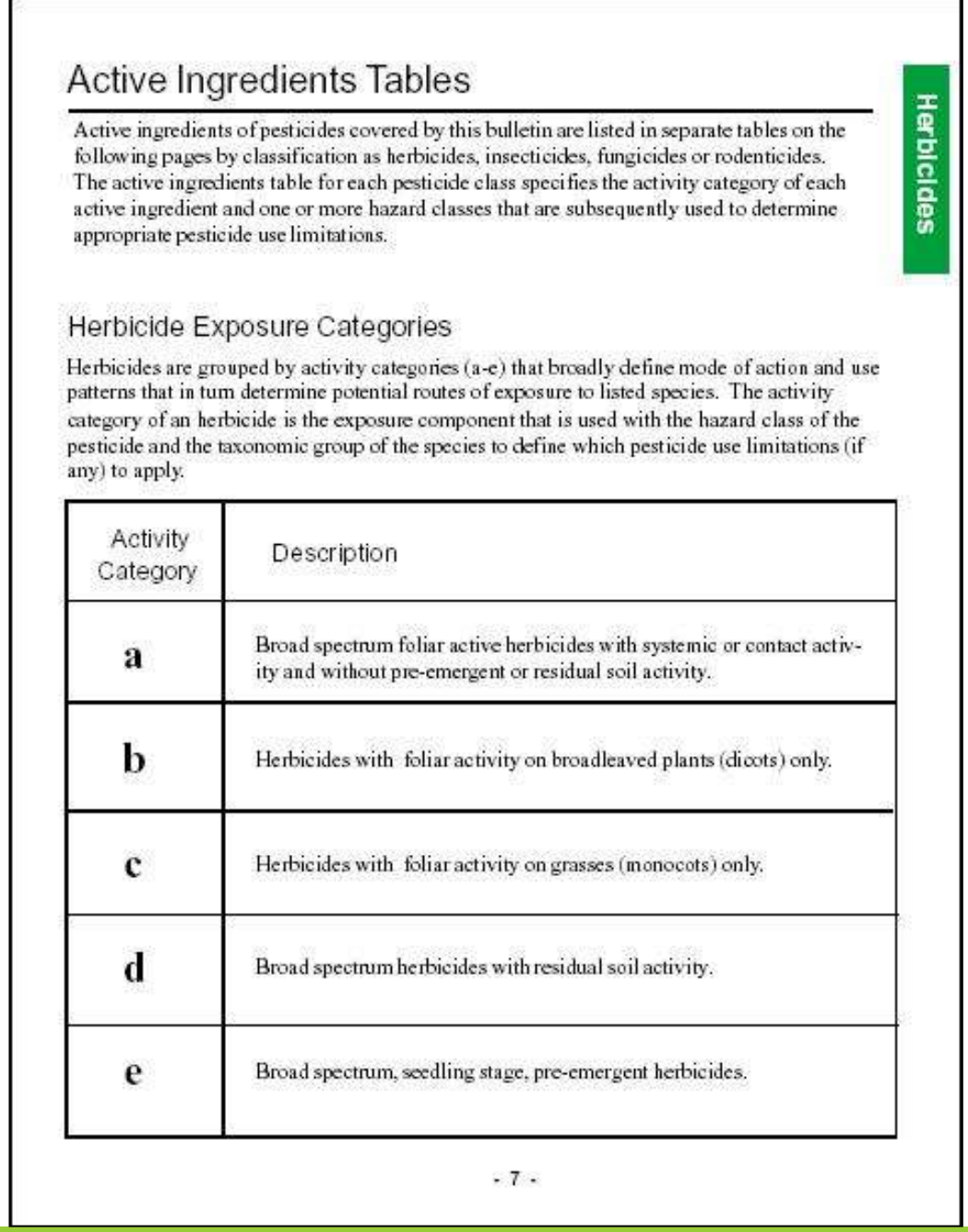
Exploring Program Goal 1

Address endangered species/pesticide issues resulting from the use of rodenticides, insecticides, herbicides, or fungicides.

- Pesticide Classification Process

  Example- HERBICIDES

- Products are grouped by activity categories, which broadly define their mode of action and use patterns, to determine potential routes of exposure to listed species.



Active Ingredients Tables

Herbicides

Active ingredients of pesticides covered by this bulletin are listed in separate tables on the following pages by classification as herbicides, insecticides, fungicides or rodenticides. The active ingredients table for each pesticide class specifies the activity category of each active ingredient and one or more hazard classes that are subsequently used to determine appropriate pesticide use limitations.

Herbicide Exposure Categories

Herbicides are grouped by activity categories (a-e) that broadly define mode of action and use patterns that in turn determine potential routes of exposure to listed species. The activity category of an herbicide is the exposure component that is used with the hazard class of the pesticide and the taxonomic group of the species to define which pesticide use limitations (if any) to apply.

Activity Category	Description
a	Broad spectrum foliar active herbicides with systemic or contact activity and without pre-emergent or residual soil activity.
b	Herbicides with foliar activity on broadleaved plants (dicots) only.
c	Herbicides with foliar activity on grasses (monocots) only.
d	Broad spectrum herbicides with residual soil activity.
e	Broad spectrum, seedling stage, pre-emergent herbicides.

- 7 -

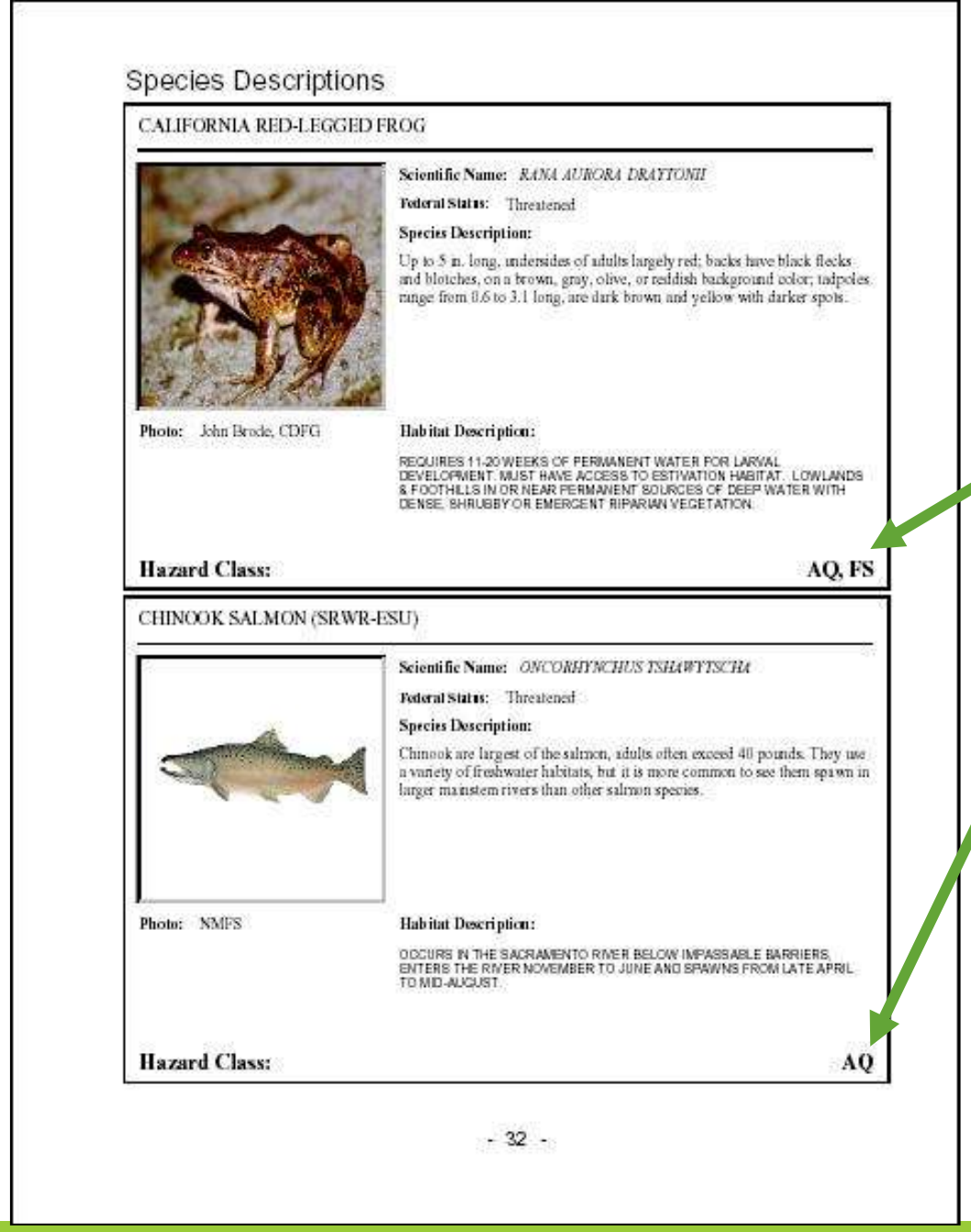
- Each AI is classified by potential hazard class.
- In this example- Aquatic Animals and Plants (Dicots or Monocots).

Active Ingredients (Herbicides)

Herbicides

Active Ingredients	Hazard Class		
		Plants	
	Aquatic Animals (AQ)	Dicot (PD)	Monocot* (PM)
2,4-D		X	
2,4-D, butoxyethanol ester	X	X	
2,4-D, dimethylamine salt		X	
2-(2,4-DP), dimethylamine salt		X	
4(2,4-DB), dimethylamine salt		X	
alachlor		X	X
atrazine		X	X
benefin	X	X	X
bensulfuron methyl		X	X
bensulide		X	X
bentazon, sodium salt		X	X
bromacil		X	X
bromoxynil	X	X	X
butylate		X	X
cacodylic acid		X	X
carfentrazon-ethyl		X	X
chlorsulfuron		X	
chlorthal-dimethyl		X	X
clethodim			X
clopyralid		X	
copper	X		
copper ethanolamine complex	X		

* and gymnosperms



Species Descriptions

CALIFORNIA RED-LEGGED FROG

Scientific Name: *RANA AURORA DRAYTONII*

Federal Status: Threatened

Species Description:

Up to 5 in. long, undersides of adults largely red; backs have black flecks and blotches, on a brown, gray, olive, or reddish background color; tadpoles range from 0.6 to 3.1 long, are dark brown and yellow with darker spots.

