



4. STATEWIDE MAPS AND SPECIES PROFILES

For each of the 43 species covered in this report, this chapter presents a brief profile and statewide maps showing distribution and suitable range. These maps indicate where populations of the species continue to spread and where the species is under management.

For most of species, smaller maps show the change in suitable range using climate projections for 2050. These maps provide a general picture of where each invasive plant might spread in the future but they are not detailed predictions. (Appendix 2 provides details on the map symbology.) Accompanying tables summarize statistics and management opportunities by Weed Management Area.

Each species profile provides a brief description of the plant's biology and ecology, based primarily on the "California Invasive Plant Inventory" (Cal-IPC 2006), *Invasive Plants of California's Wildlands* (Bossard et al. 2000), *Weeds of California and Other Western States* (DiTomaso and Healy 2007) and the "Pest Ratings of Noxious Weeds and Noxious Weed Seeds" (CDFA 2010). Each profile also summarizes priority recommendations for the region and overall change in suitable range for the species in the Sierra Nevada. See chapter 1 for a more complete description of mapping and modeling methods.

Key to Tables

Opportunities: H = high priority, M = medium, L = low

% Infested: portion of USGS quads in the area in which the species is present in wildlands

% Suitable Infested: portion of quads in the area with suitable climate that are currently infested

% Spreading: portion of infested quads in which the species is spreading

% Managed: portion of infested quads where species is under management

% Eradicated: portion of all quads in the area in which the species has been eradicated

% Suitable in 2010: portion of area with current climatic suitability of at least a level of "low" or higher

% Suitable in 2050: of area with projected 2050 climatic suitability of at least a level of "low" or higher

Suitability change:

↑ = a 15% - 99% increase from 2010 to 2050

↑↑ = an increase of greater than 100%

↓ = a decrease of greater than 15%

POISON-HEMLOCK
(Conium maculatum)

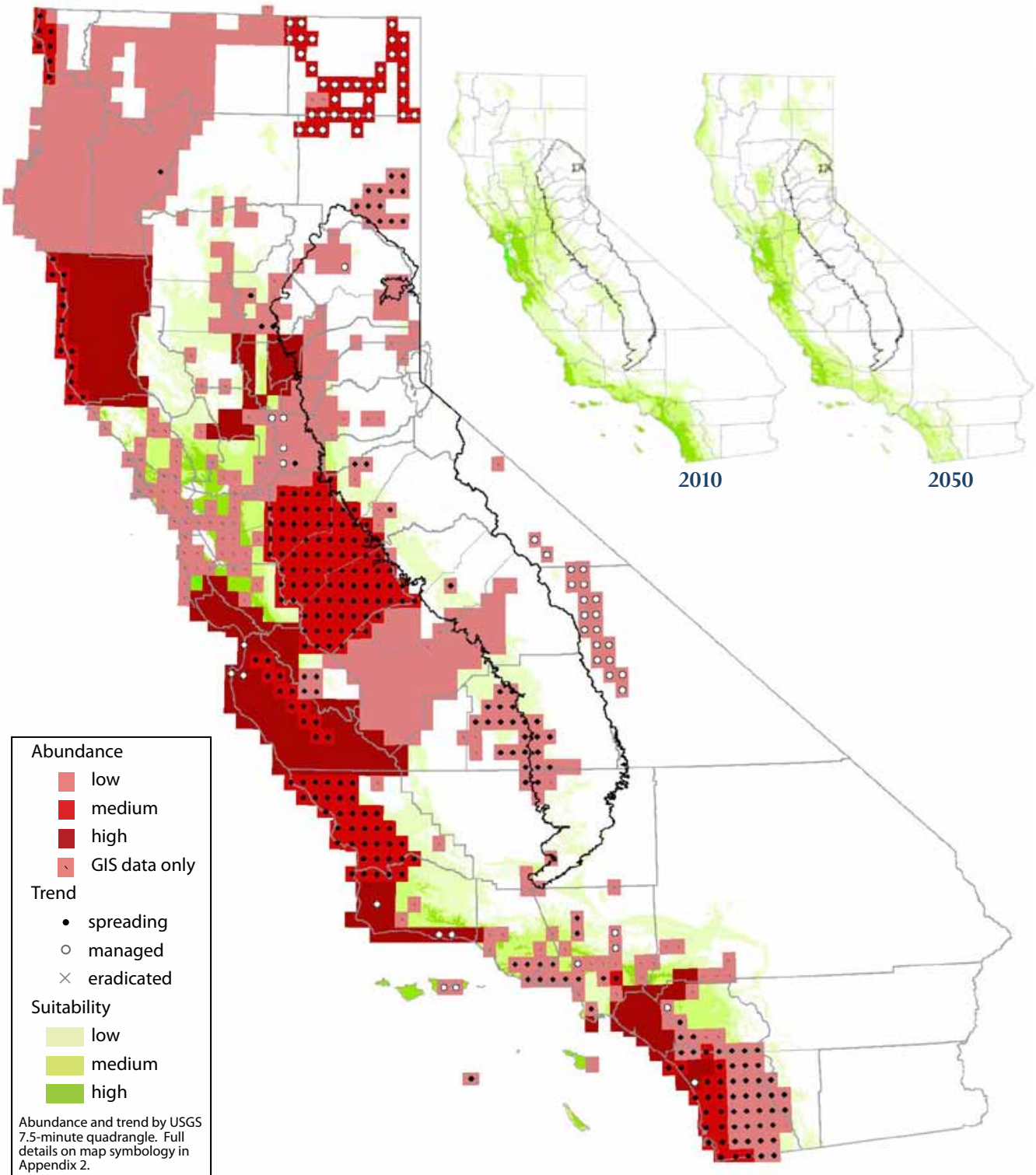
Ratings: Cal-IPC Moderate; CDFA not rated

Poison-hemlock is an erect biennial, sometimes annual or short-lived perennial to 120 in. (3 m) tall with large triangular, dissected compound leaves and purple-spotted stems. It occurs throughout California in roadsides, pastures, fields, riparian areas and other disturbed, often moist sites. It is common in shady areas throughout the state. Poison-hemlock is toxic to humans, livestock, and wildlife. Plants do not regenerate when hand pulled or cut below the crown. Our modeling suggests that the amount of suitable range for poison-hemlock in the Sierra Nevada will decrease with future climate change.



WEED MANAGEMENT AREA	OPPORTUNITIES			STATISTICS							
	ERADICATION	CONTAINMENT	SURVEILLANCE	% INFESTED	% SUITABLE INFESTED	% SPREADING	% MANAGED	% ERADICATED	% SUITABLE 2010	% SUITABLE 2050	SUITABILITY CHANGE
Lassen	-	M	-	24	100	48	0	0	3	41	↑↑
Plumas/Sierra	-	M	-	26	100	5	5	0	3	25	↑↑
Butte	-	M	-	46	60	14	0	0	51	20	↓
Yuba/Sutter	-	M	-	54	91	0	0	0	68	14	↓
Nevada/Placer	-	M	-	51	91	0	0	0	32	3	↓
Lake Tahoe Basin	-	M	-	11	100	0	0	0	1	7	↑↑
El Dorado	-	M	-	24	58	0	0	0	23	5	↓
Alpine	-	-	M	0	0	-	-	0	1	10	↑↑
Amador	M	-	-	29	44	50	0	0	44	20	↓
Central Sierra	-	M	-	18	34	79	0	0	26	8	↓
Sierra/San Joaquin	-	M	-	51	100	14	1	0	22	2	↓
Tulare	-	M	-	26	58	81	0	0	26	0	↓
Kern	-	M	-	9	19	33	0	0	14	8	↓
Eastern Sierra	-	-	M	7	100	0	95	0	0	4	-
All Sierra Nevada	L	M	-	27	53	29	2	0	21	9	↓

Poison-hemlock (*Conium maculatum*)



Family Asteraceae

RUSSIAN KNAPWEED

(Acroptilon repens)