Photo: John Brode, CDFG

Habitat Description:

REQUIRES 11-20 WEEKS OF PERMANENT WATER FOR LARVAL DEVELOPMENT. MUST HAVE ACCESS TO ESTIVATION HABITAT. LOWLANDS & FOOTHILLS IN OR NEAR PERMANENT SOURCES OF DEEP WATER WITH DENSE, SHRUBBY OR EMERGENT RIPARIAN VEGETATION.

Hazard Class: AQ, FS

CHINOOK SALMON (SRWR-ESU)

Scientific Name: *ONCORHYNCHUS TSHAWYTSCHA*

Federal Status: Threatened

Species Description:

Chinook are largest of the salmon, adults often exceed 40 pounds. They use a variety of freshwater habitats, but it is more common to see them spawn in larger mainstem rivers than other salmon species.

Photo: NMFS

Habitat Description:

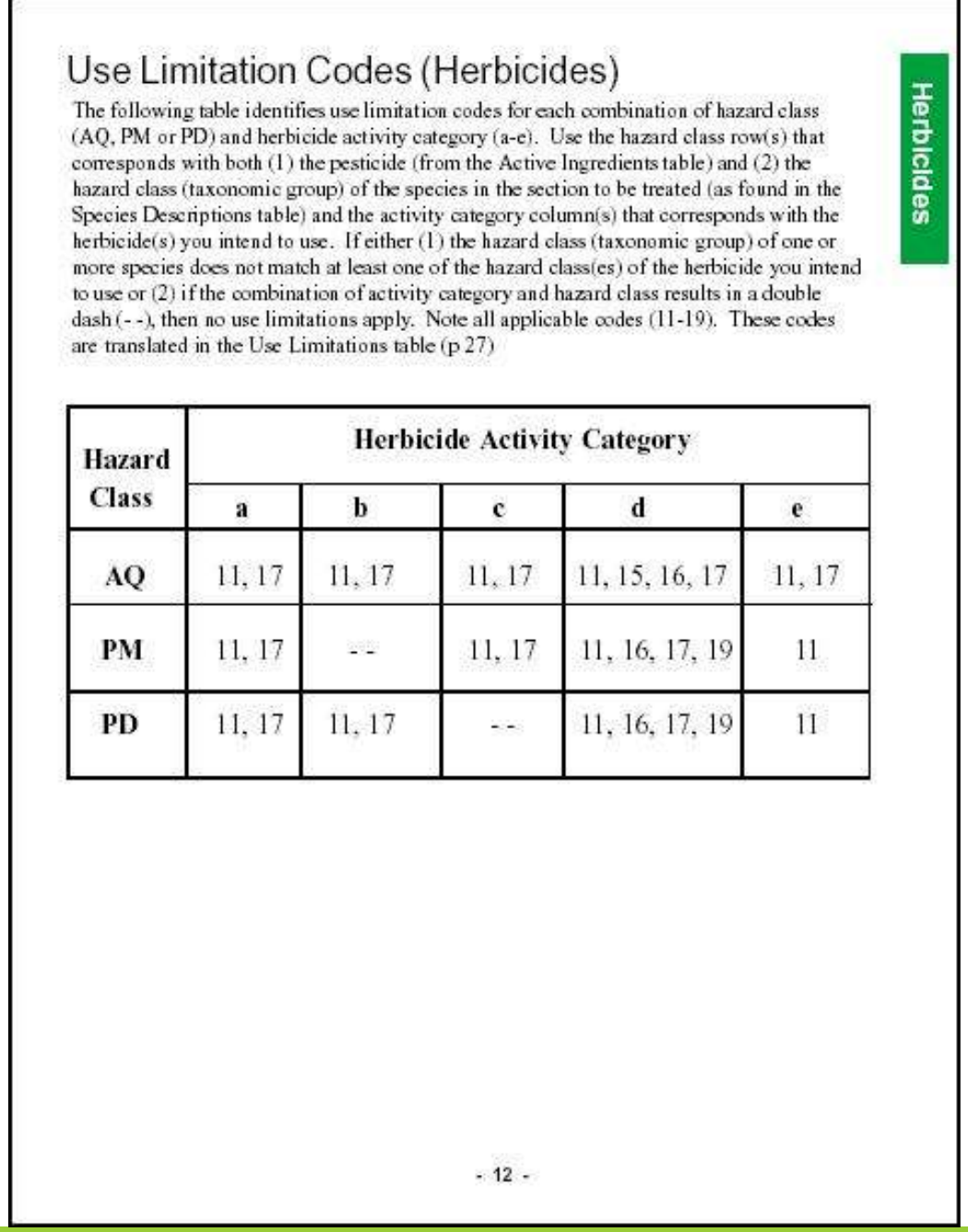
OCCURS IN THE SACRAMENTO RIVER BELOW IMPASSABLE BARRIERS, ENTERS THE RIVER NOVEMBER TO JUNE AND SPAWNS FROM LATE APRIL TO MID-AUGUST.

Hazard Class: AQ

- 32 -

- A hazard class indicates which types of hazards may impact a given species.
- In this example, CA red-legged frog is affected by the Aquatic (AQ) and Fosorial (FS) hazard classes and Chinook Salmon is affected by the AQ hazard class.

- Combine Hazard Class and Activity Category to determine the Use Limitation(s) that apply to the Active Ingredient being selected.



Use Limitation Codes (Herbicides)

Herbicides

The following table identifies use limitation codes for each combination of hazard class (AQ, PM or PD) and herbicide activity category (a-e). Use the hazard class row(s) that corresponds with both (1) the pesticide (from the Active Ingredients table) and (2) the hazard class (taxonomic group) of the species in the section to be treated (as found in the Species Descriptions table) and the activity category column(s) that corresponds with the herbicide(s) you intend to use. If either (1) the hazard class (taxonomic group) of one or more species does not match at least one of the hazard class(es) of the herbicide you intend to use or (2) if the combination of activity category and hazard class results in a double dash (- -), then no use limitations apply. Note all applicable codes (11-19). These codes are translated in the Use Limitations table (p 27)

Hazard Class	Herbicide Activity Category				
	a	b	c	d	e
AQ	11, 17	11, 17	11, 17	11, 15, 16, 17	11, 17
PM	11, 17	- -	11, 17	11, 16, 17, 19	11
PD	11, 17	11, 17	- -	11, 16, 17, 19	11

- 12 -

Exploring Program Goal 2

Develop Pesticide Use Limitations to reduce effects of pesticides on endangered species.

What to know about DPR's Pesticide Use Limitations

- Seek to protect endangered species from harm due to pesticide use while allowing lawful pest control.
- Apply to any Active Ingredient being considered for use in proximity to endangered species habitat.
- May include specific methods of application, restrictions, or prohibitions that apply to a given pesticide.
- Advisory, not enforceable.

Example of Use Limitation # 15 for run-off containment- requires a 20 foot minimum strip of vegetation on which pesticides should not be applied along rivers, creeks, streams, wetlands, vernal pools, and stock ponds, or on the downhill side of fields where run-off could occur.

Example of Use Limitation # 17 for spray-able or dust formulations- limits applications within 200 yards by air or 40 yards by ground upwind of occupied habitat.

Example of Use Limitation # 19 for soil active herbicides- restricts application within 30 yards upslope of habitat, unless a suitable method is used to contain or divert runoff waters.

Exploring Program Goal 3

Identify endangered species habitats for use in PRESCRIBE.

- Species covered in PRESCRIBE
- How we identify habitats

Species included in PRESCRIBE

- **Federal** Endangered, Threatened, and Candidate Species in California (309 species).


California Red-legged Frog

Species included in PRESCRIBE

- **California** Endangered, Threatened, and Candidate Species (255 species).

Species included in PRESCRIBE

- Species with no Federal or California listing but are California Native Plant Society listed **1B.1, 1B.2, and 1B.3** (783 species).

Sand-loving (Coast) Wallflower

Species included in PRESCRIBE

- Other **species of concern** because limited habitat or limited numbers (ex. Burrowing Owl).

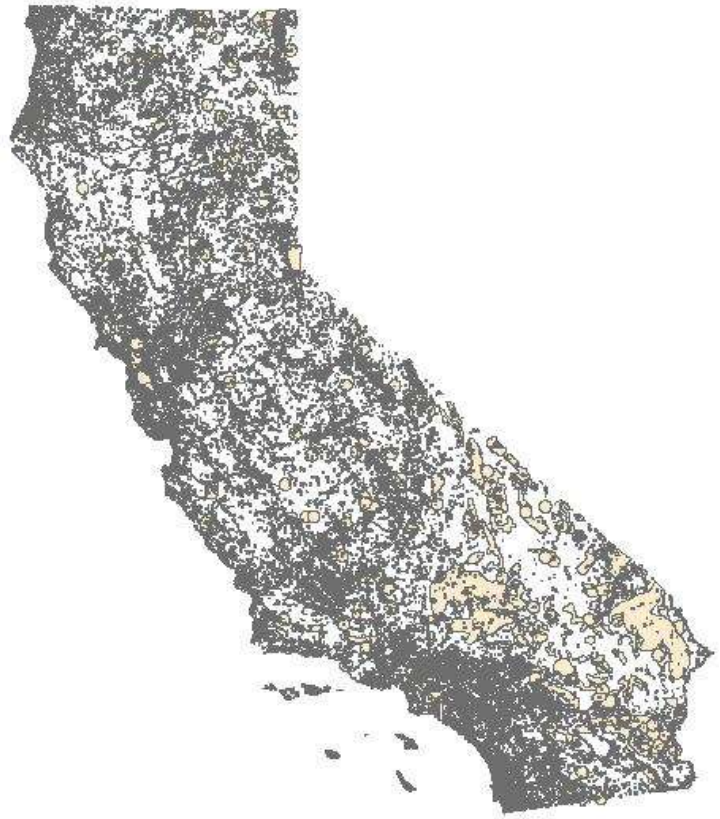
How we identify habitats

We use the **California Natural Diversity Database (CNDDB)**- it is an inventory of the status and locations of rare plants and animals in California.

California Department of
Fish and Wildlife

Statewide view of CNDDB polygons

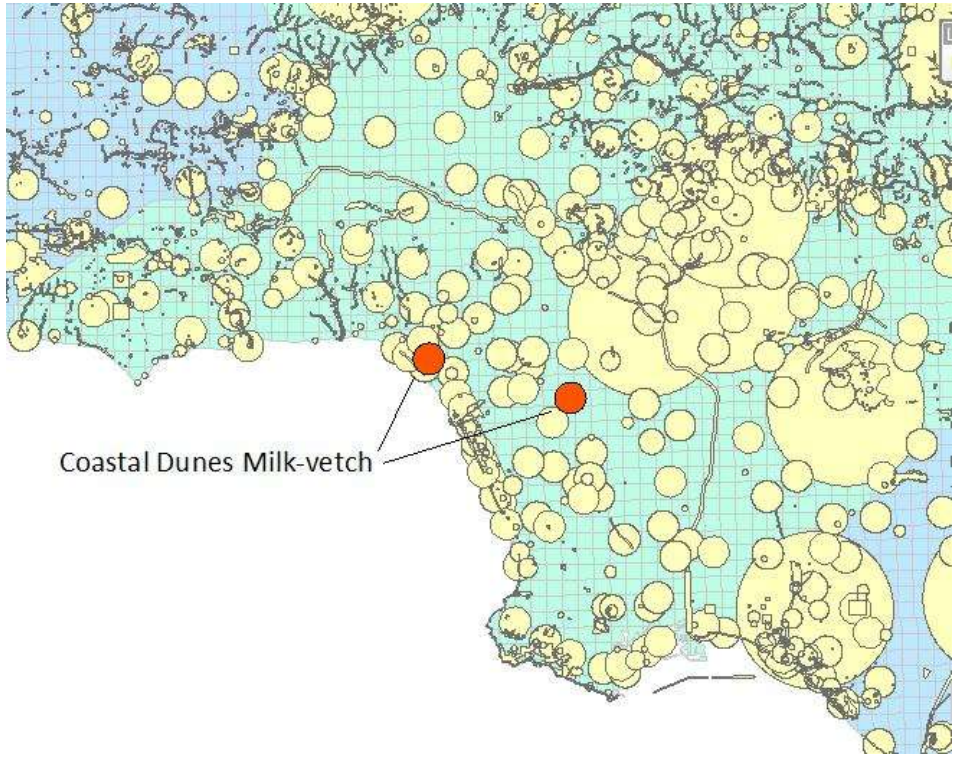
- We convert polygon information for each species to a Township/Range/Section list.



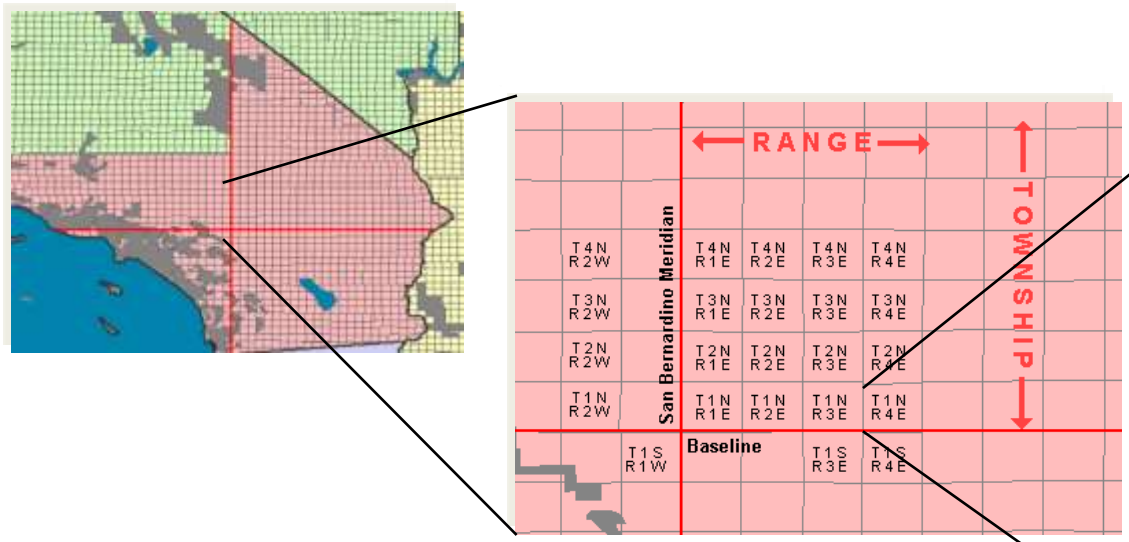
Close-up view of CNDDB polygons

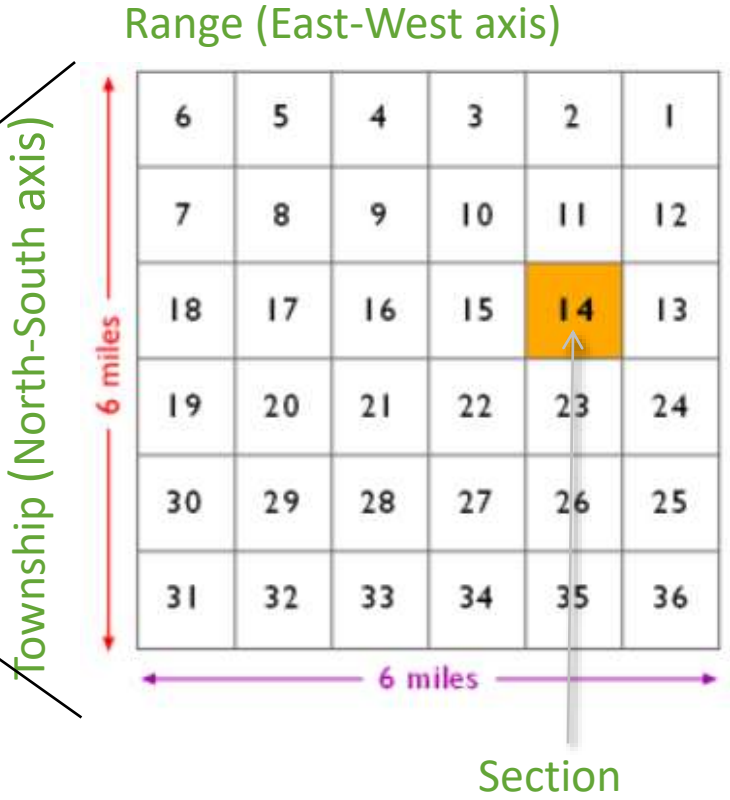
Example: Coastal Dunes Milk-vetch in Monterey County

© 2005 Bob Huettmann



We overlay the Public Land Use Survey System Coordinates (TRS)

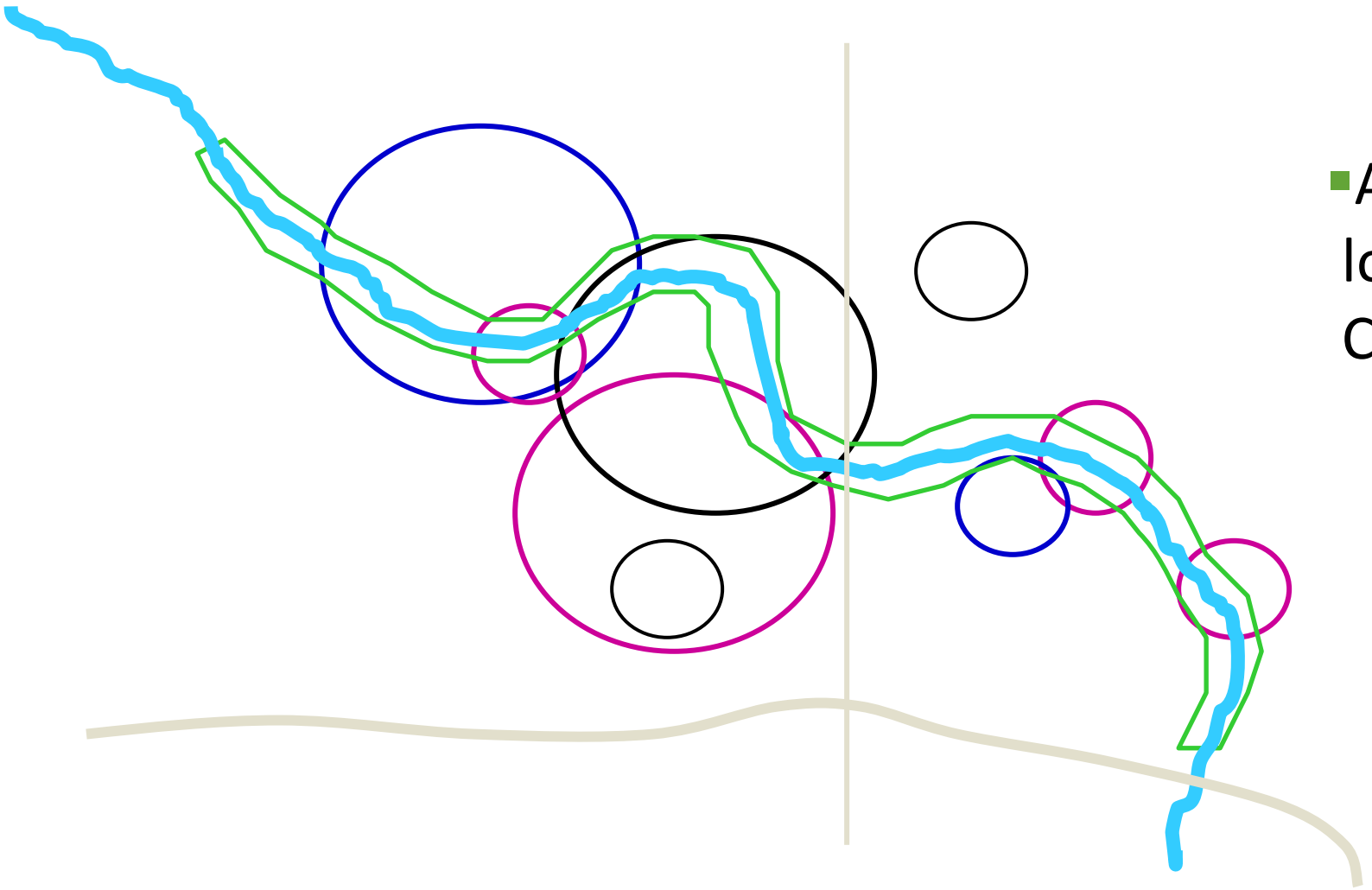




- In California there are over 4,000 Townships, each one containing 36 sections.
- Each section has a unique T/R/S coordinate code.