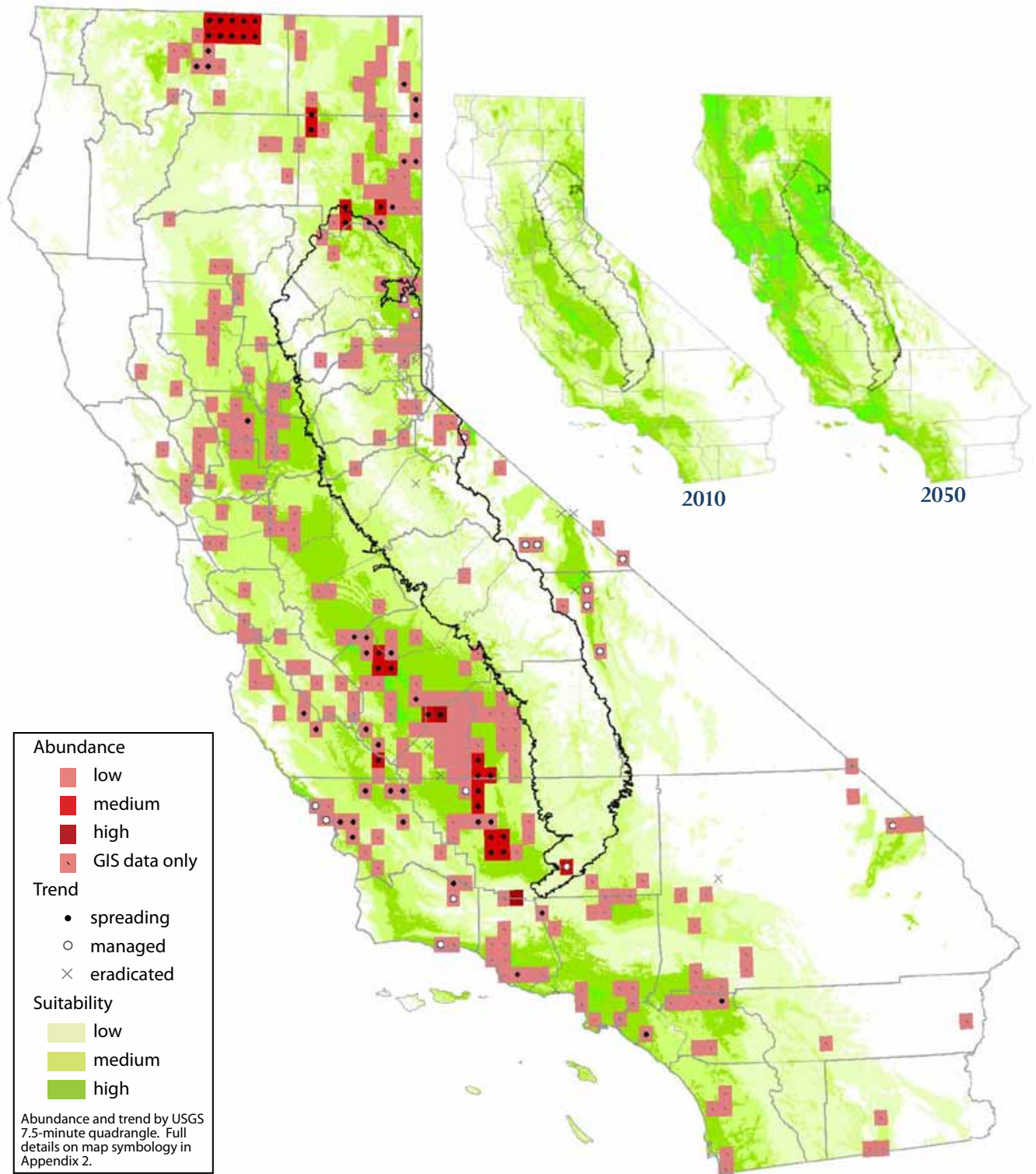
Ratings: Cal-IPC Moderate; CDFA B

Russian knapweed typically invades disturbed, open sites such as roadsides, riverbanks, irrigation ditches, pasture, waste places, and cropland. Russian knapweed does not readily establish or thrive in healthy, natural habitats because it is sensitive to shading and may not compete well with other plants. Occasionally, Russian knapweed grows in healthy native plant communities, especially those lacking aggressive plant competition or in areas that border sites with recent natural or anthropogenic disturbance. Russian knapweed commonly infests cropland and can be found as a contaminant in hay, straw, and fill dirt. Plants often grow in roadsides, ditches, and parking areas and are spread along transportation corridors. Our modeling suggests that the amount of suitable range for Russian knapweed in the Sierra Nevada will increase with future climate change.



WEED MANAGEMENT AREA	OPPORTUNITIES			STATISTICS							
	ERADICATION	CONTAINMENT	SURVEILLANCE	% INFESTED	% SUITABLE INFESTED	% SPREADING	% MANAGED	% ERADICATED	% SUITABLE 2010	% SUITABLE 2050	SUITABILITY CHANGE
Lassen	-	H	-	28	28	34	3	0	94	98	-
Plumas/Sierra	-	H	-	13	13	18	18	0	82	98	↑
Butte	-	-	M	10	19	0	0	0	66	100	↑
Yuba/Sutter	-	-	M	19	33	0	0	0	86	100	↑
Nevada/Placer	-	H	-	21	21	0	0	3	78	100	↑
Lake Tahoe Basin	H	-	-	22	27	0	0	17	62	99	↑
El Dorado	H	-	-	9	9	0	0	7	77	100	↑
Alpine	H	-	-	17	18	0	25	8	50	93	↑
Amador	H	-	-	11	11	0	0	4	89	100	-
Central Sierra	-	-	M	1	1	0	0	1	70	89	↑
Sierra/San Joaquin	H	-	-	16	16	33	0	0	79	87	-
Tulare	-	-	H	22	22	14	0	0	79	88	-
Kern	H	-	-	18	19	43	7	1	94	85	-
Eastern Sierra	H	-	-	4	5	0	64	1	37	58	↑
All Sierra Nevada	H	M		8	8	13	11	1	76	90	↑

Russian knapweed (*Acrotilon repens*)



MUSK THISTLE

(*Carduus nutans*)

Ratings: Cal-IPC Moderate; CDFA A

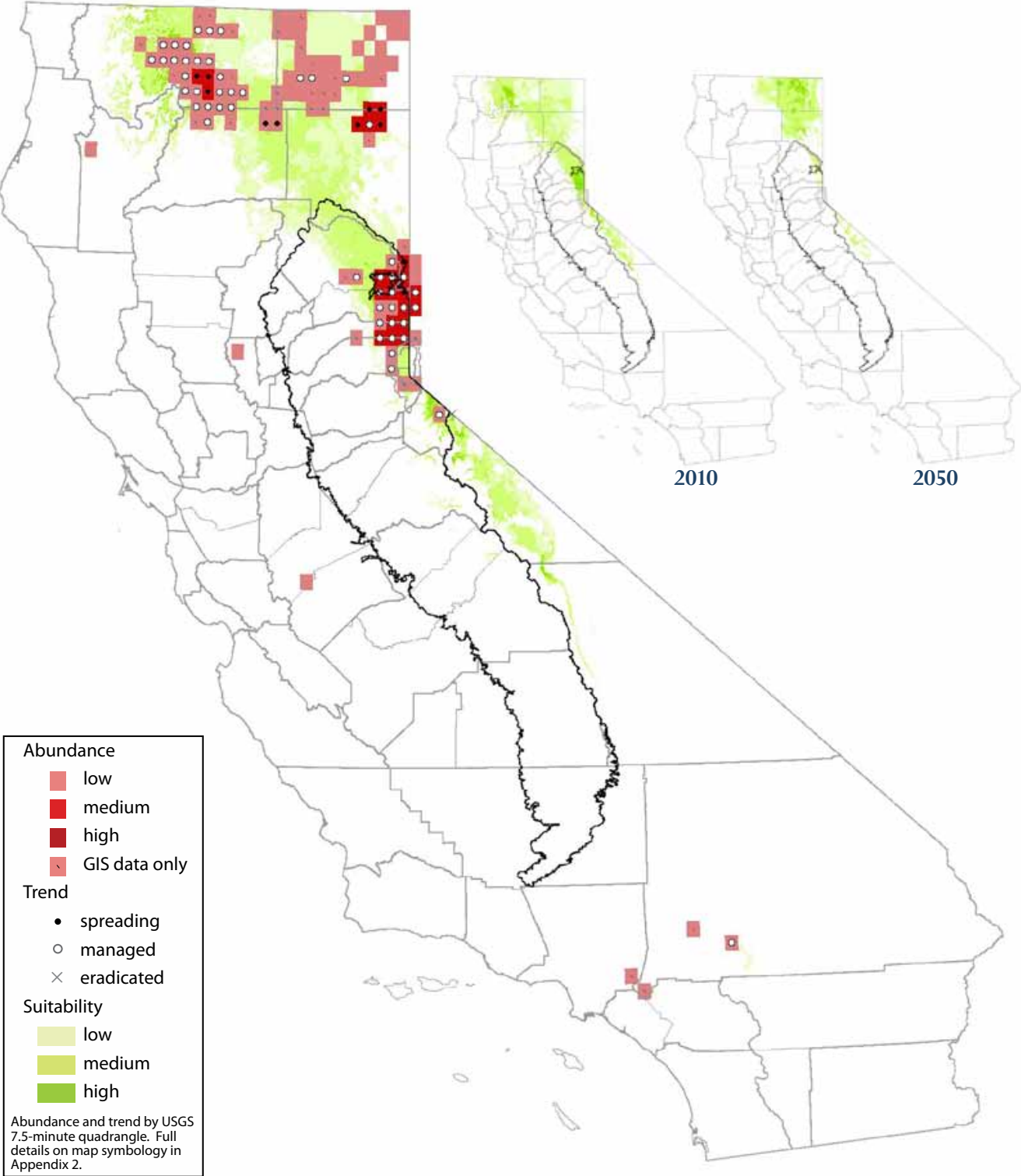
Musk thistle is a biennial or winter annual thistle with purple to pink flowers. It readily hybridizes with plumless thistle (*Carduus acanthoides*). It produces a taproot that grows to >16 in (40 cm). Like other thistles, it colonizes disturbed open sites, pastures, and annual grasslands. Musk thistle is often associated with sandy fertile soils or soils that are high in calcium, but it tolerates a wide range of soil conditions, including those that are acidic or saline. *Carduus nutans* can form dense stands and may inhibit the growth of other plants through allelopathy. It is also a host plant for an introduced weevil that attacks native thistles. Thistles generally compete poorly with established grasses and other vegetation. We recommend eradication in the few isolated quads as a high priority, and containment as a high priority elsewhere. Our modeling suggests that the amount of suitable range for musk thistle in the Sierra Nevada will decrease with future climate change.



WEED MANAGEMENT AREA	OPPORTUNITIES			STATISTICS							
	ERADICATION	CONTAINMENT	SURVEILLANCE	% INFESTED	% SUITABLE INFESTED	% SPREADING	% MANAGED	% ERADICATED	% SUITABLE 2010	% SUITABLE 2050	SUITABILITY CHANGE
Lassen	-	H	-	15	16	41	18	0	71	56	↓
Plumas/Sierra	-	H	-	21	28	39	50	0	58	13	↓
Butte	-	-	M	0	0	-	-	0	1	0	-
Yuba/Sutter	-	-	M	0	-	-	-	0	0	0	-
Nevada/Placer	-	H	-	14	45	0	0	0	17	3	↓
Lake Tahoe Basin	-	H	-	33	40	0	0	0	46	5	↓
El Dorado	H	-	-	7	20	0	0	0	8	0	-
Alpine	H	-	-	8	10	0	0	4	31	6	↓
Amador	-	-	M	0	0	-	-	0	1	0	-
Central Sierra	-	-	L	0	0	-	-	0	4	0	-
Sierra/San Joaquin	-	-	L	0	0	-	-	0	1	0	-
Tulare	-	-	L	0	0	-	-	0	0	0	-
Kern	-	-	L	0	-	-	-	0	0	0	-
Eastern Sierra	-	-	H	0	0	-	-	0	11	6	↓
All Sierra Nevada	H	H	-	5	19	19	27	0	13	3	↓

Abundance, Trend and Suitability

Musk thistle (*Carduus nutans*)



**ITALIAN THISTLE AND
SLENDERFLOWER THISTLE**
*(Carduus pycnocephalus and
C. tenuiflorus)*

Ratings: *C. pycnocephalus*: Cal-IPC Moderate; CDFA C

C. tenuiflorus: Cal-IPC Limited; CDFA C

We combined Italian and slenderflower thistles for this report due to difficulties in their identification and because they occasionally hybridize. Both species are winter annuals or biennials that grow up to 6 ft (2 m) tall with pink to purple flowers. Both are widely distributed in California. They colonize disturbed sites and annual grasslands but inhabit drier sites than musk thistle. Thistles generally compete poorly with established grasses and other vegetation. We did not model suitability for this species.