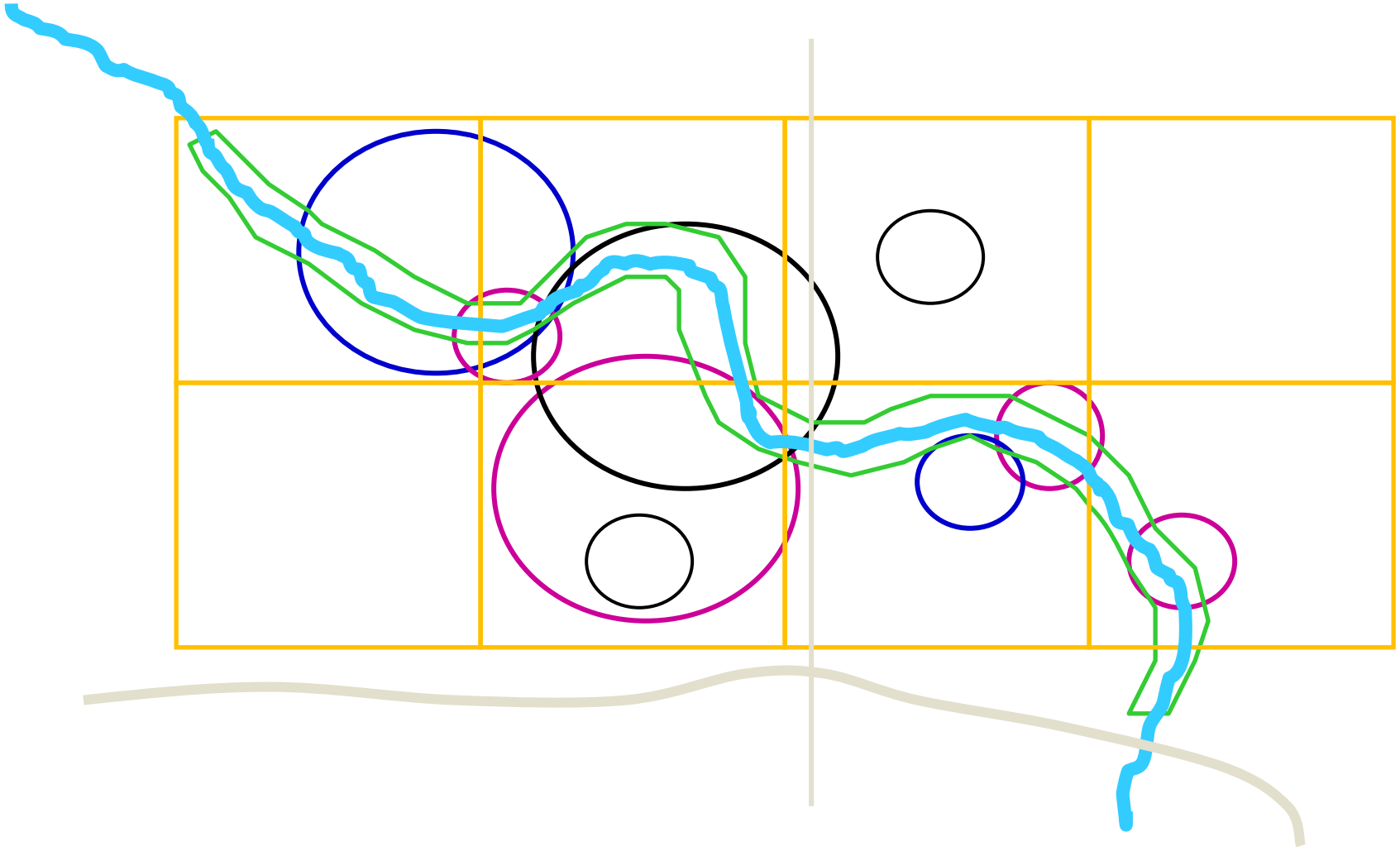
Example: T01NR4ES14

Creating a Section List- Step 1



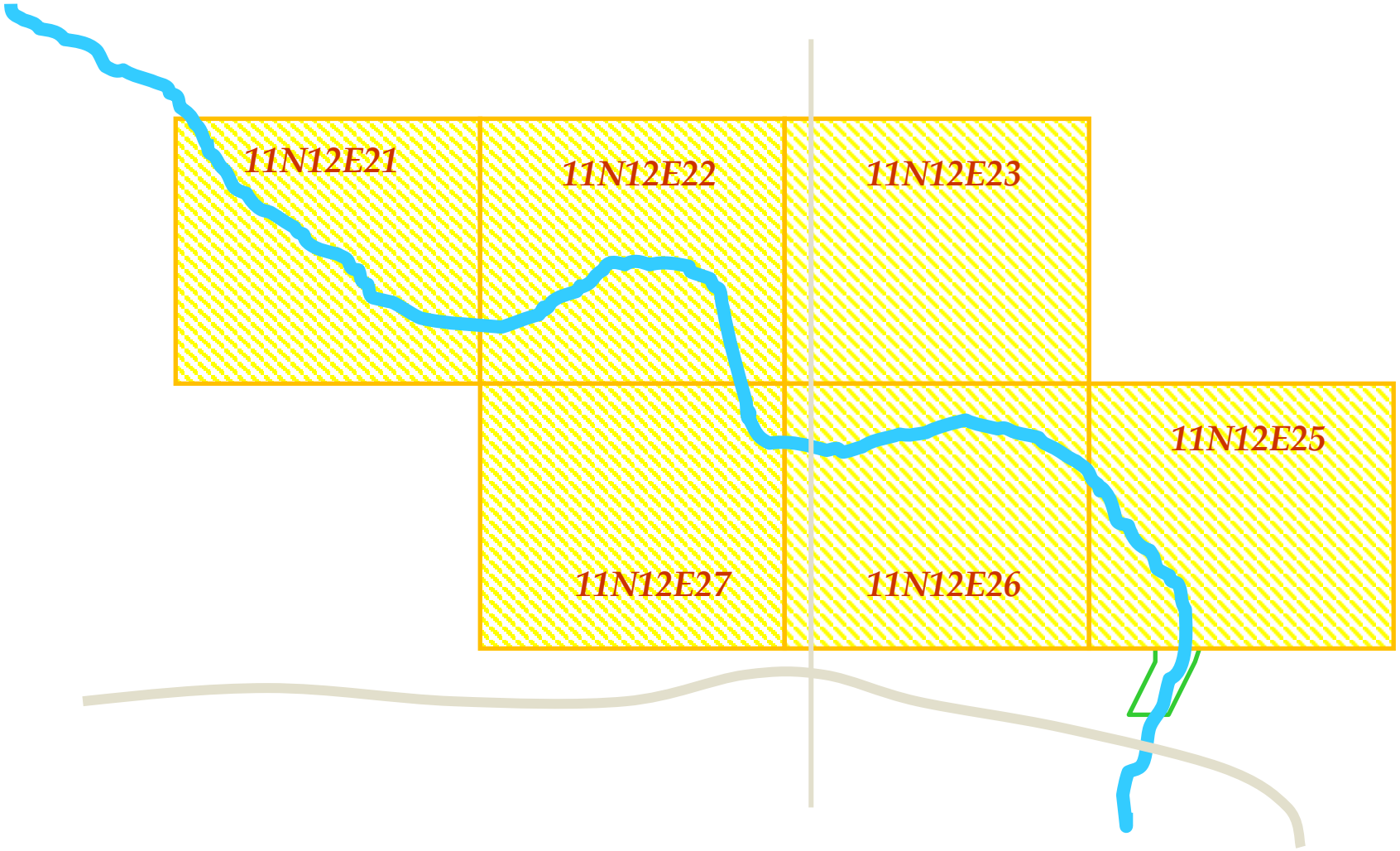
- Add endangered species location polygons from CNDDB.

Creating a Section List- Step 2



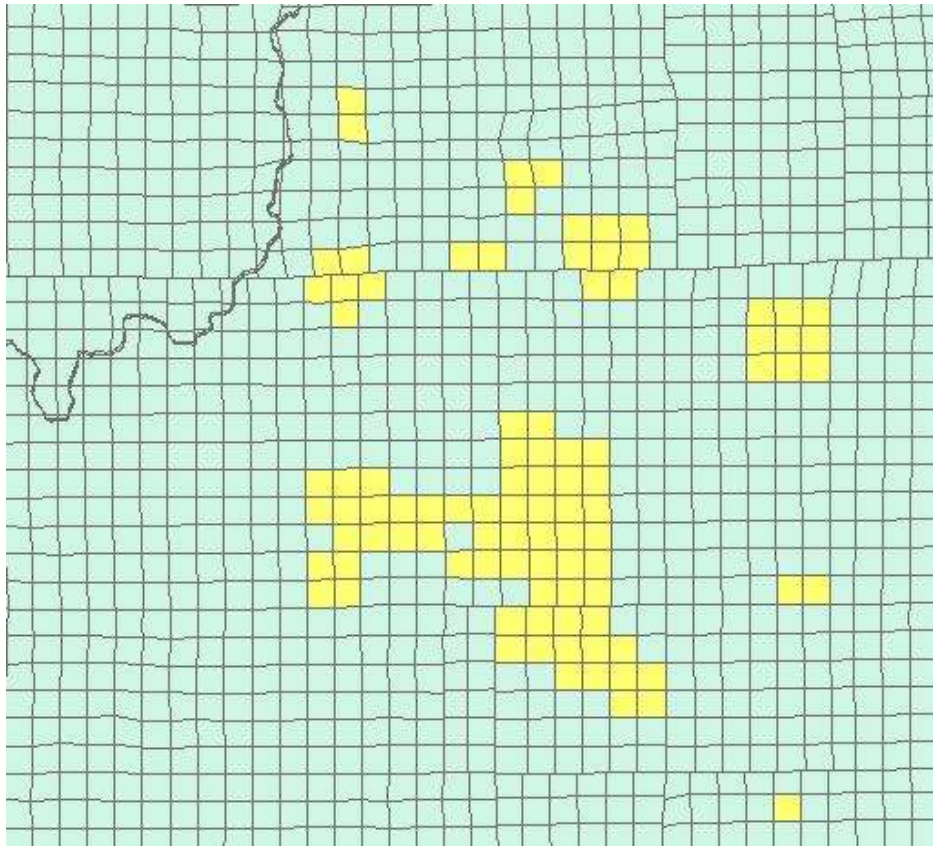
- Overlay the Township/Range/ Section (TRS) grid.
- A species is included in a section if it is contained entirely or in part within that section.