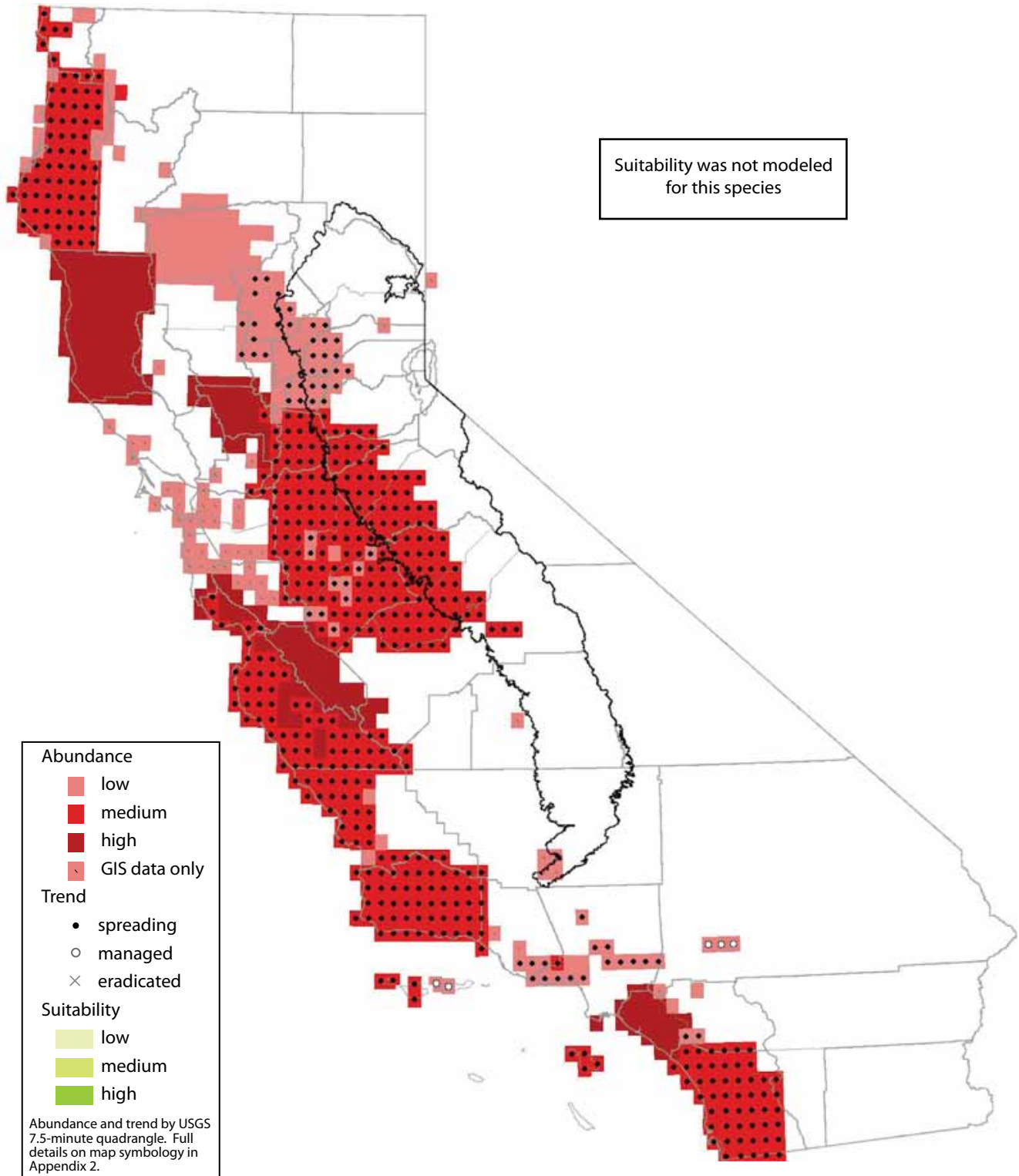


WEED MANAGEMENT AREA	OPPORTUNITIES			STATISTICS							
	ERADICATION	CONTAINMENT	SURVEILLANCE	% INFESTED	% SUITABLE INFESTED	% SPREADING	% MANAGED	% ERADICATED	% SUITABLE 2010	% SUITABLE 2050	SUITABILITY CHANGE
Lassen	-	-	M	1	-	0	0	0	-	-	-
Plumas/Sierra	-	-	M	2	-	50	0	0	-	-	-
Butte	-	M	-	60	-	38	0	0	-	-	-
Yuba/Sutter	-	M	-	60	-	55	0	0	-	-	-
Nevada/Placer	M	M	-	48	-	97	0	0	-	-	-
Lake Tahoe Basin	-	-	M	0	-	-	-	0	-	-	-
El Dorado	-	M	-	24	-	100	0	0	-	-	-
Alpine	-	-	M	0	-	-	-	0	-	-	-
Amador	-	M	-	68	-	100	0	0	-	-	-
Central Sierra	-	M	-	49	-	100	0	0	-	-	-
Sierra/San Joaquin	-	H	-	32	-	100	0	0	-	-	-
Tulare	-	-	M	1	-	0	0	0	-	-	-
Kern	-	M	-	3	-	20	0	0	-	-	-
Eastern Sierra	-	-	L	0	-	-	-	0	-	-	-
All Sierra Nevada	-	M	-	26	-	91	0	0	-	-	-

Abundance, Trend and Suitability

Italian thistle and slenderflower thistle

(*Carduus pycnocephalus* and *C. tenuiflorus*)



WOOLLY DISTAFF THISTLE

(*Carthamus lanatus*)

Ratings: Cal-IPC Moderate Alert; CDFA B

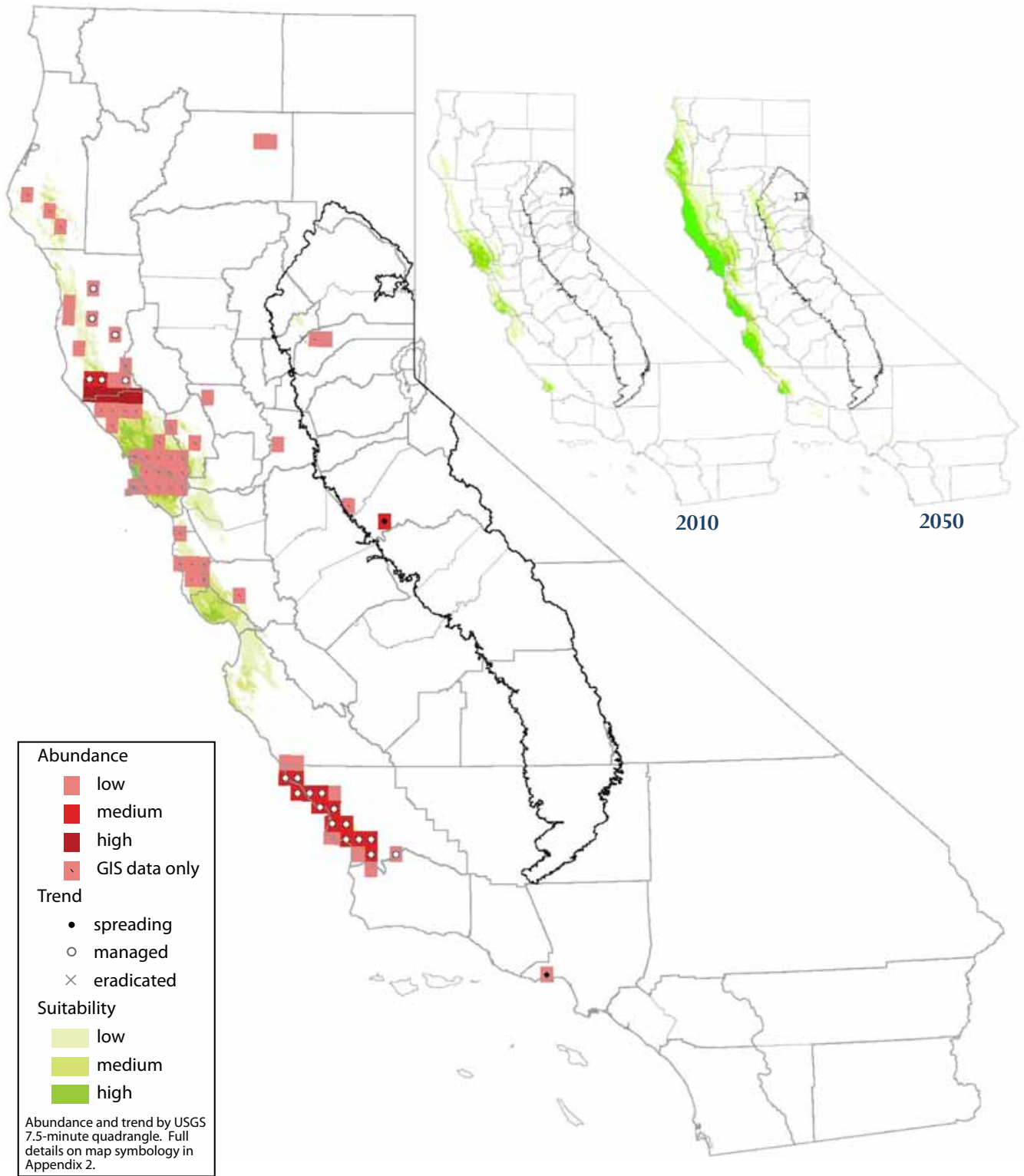
An annual thistle with a rigid stem to 40 in. (1 m) tall, woolly distaff thistle is highly competitive with cereal crops and desirable rangeland species. It grows in disturbed open sites, grasslands, rangelands, and on many soil types. Woolly distaff thistle is especially prolific in areas that receive 16-24 in. (40-60 cm) annual rainfall. Its large seeds and flat rosettes give it an early growth advantage over other species. The spiny foliage and flower heads can injure livestock. Some botanists classify smooth distaff thistle (*Carthamus baeticus*) as a subspecies of *C. lanatus*. Our modeling suggests that the amount of suitable range for woolly distaff thistle in the Sierra Nevada will increase considerably with future climate change.