Creating a section list- Step 3



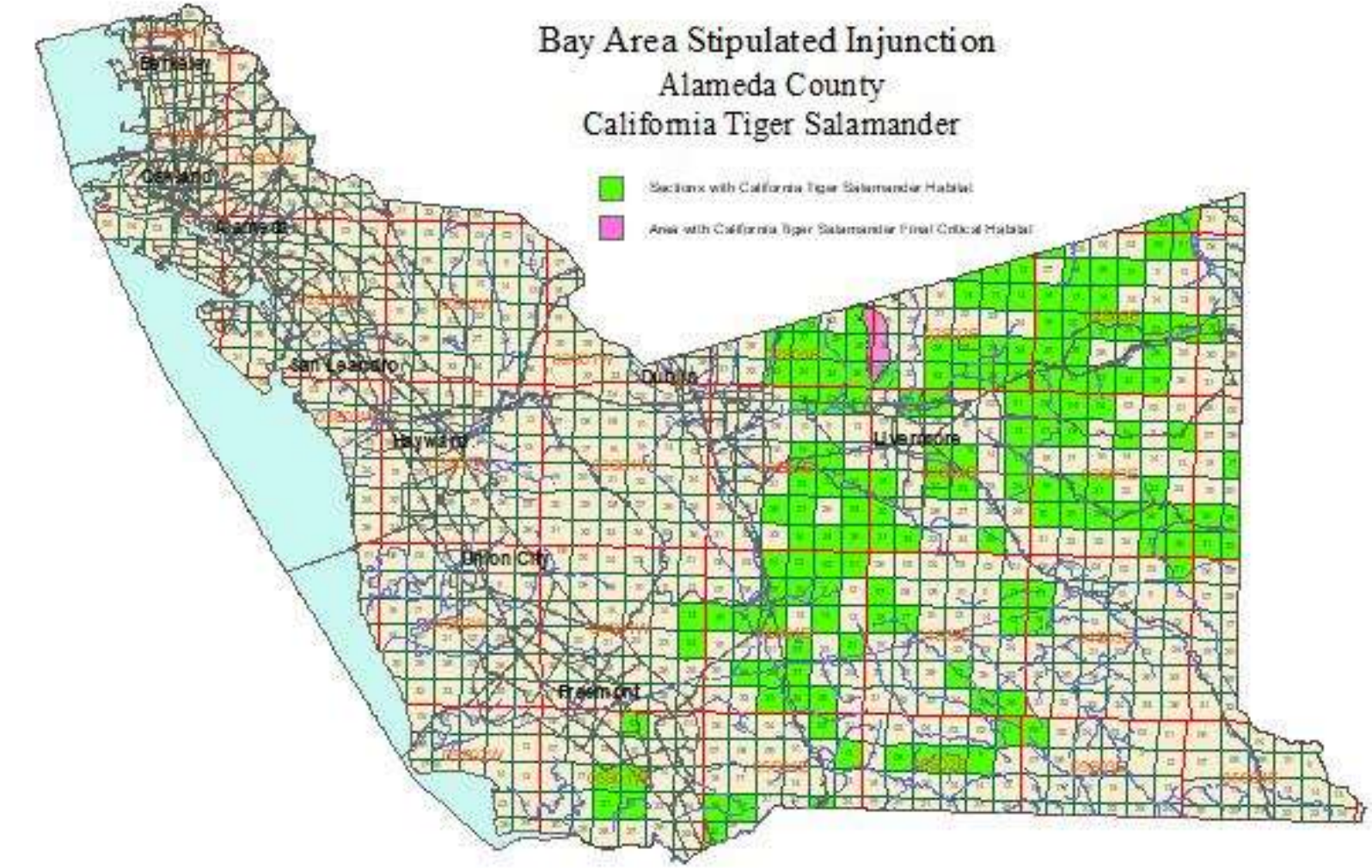
- The Township/Range/Section (TRS) coordinates are used to “cut” the polygons and create a section list for each species.
- The resulting location data has a precision of one mile.

Creating Layers and Maps



- Sections can be added to ArcMap to create species layers and maps.

Example- map of California Tiger Salamander in Alameda County



Bringing It All Together

PRESCRIBE

DPR’s online database application for protection of endangered species from pesticide exposure

PRESCRIBE stands for:

Pesticide

Regulation

Endangered

Species

Custom

Real-time

Internet

Bulletin

Engine

Starting a PRESCRIBE query

We have two modes of querying PRESCRIBE-

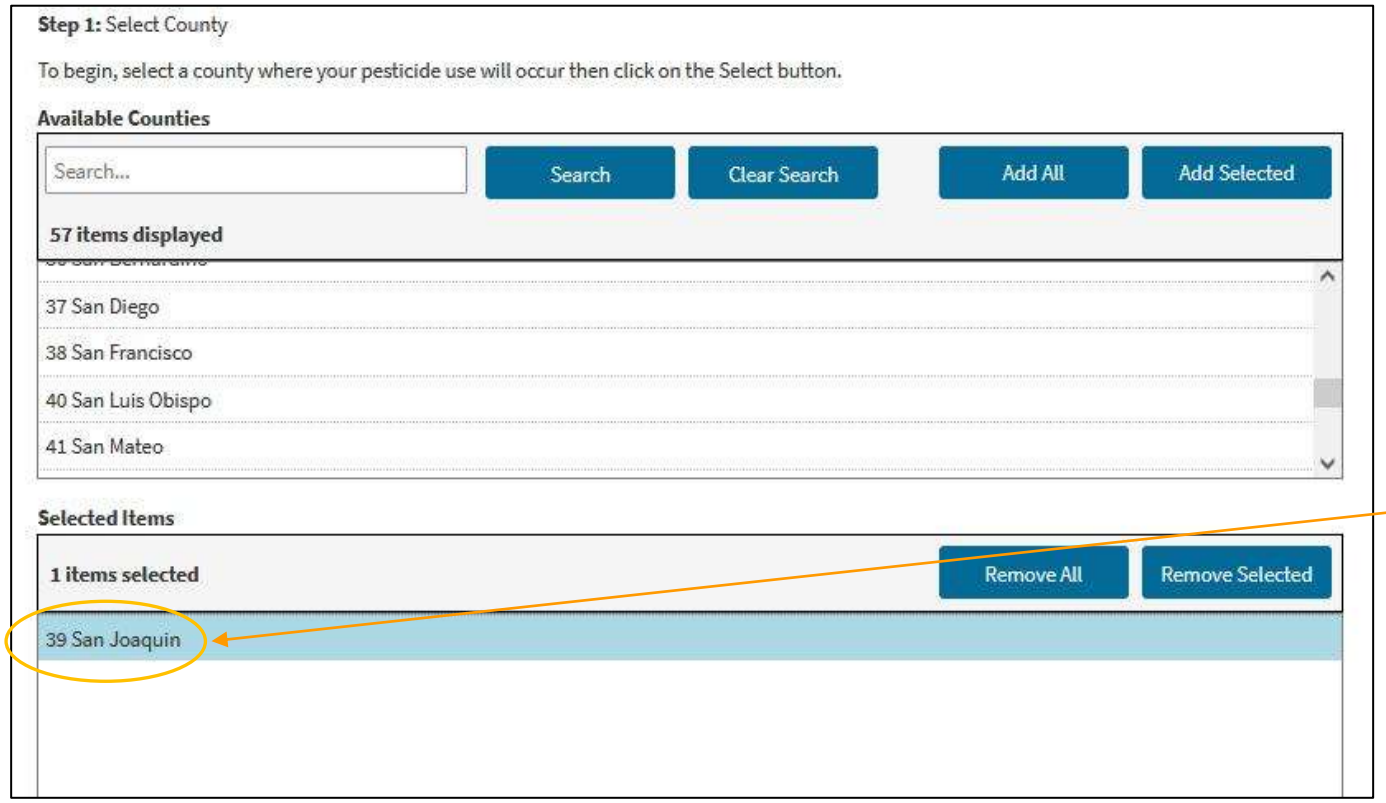
- Desktop or laptop
- PRESCRIBE mobile

PRESCRIBE Desktop

PRESCRIBE is accessible on desktops and laptops

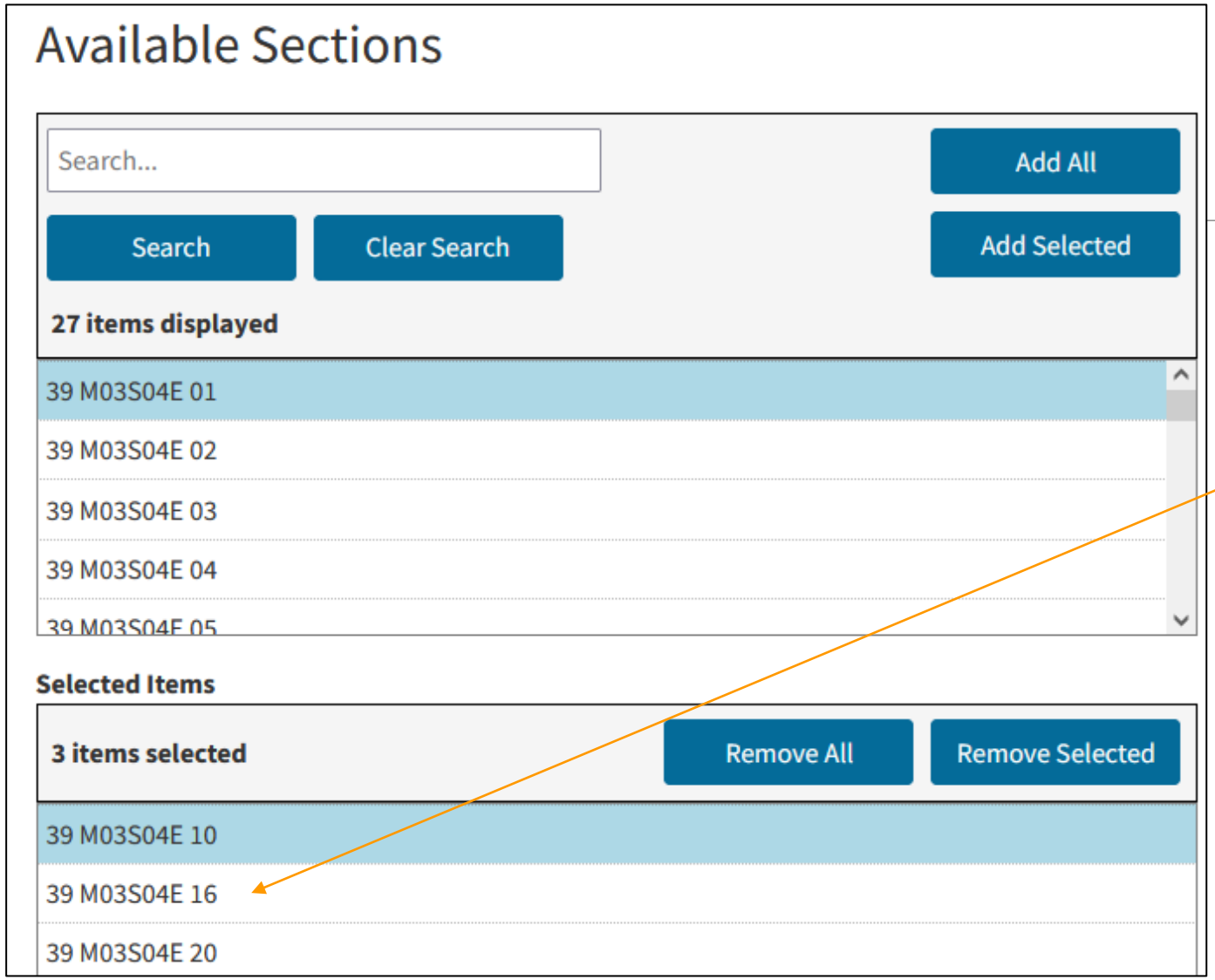
- It can be accessed at: https://www.cdpr.ca.gov/docs/endspec/
- Or search CDPR PRESCRIBE