WEED MANAGEMENT AREA	OPPORTUNITIES			STATISTICS							
	ERADICATION	CONTAINMENT	SURVEILLANCE	% INFESTED	% SUITABLE INFESTED	% SPREADING	% MANAGED	% ERADICATED	% SUITABLE 2010	% SUITABLE 2050	SUITABILITY CHANGE
Lassen	-	-	L	0	-	-	-	0	0	0	-
Plumas/Sierra	-	-	M	0	0	-	-	0	0	2	-
Butte	-	-	L	0	0	-	-	0	1	34	↑↑
Yuba/Sutter	-	-	M	0	0	-	-	3	3	23	↑↑
Nevada/Placer	M	-	-	3	67	0	0	2	1	16	↑↑
Lake Tahoe Basin	-	-	L	0	-	-	-	0	0	0	-
El Dorado	-	-	M	0	-	-	-	0	0	17	-
Alpine	-	-	L	0	-	-	-	0	0	0	-
Amador	-	-	M	0	-	-	-	0	0	9	-
Central Sierra	M	-	-	3	-	50	0	0	0	0	-
Sierra/San Joaquin	-	-	M	0	-	-	-	0	0	0	-
Tulare	-	-	L	0	-	-	-	0	0	0	-
Kern	-	-	L	0	-	-	-	0	0	0	-
Eastern Sierra	-	-	L	0	-	-	-	0	0	0	-
All Sierra Nevada	L	-	-	1	40	25	0	0	0	5	↑↑

Abundance, Trend and Suitability

Woolly distaff thistle (*Carthamus lanatus*)



DIFFUSE KNAPWEED
(Centaurea diffusa)

Ratings: Cal-IPC Moderate; CDFA A

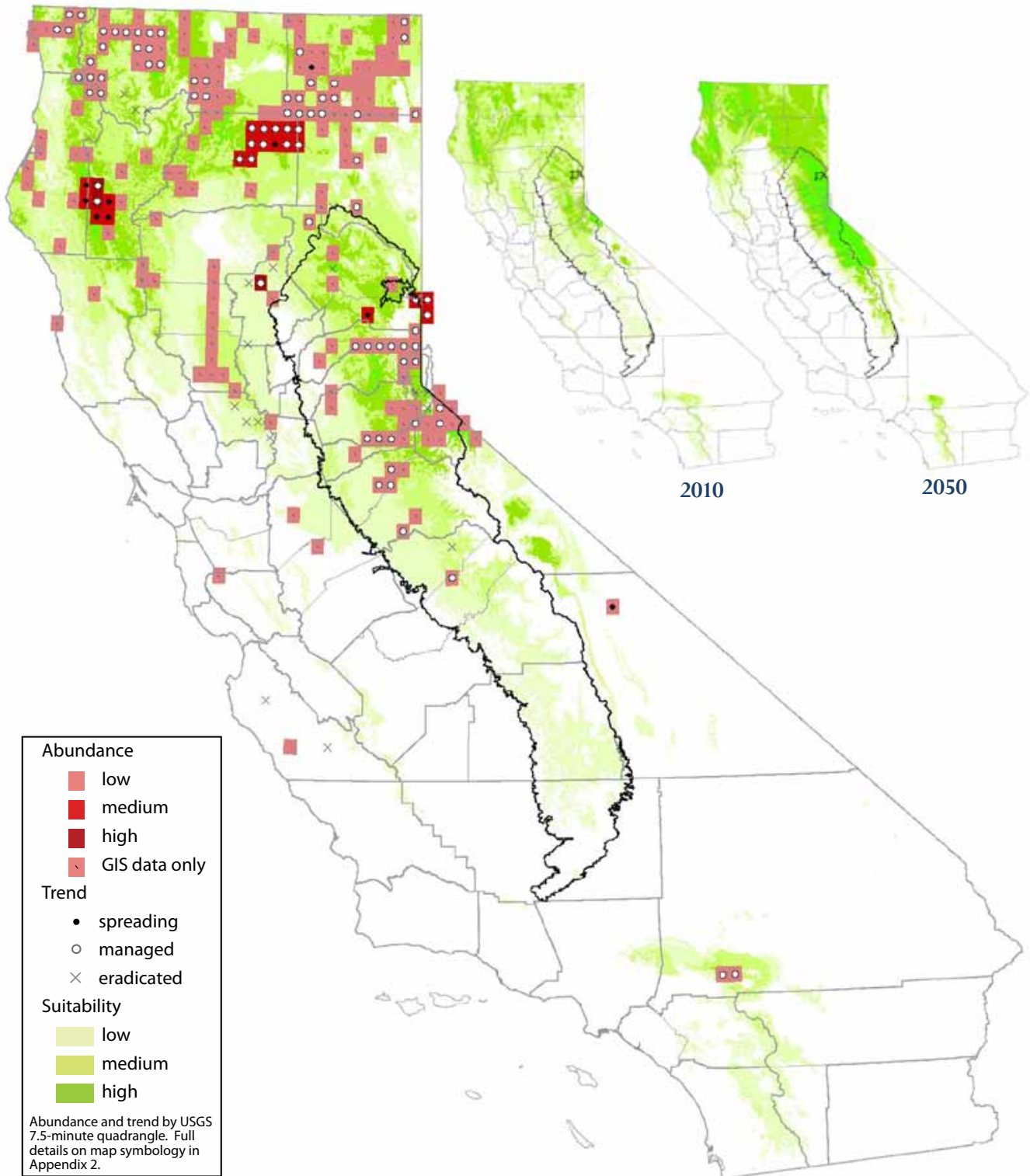
Diffuse knapweed is typically a biennial but can grow as an annual or short-lived perennial. It invades fields, disturbed open sites, grasslands, and rangeland. It forms large, dense infestations, especially on light, well-drained soils in areas that receive summer rainfall. It requires less moisture than spotted knapweed. Disturbance increases the rate and density of diffuse knapweed. It can be spread by attaching to vehicles. It occasionally hybridizes with spotted knapweed. Maintaining pasture and rangeland health by preventing overgrazing and minimizing disturbance can help limit knapweeds. Our modeling suggests that the amount of suitable range for diffuse knapweed in the Sierra Nevada will remain relatively unchanged with future climate change.



WEED MANAGEMENT AREA	OPPORTUNITIES			STATISTICS							
	ERADICATION	CONTAINMENT	SURVEILLANCE	% INFESTED	% SUITABLE INFESTED	% SPREADING	% MANAGED	% ERADICATED	% SUITABLE 2010	% SUITABLE 2050	SUITABILITY CHANGE
Lassen	H	-	-	20	20	9	9	1	85	100	↑
Plumas/Sierra	H	-	-	12	12	40	40	2	94	99	-
Butte	-	-	M	6	6	33	0	4	83	37	↓
Yuba/Sutter	-	-	M	3	4	0	0	3	65	27	↓
Nevada/Placer	-	M	-	22	23	7	0	0	70	68	-
Lake Tahoe Basin	-	M	-	50	60	0	0	17	88	100	-
El Dorado	-	M	-	28	29	0	0	7	90	72	↓
Alpine	-	M	-	42	42	0	0	8	80	100	↑
Amador	-	M	-	25	25	0	0	0	98	51	↓
Central Sierra	-	M	-	8	8	0	0	0	80	63	↓
Sierra/San Joaquin	H	-	-	1	2	0	0	1	32	29	-
Tulare	-	-	L	0	0	-	-	0	30	26	-
Kern	-	-	L	0	0	-	-	0	7	2	↓
Eastern Sierra	H	-	-	1	2	33	0	0	16	33	↑↑
All Sierra Nevada	M	M	-	10	10	4	2	1	62	56	-

Abundance, Trend and Suitability

Diffuse knapweed (*Centaurea diffusa*)



SPOTTED KNAPWEED
(Centaurea maculosa)

Ratings: Cal-IPC High; CDFA A

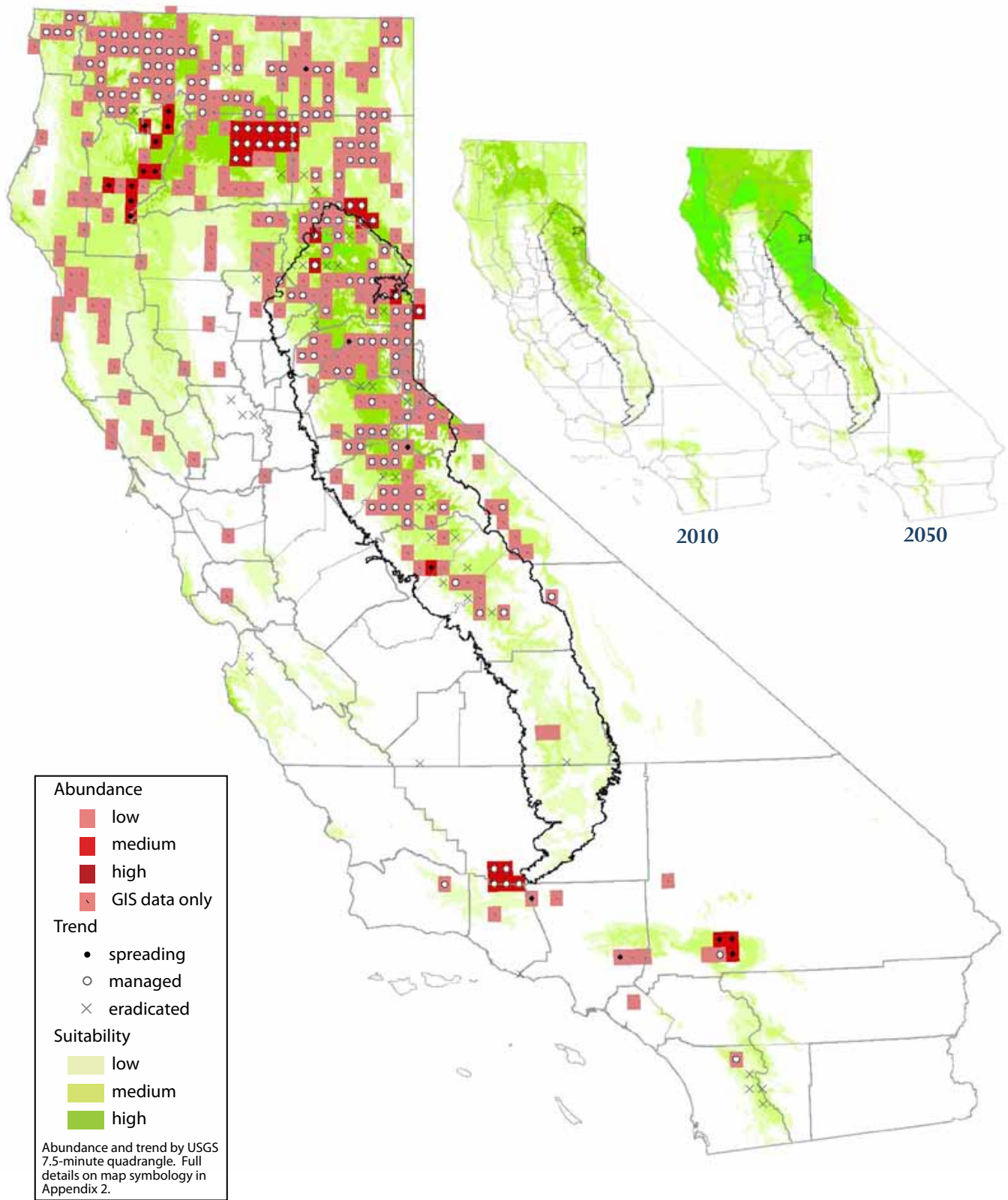
Spotted knapweed is a biennial to short-lived perennial that grows 40 in. (1 m) tall. It invades fields, disturbed open sites, grasslands, and rangeland. It forms large, dense infestations, especially on light, well-drained soils in areas that receive summer rainfall. Spotted knapweed requires more moisture than diffuse knapweed. Spotted knapweed can be transported on the undercarriages of vehicles and by moving hay from infested to non-infested areas. Maintaining pasture and rangeland health by preventing overgrazing and minimizing disturbance can help limit knapweeds. We recommend eradication as a high priority where possible and containment as a high priority elsewhere. Our modeling suggests that the amount of suitable range for spotted knapweed in the Sierra Nevada will remain relatively unchanged with future climate change.



WEED MANAGEMENT AREA	OPPORTUNITIES			STATISTICS							
	ERADICATION	CONTAINMENT	SURVEILLANCE	% INFESTED	% SUITABLE INFESTED	% SPREADING	% MANAGED	% ERADICATED	% SUITABLE 2010	% SUITABLE 2050	SUITABILITY CHANGE
Lassen	-	H	-	40	41	0	9	2	90	100	-
Plumas/Sierra	-	H	-	47	47	5	38	8	99	100	-
Butte	-	H	-	27	35	0	0	2	58	59	-
Yuba/Sutter	-	-	H	5	20	0	0	3	31	34	-
Nevada/Placer	-	H	-	43	51	4	0	3	75	75	-
Lake Tahoe Basin	-	H	-	67	80	0	0	6	79	100	↑
El Dorado	-	H	-	44	46	0	0	9	84	83	-
Alpine	-	H	-	46	50	0	9	0	76	100	↑
Amador	-	H	-	39	48	0	0	4	63	60	-
Central Sierra	-	H	-	28	31	0	0	5	66	76	↑
Sierra/San Joaquin	-	H	-	8	14	6	19	3	30	42	↑
Tulare	H	-	-	2	3	0	0	1	35	45	↑
Kern	-	-	H	3	8	100	100	1	15	14	-
Eastern Sierra	-	H	-	4	9	0	36	0	16	35	↑↑
All Sierra Nevada	H	H	-	26	30	4	15	5	62	71	-

Abundance, Trend and Suitability

Spotted knapweed (*Centaurea maculosa*)



Tocalote

(*Centaurea melitensis*)

Ratings: Cal-IPC Moderate; CDFA C

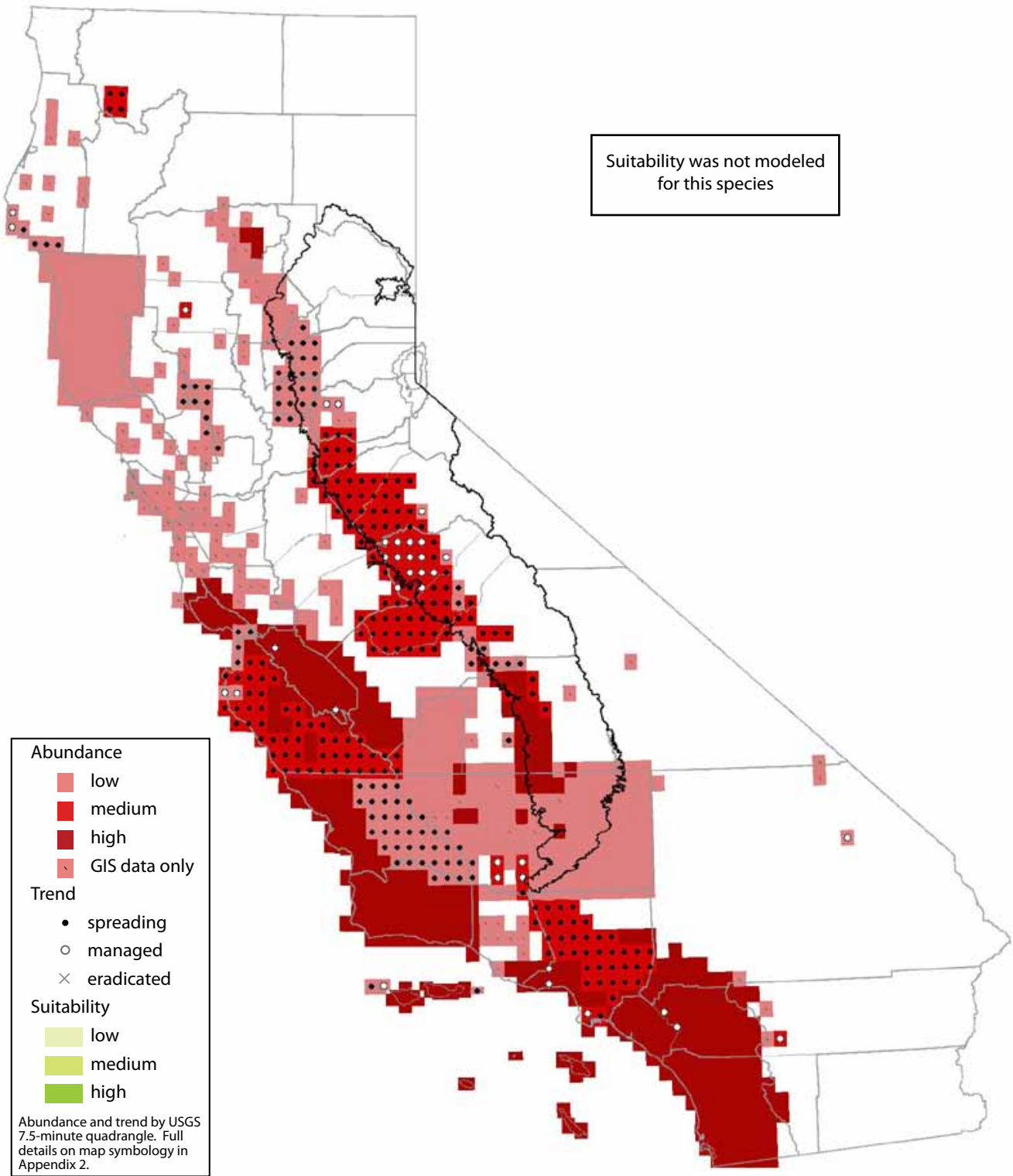
Tocalote, or Malta starthistle, looks similar to yellow starthistle but is less common statewide. It grows as a simple to bushy winter annual or occasionally as a biennial. It inhabits open disturbed sites, grasslands, rangelands, and woodlands. Dense stands displace native plants and animals. It can be spread through human activities such as attaching to equipment or vehicles and as a seed or soil contaminant. As it is difficult to distinguish from the more familiar yellow starthistle, it may be more widespread than our maps indicate. We did not model suitability for this species.



WEED MANAGEMENT AREA	OPPORTUNITIES			STATISTICS							
	ERADICATION	CONTAINMENT	SURVEILLANCE	% INFESTED	% SUITABLE INFESTED	% SPREADING	% MANAGED	% ERADICATED	% SUITABLE 2010	% SUITABLE 2050	SUITABILITY CHANGE
Lassen	-	-	M	0	-	-	-	0	-	-	-
Plumas/Sierra	-	-	M	1	-	0	0	0	-	-	-
Butte	-	M	-	44	-	5	0	0	-	-	-
Yuba/Sutter	-	M	-	41	-	60	0	0	-	-	-
Nevada/Placer	-	M	-	37	-	91	0	0	-	-	-
Lake Tahoe Basin	-	-	M	0	-	-	-	0	-	-	-
El Dorado	-	H	-	26	-	42	0	0	-	-	-
Alpine	-	M	-	0	-	-	-	0	-	-	-
Amador	-	M	-	54	-	87	0	0	-	-	-
Central Sierra	-	M	-	46	-	92	0	0	-	-	-
Sierra/San Joaquin	-	M	-	52	-	55	0	0	-	-	-
Tulare	-	M	-	49	-	16	0	0	-	-	-
Kern	-	M	-	98	-	11	3	0	-	-	-
Eastern Sierra	-	-	M	2	-	0	0	0	-	-	-
All Sierra Nevada	-	M	-	42	-	46	1	0	-	-	-

Abundance, Trend and Suitability

Tocalote (*Centaurea melitensis*)



YELLOW STARHISTLE
(Centaurea solstitialis)

Ratings: Cal-IPC High; CDFA B

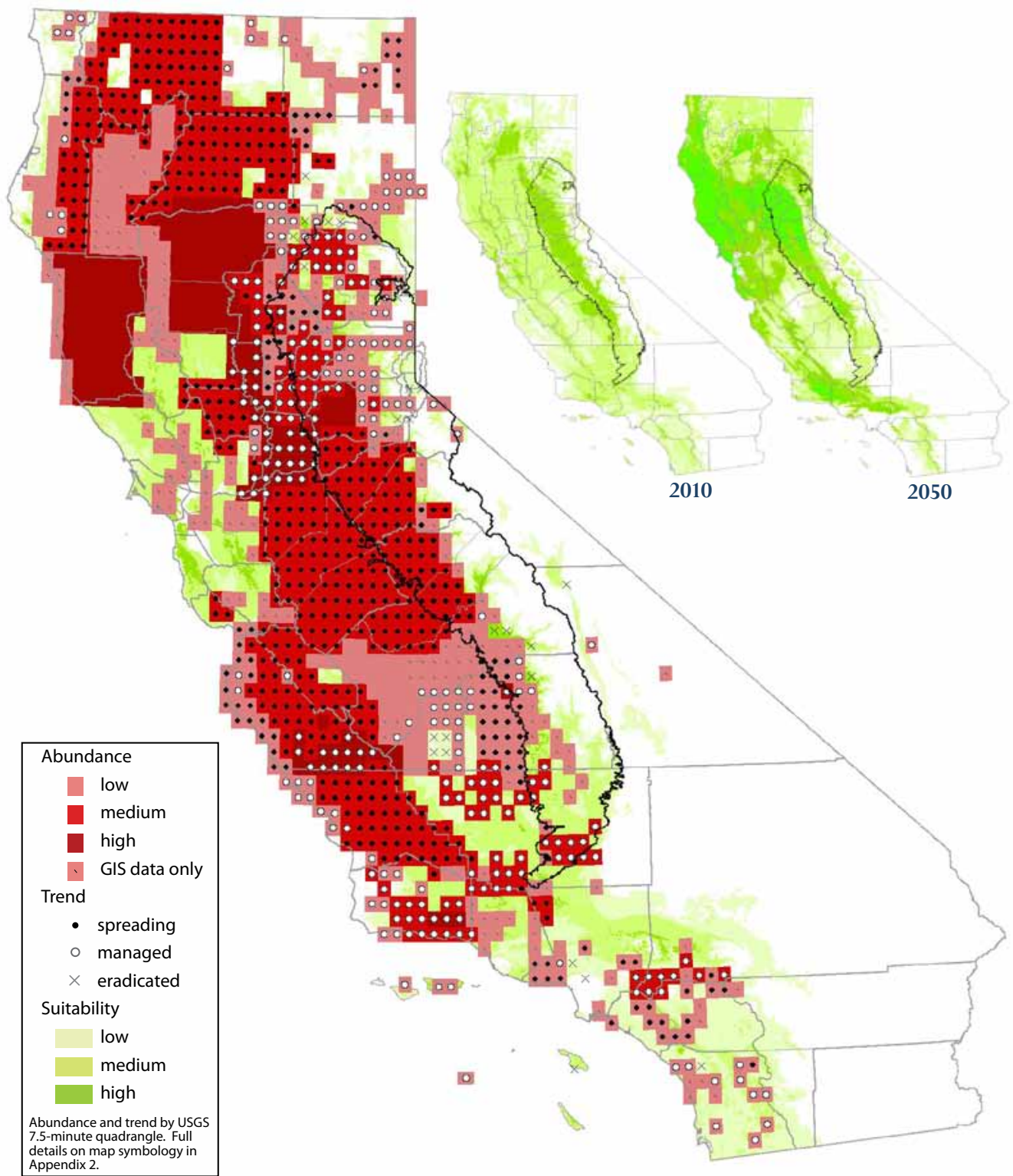
Yellow starthistle infests more than 14 million acres in California and may be the most widely distributed invasive plant statewide. It grows as a simple to bushy winter annual or occasionally as a biennial. It inhabits open disturbed sites, grasslands, rangelands, and woodlands. Dense stands displace native plants and animals and reduce the quality of rangeland by reducing forage quality and yield. It can be spread through human activities such as attaching to equipment or vehicles and as a seed or soil contaminant. Grazing, mowing, burning, and cultivation can prevent seed production and control spread when properly timed and used for several years. We recommend containment as a high priority, in coordination with the existing Yellow Starthistle Leading Edge Project. Our modeling suggests that the amount of suitable range for yellow starthistle in the Sierra Nevada will remain relatively unchanged with future climate change.