PRESCRIBE Desktop- Step 1



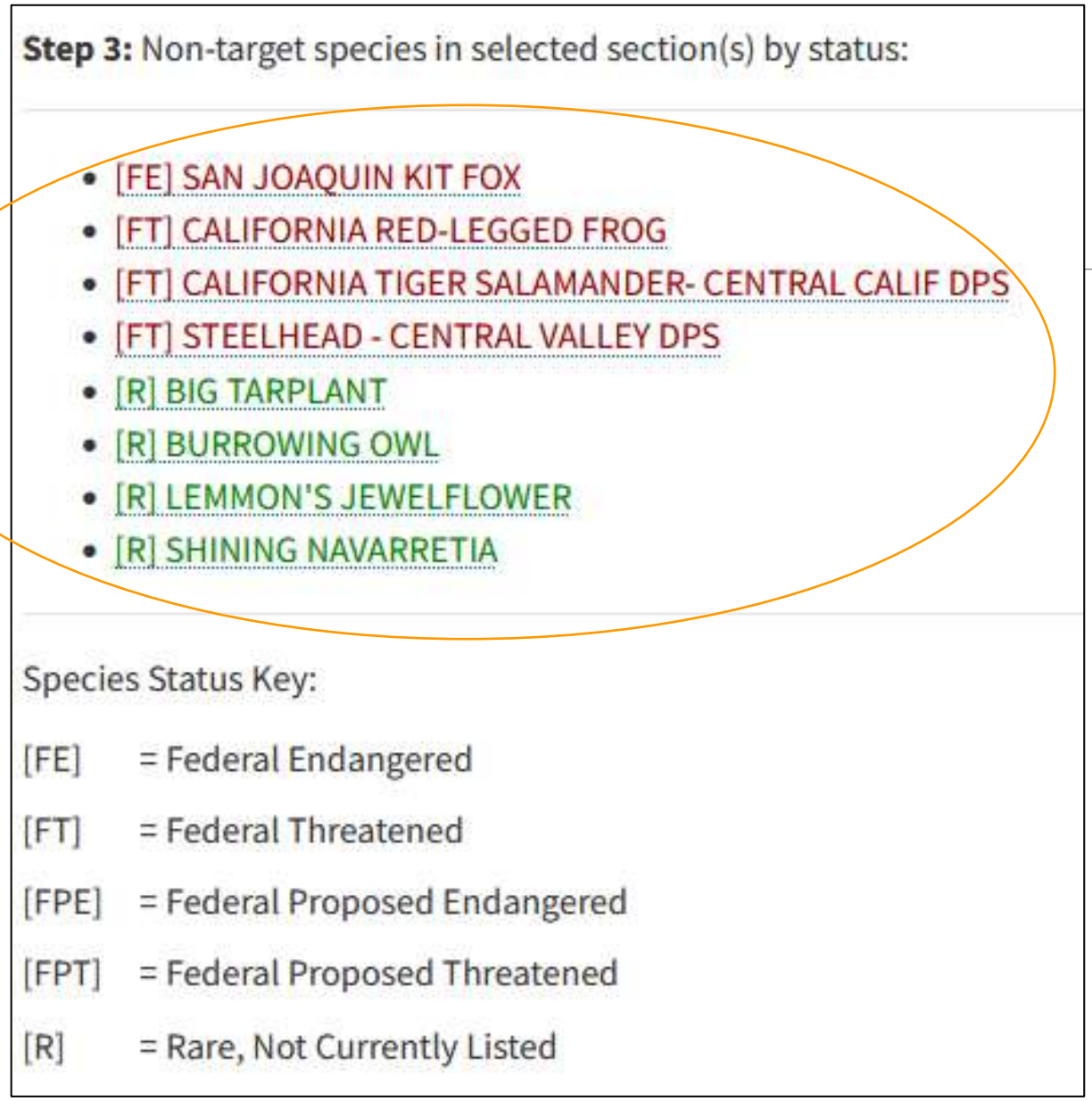
The user selects a county from the pick list and then selects "Next."

In this example San Joaquin County is selected.



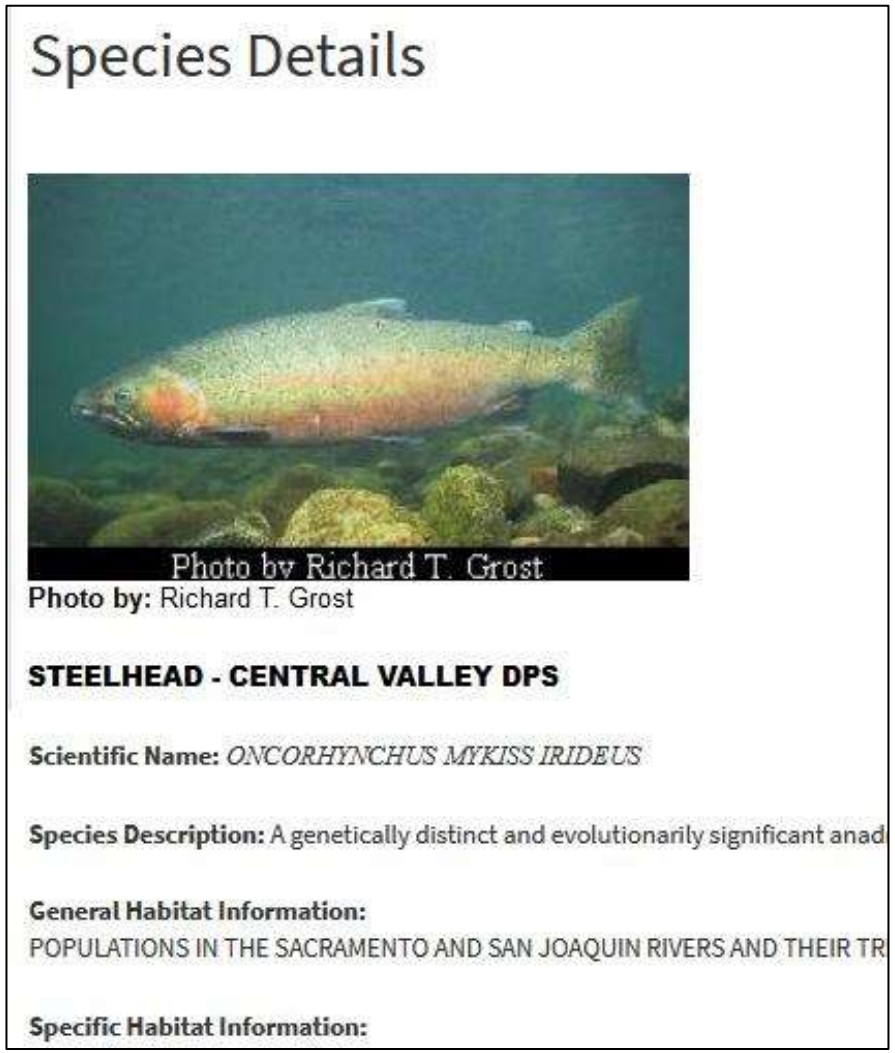
PRESCRIBE Desktop- Step 2

The user selects Township, Range, and Section(s) where a pesticide will be applied. In this example Township 03S, Range 04E, Sections 10, 16, and 20 are selected.



PRESCRIBE Desktop- Step 3

- PRESCRIBE produces a list of species occurring in the selected sections. In this example: San Joaquin kit fox, CA reg-legged frog, CA tiger salamander, Steelhead, big tarplant, burrowing owl, Lemon's jewelflower, shining navarretia.
- Click on a species for more information.



PRESCRIBE Desktop- Species Details

These pages provide details about the species found in the selected sections.