WEED MANAGEMENT AREA	OPPORTUNITIES			STATISTICS							
	ERADICATION	CONTAINMENT	SURVEILLANCE	% INFESTED	% SUITABLE INFESTED	% SPREADING	% MANAGED	% ERADICATED	% SUITABLE 2010	% SUITABLE 2050	SUITABILITY CHANGE
Lassen	-	H	-	36	38	46	12	4	55	97	↑
Plumas/Sierra	-	H	-	62	62	42	53	6	81	100	↑
Butte	-	H	-	98	98	21	4	0	100	100	-
Yuba/Sutter	-	H	-	78	100	59	0	0	100	100	-
Nevada/Placer	-	H	-	79	79	52	0	0	89	99	-
Lake Tahoe Basin	H	-	-	22	27	0	0	17	50	80	↑
El Dorado	-	H	-	72	73	36	0	9	86	94	-
Alpine	H	-	-	21	24	20	20	8	32	70	↑↑
Amador	-	H	-	89	89	88	0	7	92	96	-
Central Sierra	-	H	-	65	73	92	0	0	71	78	-
Sierra/San Joaquin	-	H	-	69	74	48	1	2	78	78	-
Tulare	-	H	-	52	55	60	14	1	79	86	-
Kern	-	H	-	41	46	52	55	0	82	65	↓
Eastern Sierra	H	-	-	1	4	0	67	0	8	18	↑↑
All Sierra Nevada	H	H	-	57	61	64	16	3	78	85	-

Abundance, Trend and Suitability

Yellow starthistle (*Centaurea solstitialis*)



RUSH SKELETONWEED

(*Chondrilla juncea*)

Ratings: Cal-IPC Moderate; CDFA A

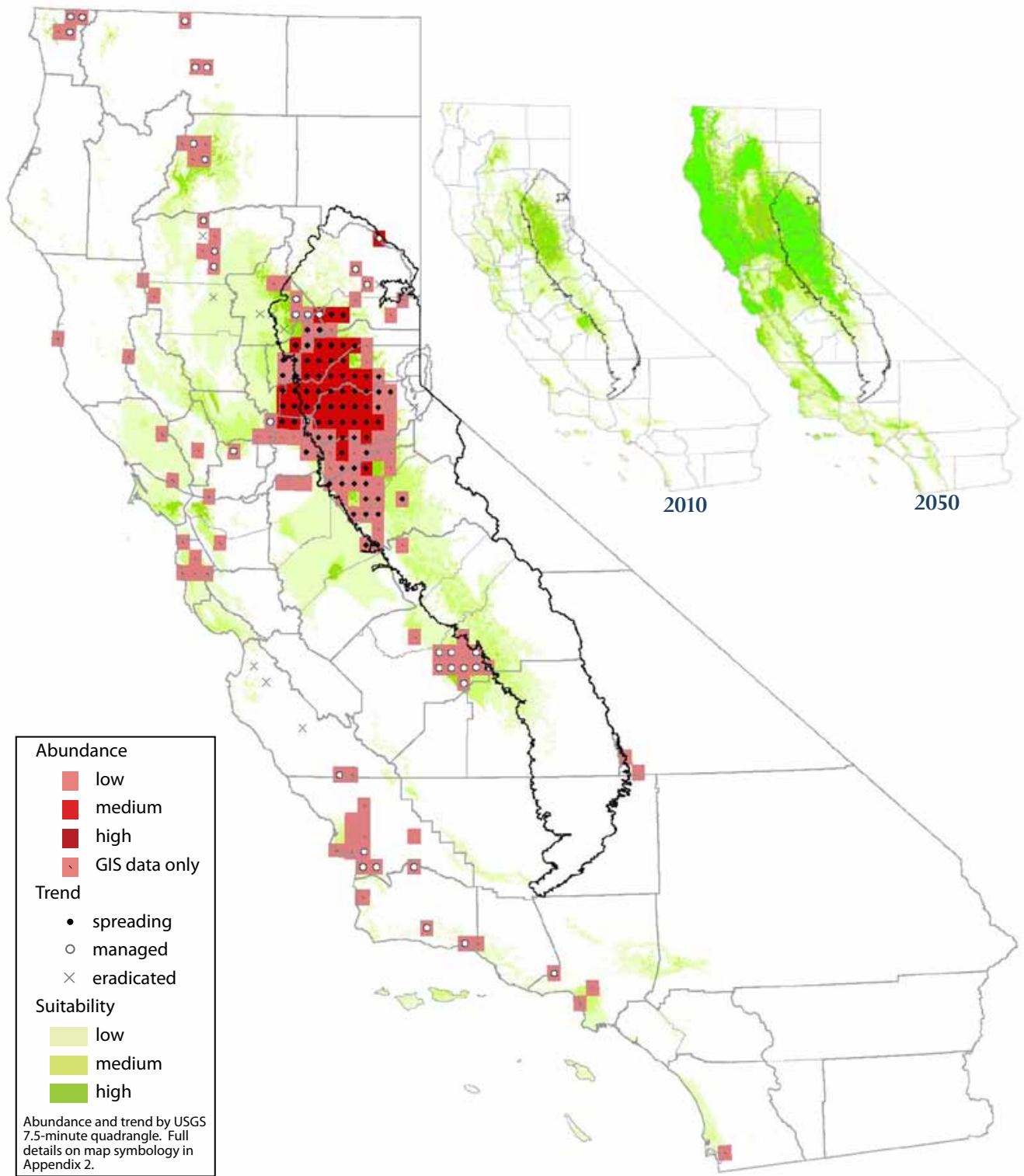
Rush skeletonweed is an herbaceous perennial or biennial that is highly competitive for water and soil nutrients, especially nitrogen. It grows best on well-drained sandy or gravelly soils in climate with cool winters and hot, relatively dry summer but it tolerates a wide range of environmental conditions. In California it is mainly a roadside invader but can expand away from roads. It is also a contaminant of hay. Our modeling suggests that the amount of suitable range for rush skeletonweed in the Sierra Nevada will increase with future climate change.



WEED MANAGEMENT AREA	OPPORTUNITIES			STATISTICS							
	ERADICATION	CONTAINMENT	SURVEILLANCE	% INFESTED	% SUITABLE INFESTED	% SPREADING	% MANAGED	% ERADICATED	% SUITABLE 2010	% SUITABLE 2050	SUITABILITY CHANGE
Lassen	H	-	-	2	50	0	0	0	1	14	↑↑
Plumas/Sierra	-	H	-	14	23	33	25	1	26	85	↑↑
Butte	-	H	-	15	15	29	14	6	87	100	-
Yuba/Sutter	-	H	-	38	54	79	7	0	97	100	-
Nevada/Placer	-	H	-	67	78	91	0	0	76	100	↑
Lake Tahoe Basin	-	-	H	0	0	-	-	6	4	97	↑↑
El Dorado	-	H	-	70	82	84	0	2	74	100	↑
Alpine	-	-	H	0	0	-	-	0	7	89	↑↑
Amador	-	H	-	71	71	60	0	0	88	100	-
Central Sierra	-	H	-	29	35	70	0	0	61	90	↑
Sierra/San Joaquin	H	-	-	7	11	7	64	0	32	53	↑
Tulare	-	-	H	3	7	0	67	0	20	22	-
Kern	-	-	M	1	3	0	0	0	3	10	↑↑
Eastern Sierra	M	-	-	1	10	0	0	0	0	6	↑↑
All Sierra Nevada	M	H		22	32	67	5	1	42	67	↑

Abundance, Trend and Suitability

Rush skeletonweed (*Chondrilla juncea*)



CANADA THISTLE
(*Cirsium arvense*)

Ratings: Cal-IPC Moderate; CDFA B

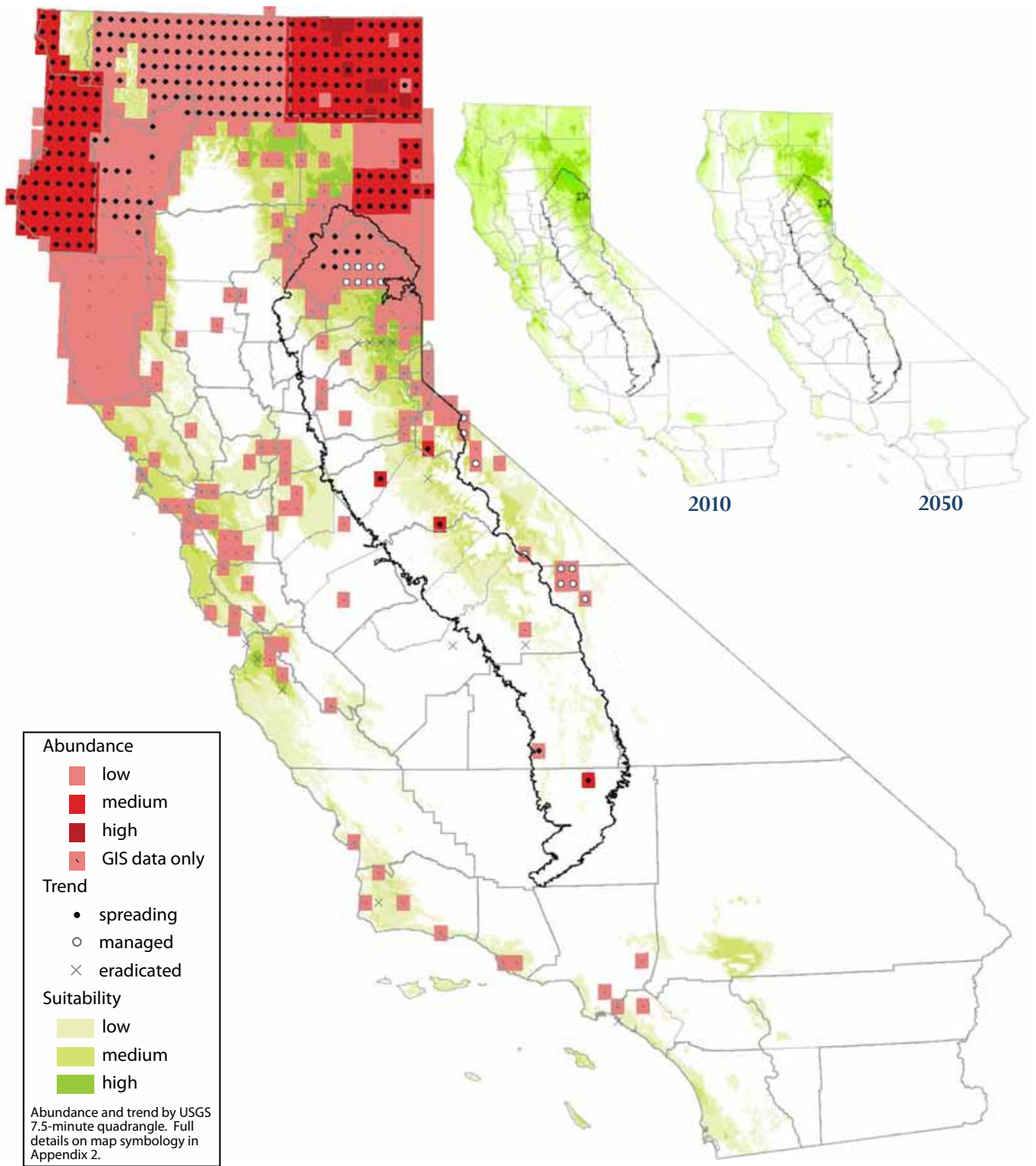
Canada thistle is a perennial species that forms dense patches with extensive creeping roots. It invades open disturbed sites, pastures, rangeland, and forest openings. It tolerates a wide range of soil types but grows best in areas with moist soils such as stream banks and moist depressions. It reproduces both vegetatively from creeping roots and from seeds. Repeated cultivation, mowing, and hand-cutting reduces and can eventually eliminate populations of perennial thistles. Our modeling suggests that the amount of suitable range for Canada thistle in the Sierra Nevada will decrease with future climate change.



WEED MANAGEMENT AREA	OPPORTUNITIES			STATISTICS							
	ERADICATION	CONTAINMENT	SURVEILLANCE	% INFESTED	% SUITABLE INFESTED	% SPREADING	% MANAGED	% ERADICATED	% SUITABLE 2010	% SUITABLE 2050	SUITABILITY CHANGE
Lassen	-	M	-	82	82	35	0	0	99	96	-
Plumas/Sierra	-	M	-	80	80	25	12	0	100	77	↓
Butte	-	M	-	27	50	0	0	2	41	10	↓
Yuba/Sutter	-	M	-	8	23	0	0	0	32	0	↓
Nevada/Placer	-	M	-	16	22	0	0	6	60	22	↓
Lake Tahoe Basin	-	M	-	44	47	0	0	0	87	82	-
El Dorado	-	M	-	26	34	0	0	0	50	20	↓
Alpine	-	M	-	46	48	9	18	0	69	87	↑
Amador	M	-	-	11	20	0	0	0	36	7	↓
Central Sierra	M	-	-	4	5	100	0	1	36	32	-
Sierra/San Joaquin	M	-	-	2	3	33	33	1	18	11	↓
Tulare	M	-	-	1	2	100	0	0	8	4	↓
Kern	M	-	-	1	3	100	0	0	2	0	-
Eastern Sierra	M	-	-	4	9	0	82	0	14	16	↑
All Sierra Nevada	M	M		20	27	24	12	1	41	27	↓

Abundance, Trend and Suitability

Canada thistle (*Cirsium arvense*)



BULL THISTLE
(*Cirsium vulgare*)

Ratings: Cal-IPC Moderate; CDFA C

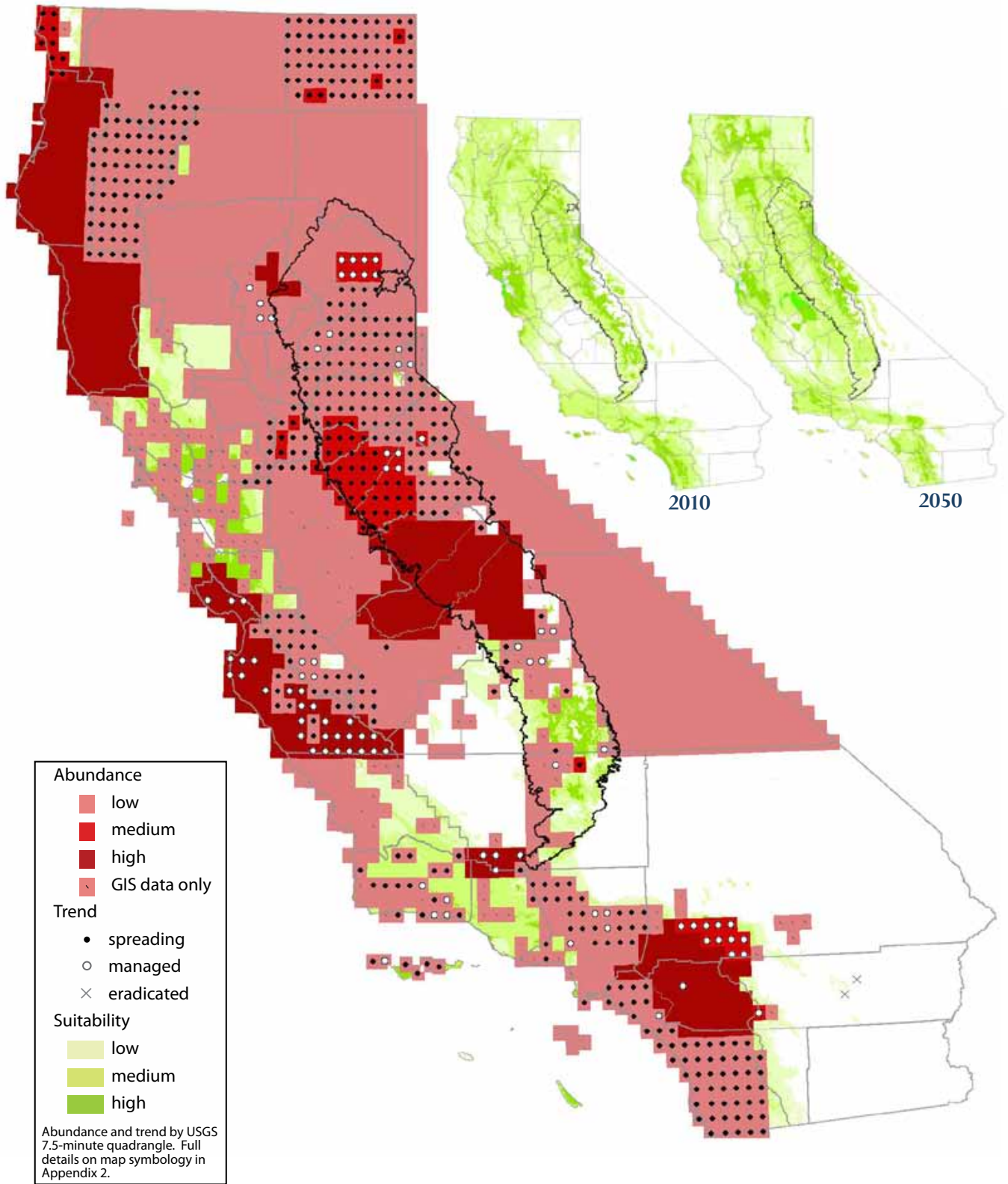
Bull thistle is a biennial, sometimes annual or short-lived perennial that grows to 80 in. (2 m) tall. Regional biotypes vary in life cycle patterns, seed dormancy, and seed longevity. It invades open disturbed sites, pastures, rangeland, and forest openings, and recently logged and newly planted forestry sites. Bull thistle grows best on heavy fertile soils. Compared to other thistles, bull thistle can germinate under lower moisture conditions. It dominates recently clearcut forests in the Sierra Nevada. Bull thistle colonizes and maintains high population densities for up to six years in clearcuts in redwood and mixed evergreen forests in northwestern California. Our modeling suggests that the amount of suitable range for bull thistle in the Sierra Nevada will remain relatively unchanged with future climate change.