PRESCRIBE Desktop- Step 4

New EPA measures have been implemented to protect Pacific salmon species from the effects of six pesticides. If you intend to use any of these pesticides, the label specifies that you must also abide by the requirements of EPA's Bulletins Live Two

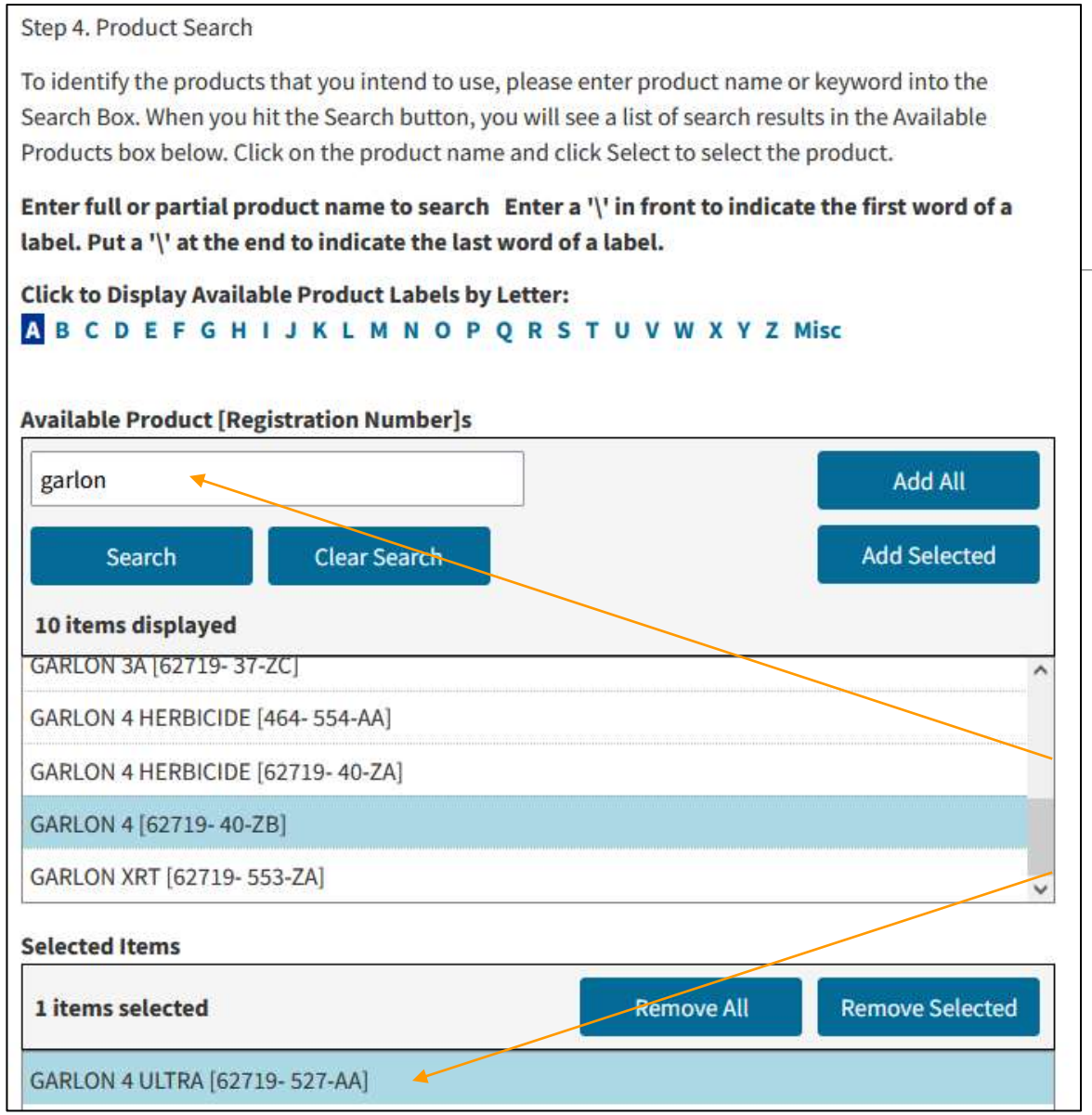
Endangered Species Custom Bulletin

U.S. EPA Recent Implementation of Protections to Pacific salmon species. The U.S. Environmental Protection Agency (EPA) has implemented measures to protect 28 federally endangered and threatened Pacific salmon and steelhead species and their designated critical habitat from the effects of:

- bromoxynil,
- prometryn,
- metolachlor,
- Pyraclonil,
- Malathion, and
- 1,3-Dichloropropene (also known as 1,3-D).

Bromoxynil, prometryn, metolachlor, and Pyraclonil are herbicides used to control grasses and broadleaf weeds; Malathion is an organophosphate insecticide commonly used to control foliage and soil insect pests; and 1,3-D is a pesticide used in pre-plant soil fumigation.

If you intend to use any of the above pesticides, the label specifies that you MUST also abide by the requirements of EPA's Bulletins Live! Two.

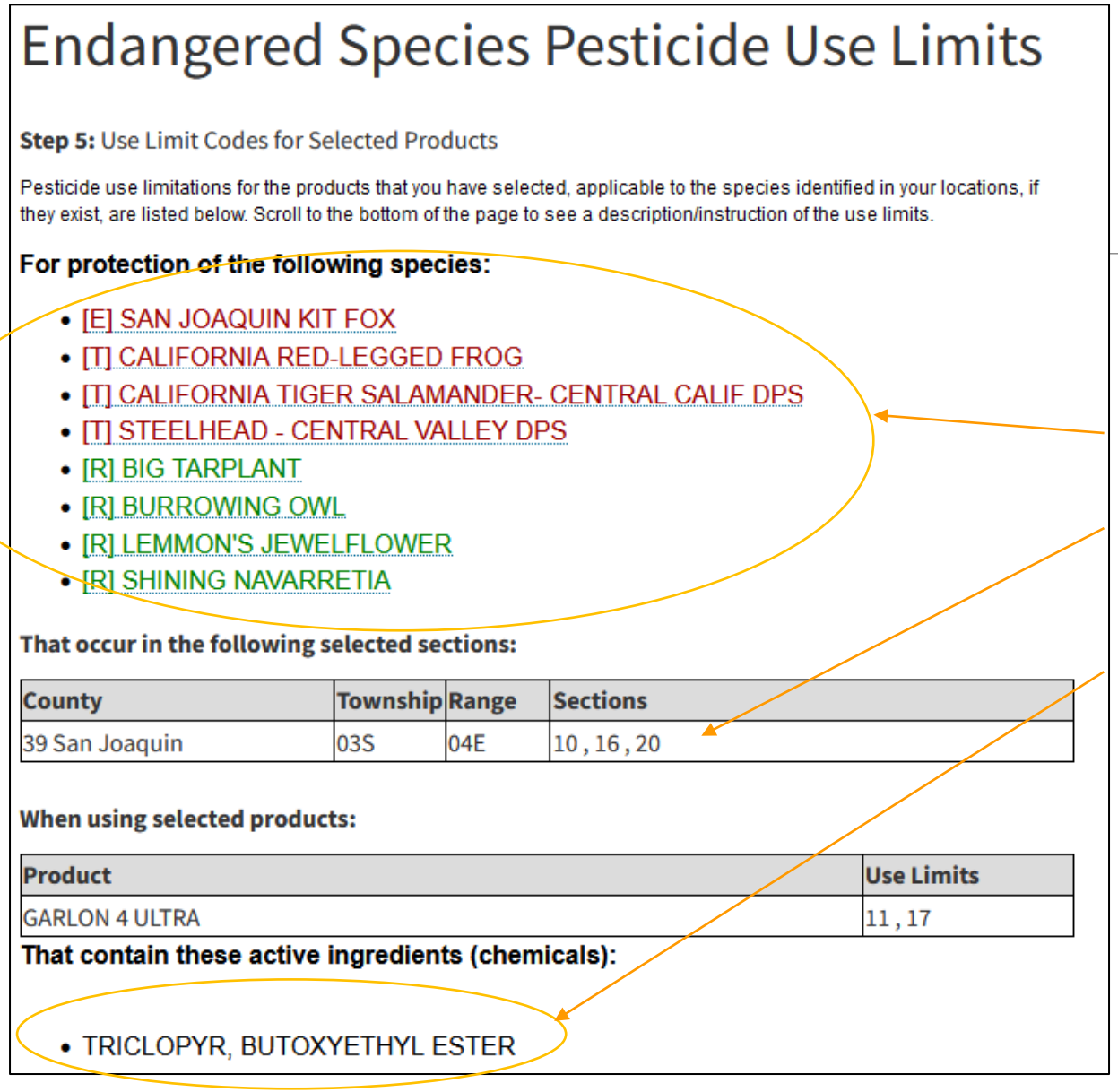


PRESCRIBE Desktop- Step 4

Chemicals can be searched by their U.S. EPA Registration number or their commercial name.

In this example the search is for “garlon”, and then “Garlon 4 Ultra.

PRESCRIBE Desktop- Step 5



Endangered Species Pesticide Use Limits

Step 5: Use Limit Codes for Selected Products

Pesticide use limitations for the products that you have selected, applicable to the species identified in your locations, if they exist, are listed below. Scroll to the bottom of the page to see a description/instruction of the use limits.

For protection of the following species:

- [E] SAN JOAQUIN KIT FOX
- [T] CALIFORNIA RED-LEGGED FROG
- [T] CALIFORNIA TIGER SALAMANDER- CENTRAL CALIF DPS
- [T] STEELHEAD - CENTRAL VALLEY DPS
- [R] BIG TARPLANT
- [R] BURROWING OWL
- [R] LEMMON'S JEWELFLOWER
- [R] SHINING NAVARRETIA

That occur in the following selected sections:

County	Township	Range	Sections
39 San Joaquin	03S	04E	10 , 16 , 20

When using selected products:

Product	Use Limits
GARLON 4 ULTRA	11 , 17

That contain these active ingredients (chemicals):

- TRICLOPYR, BUTOXYETHYL ESTER

Custom report detailing species that are present, the location, and the product being applied.

PRESCRIBE Desktop- Step 5

Custom report with applicable use limitations.

Observe Use Limits for Selected Products:

Code	Use Limitations
11	Occupied Habitat: Do not use in currently occupied habitat except: (1) if specified in Species Descriptions, or (2) in organized habitat recovery programs, or (3) for selective control of invasive exotic plants.
17	Spray Drift: For sprayable or dust formulations: when the air is calm or moving away from habitat, commence applications on the side nearest the habitat and proceed away from the habitat. When air currents are moving toward habitat, do not make applications within 200 yards by air or 40 yards by ground upwind from occupied habitat. The county agricultural commissioner may reduce or waive buffer zones following a site inspection, if there is an adequate hedgerow, windbreak, riparian corridor or other physical barrier that substantially reduces the probability of drift.

PRESCRIBE Mobile

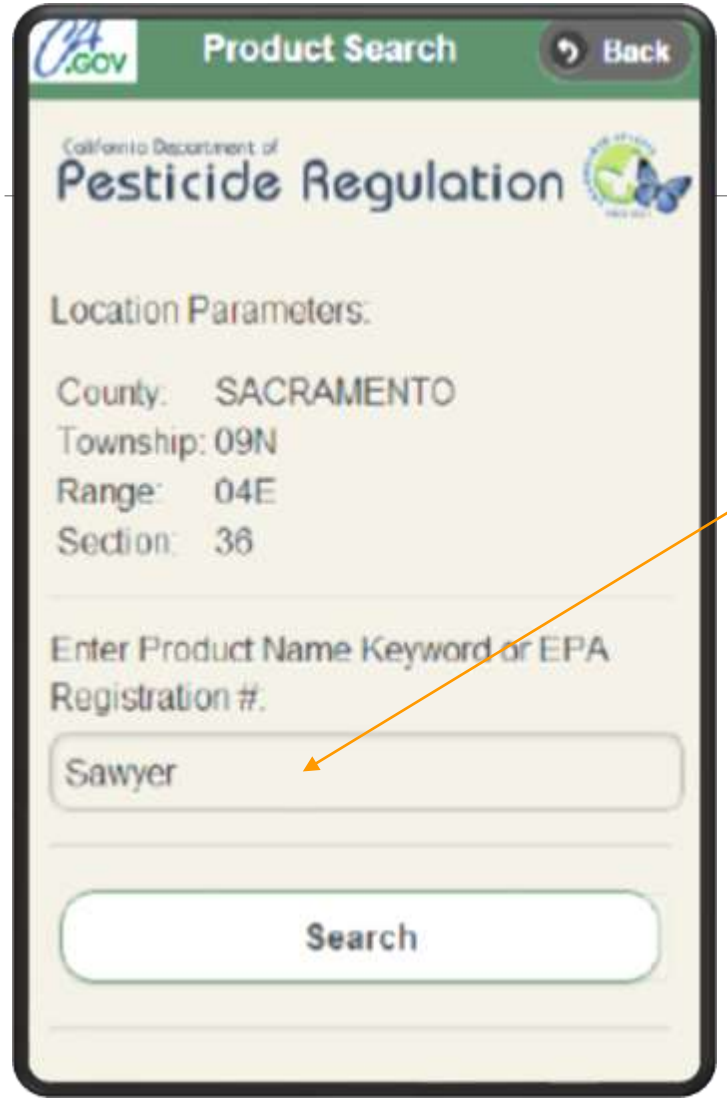
PRESCRIBE is available for mobile devices such as smartphones, tablets, etc.

- It can be accessed at:
  https://mobile.cdpr.ca.gov/prescribe

PRESCRIBE Mobile- Step 1

Search by Use My Location (On)

- The program finds the corresponding County and TRS coordinates based on where your mobile device is at that moment.
- Easy to use, particularly for those not familiar with the TRS coordinate system.
- Click “Submit Location” button.



PRESCRIBE Mobile- Step 2

Product Search

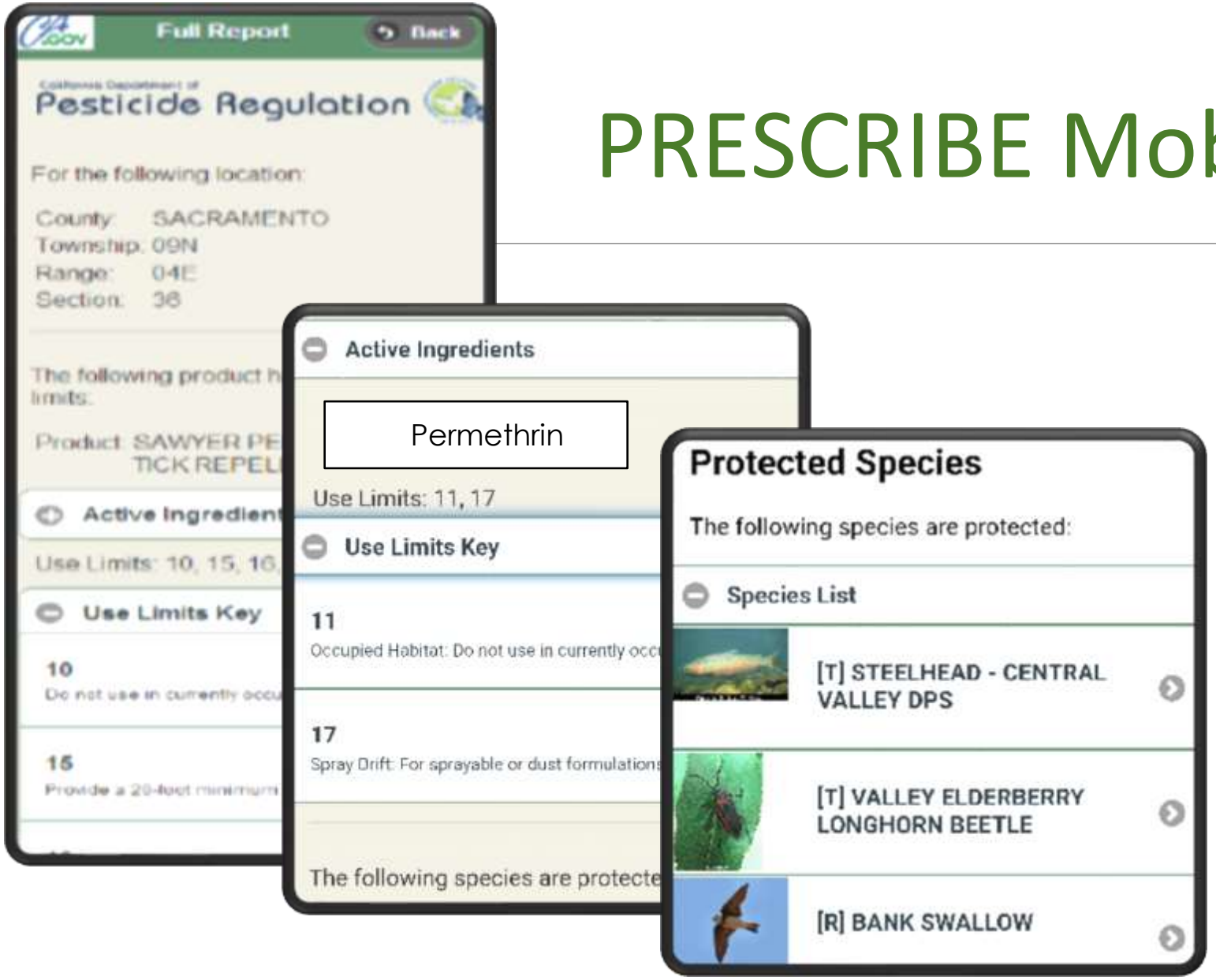
- Type the product name or U.S. EPA Registration Number.
- Click the “Search” button.

PRESCRIBE Mobile- Step 3

Product Results Screen

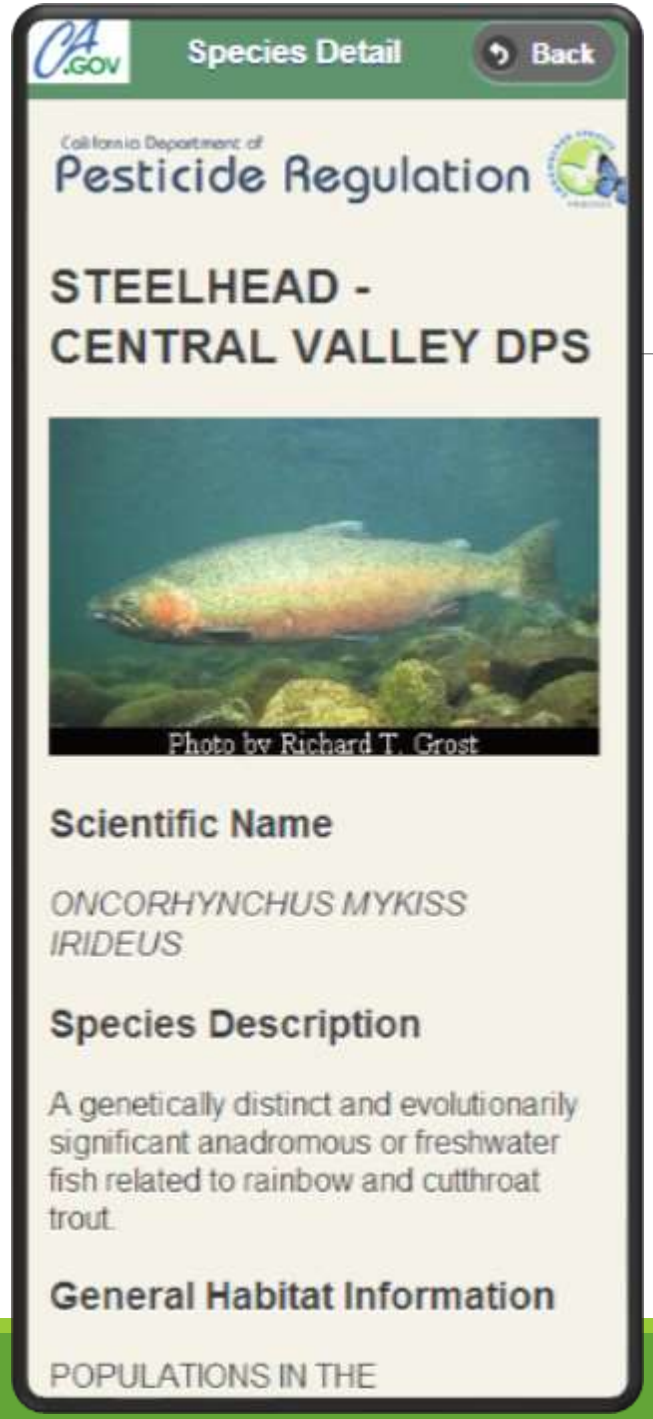
- By clicking on a product's box, the full report is available.

PRESCRIBE Mobile- Step 4



Full Report Screen

- Click on each box to expand it.



PRESCRIBE Mobile- Species' Details

This screen provides details about the species found in the selected sections.

Recap-

- Endangered Species Program Goals
  1. Address endangered species/pesticide issues
  2. Develop Pesticide Use Limitations
  3. Behind the scenes of PRESCRIBE- Identify endangered species habitats for use in PRESCRIBE
- How to use PRESCRIBE
  1. Desktop
  2. Mobile

Questions? Thank you!