WEED MANAGEMENT AREA	OPPORTUNITIES			STATISTICS							
	ERADICATION	CONTAINMENT	SURVEILLANCE	% INFESTED	% SUITABLE INFESTED	% SPREADING	% MANAGED	% ERADICATED	% SUITABLE 2010	% SUITABLE 2050	SUITABILITY CHANGE
Lassen	-	L	-	100	100	0	0	0	61	99	↑
Plumas/Sierra	-	L	-	100	100	20	9	0	93	99	-
Butte	-	L	-	100	100	2	0	0	100	100	-
Yuba/Sutter	-	L	-	76	100	43	0	0	100	100	-
Nevada/Placer	-	L	-	100	100	92	0	0	96	100	-
Lake Tahoe Basin	-	L	-	94	94	65	0	0	78	99	↑
El Dorado	-	L	-	98	98	93	0	0	94	100	-
Alpine	-	L	-	92	100	77	0	0	64	96	↑
Amador	-	L	-	100	100	100	0	0	97	100	-
Central Sierra	-	L	-	95	99	91	0	0	77	91	↑
Sierra/San Joaquin	-	L	-	92	100	6	2	0	44	84	↑
Tulare	-	M	-	39	46	15	10	0	59	90	↑
Kern	-	M	-	27	46	4	13	0	41	70	↑
Eastern Sierra	-	L	-	95	100	4	0	0	19	27	↑
All Sierra Nevada	-	L	-	84	85	42	4	0	80	92	-

Abundance, Trend and Suitability

Bull thistle (*Cirsium vulgare*)



STINKWORT

(Dittrichia graveolens)

Ratings: Cal-IPC Moderate Alert, CDFA not rated

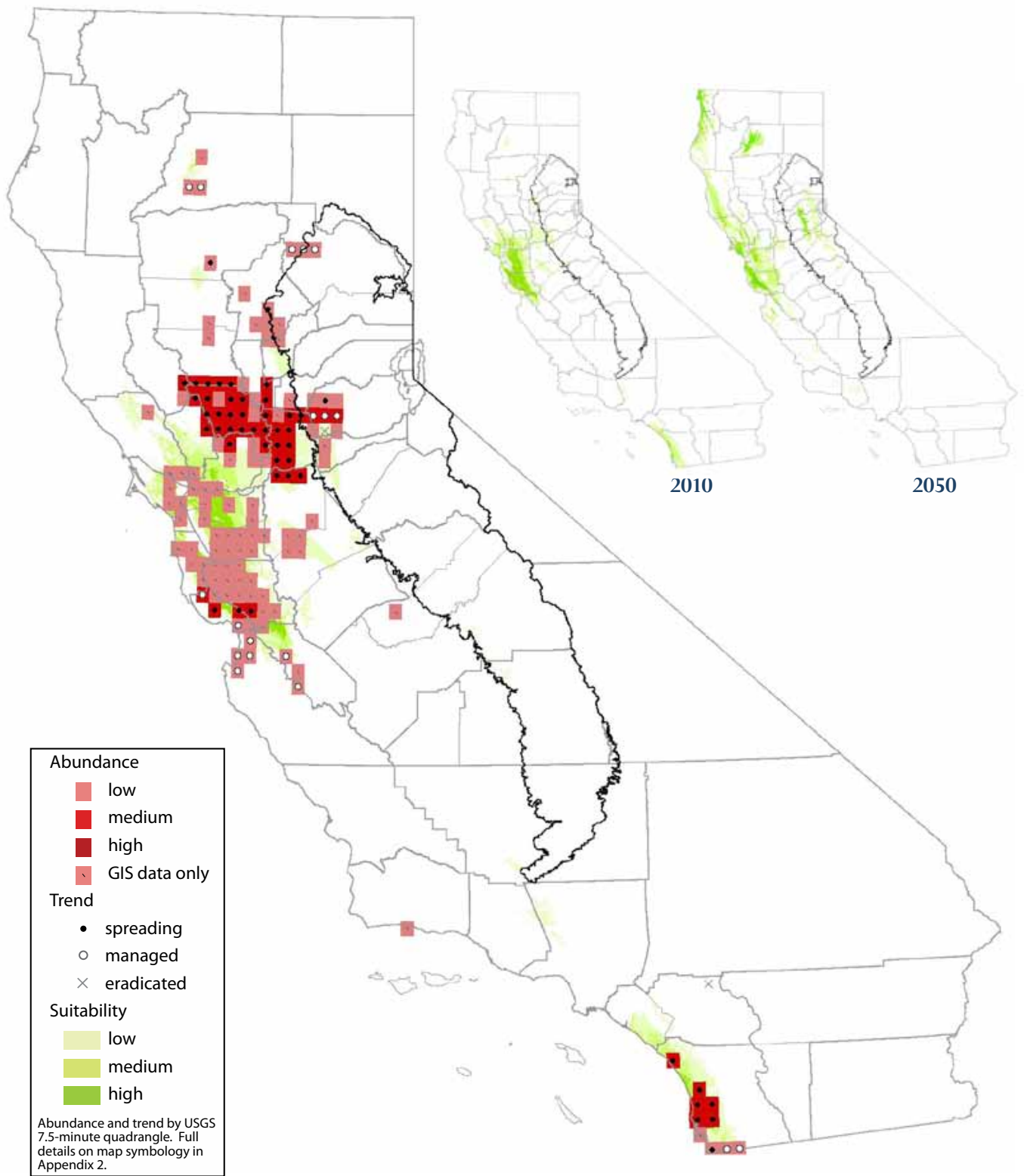
Stinkwort is a relatively new invasive species in California. It is an erect, fall-flowering, aromatic annual, with sticky glandular-hairy foliage. It resembles tarweeds. Stinkwort can form dense stands in late summer or early fall when there are few plant competitors. Because it is a new species to the state, little information exists on stinkwort's impacts, but it has been reported as spreading rapidly in some parts of California. Due to its limited distribution, the projected suitability map for this species may be too conservative. Our modeling suggests that the amount of suitable range for stinkwort in the Sierra Nevada will increase considerably with future climate change.



WEED MANAGEMENT AREA	OPPORTUNITIES			STATISTICS							
	ERADICATION	CONTAINMENT	SURVEILLANCE	% INFESTED	% SUITABLE INFESTED	% SPREADING	% MANAGED	% ERADICATED	% SUITABLE 2010	% SUITABLE 2050	SUITABILITY CHANGE
Lassen	-	-	M	0	-	-	-	0	0	0	-
Plumas/Sierra	M	-	-	4	-	0	100	0	0	3	-
Butte	-	M	-	17	89	13	13	0	5	0	↓
Yuba/Sutter	-	M	-	24	90	33	0	0	13	0	↓
Nevada/Placer	-	-	M	10	40	50	17	0	4	19	↑↑
Lake Tahoe Basin	-	-	L	0	-	-	-	0	0	20	-
El Dorado	-	M	-	20	100	56	33	2	3	33	↑↑
Alpine	-	-	L	0	-	-	-	0	0	13	-
Amador	-	M	-	14	33	0	0	4	22	27	↑
Central Sierra	-	-	M	0	0	-	-	0	3	16	↑↑
Sierra/San Joaquin	-	-	M	1	13	0	0	0	0	2	↑↑
Tulare	-	-	L	0	0	-	-	0	1	0	↓
Kern	-	-	L	0	0	-	-	0	0	1	-
Eastern Sierra	-	-	-	0	-	-	-	0	0	0	-
All Sierra Nevada	-	H	-	4	39	30	30	0	3	8	↑↑

Abundance, Trend and Suitability

Stinkwort (*Dittrichia graveolens*)



OX-EYE DAISY

(Leucanthemum vulgare)

Ratings: Cal-IPC Moderate, CDFG not rated

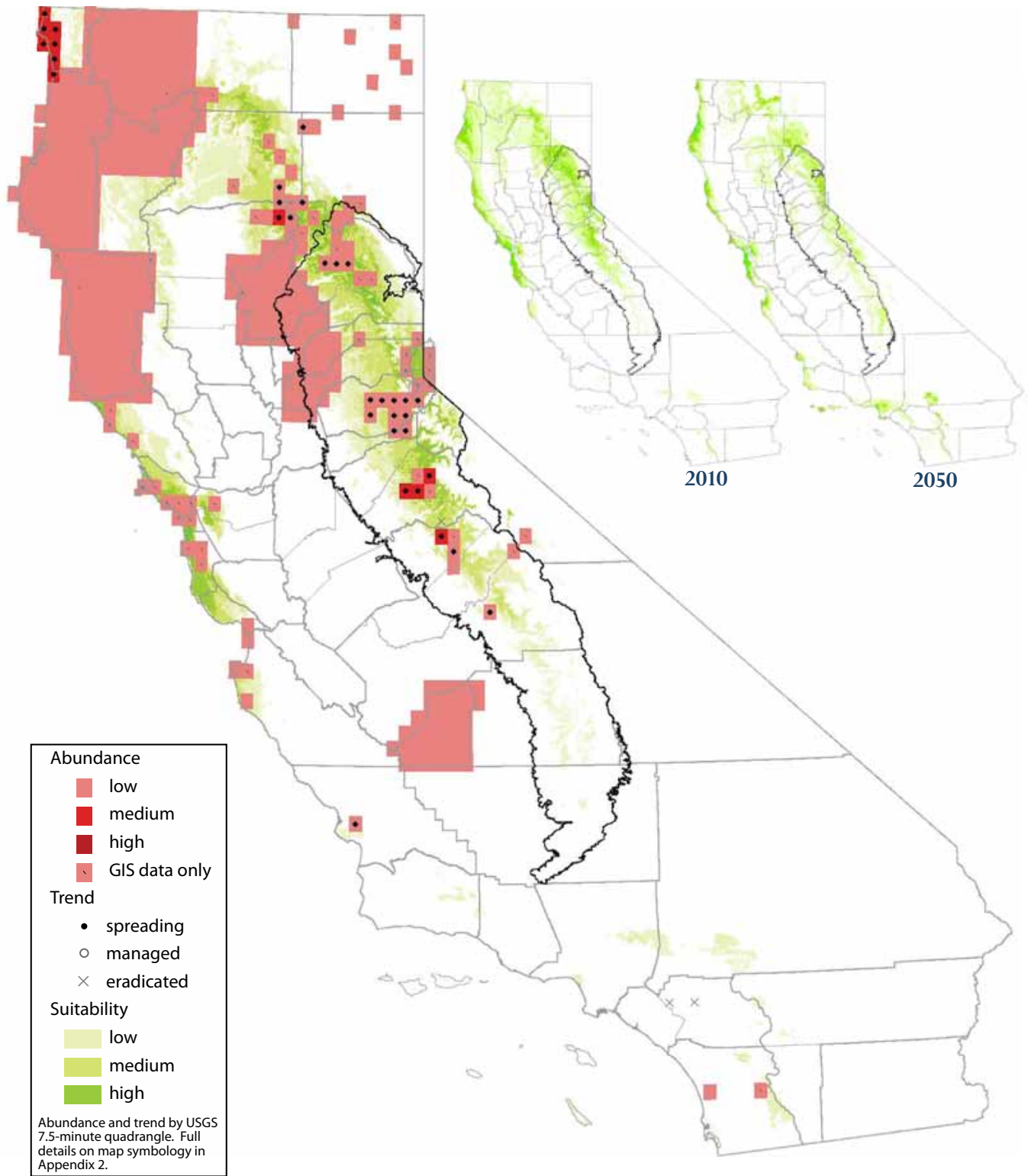
Ox-eye daisy is a clumping perennial with white daisy flowers and creeping roots. It can develop dense colonies and most large herbivores avoid grazing on it. It inhabits disturbed sites, grassland, and coastal scrub, often grows on poor soil, and can thrive on moist clay soils. Root fragments can develop new plants. Seeds disperse with vehicles, soil movement and human activities and germinate wherever sufficient moisture is available. Ox-eye daisy also spreads as a component of wildflower seed mixes. Our modeling suggests that the amount of suitable range for ox-eye daisy in the Sierra Nevada will decrease with future climate change.



WEED MANAGEMENT AREA	OPPORTUNITIES			STATISTICS							
	ERADICATION	CONTAINMENT	SURVEILLANCE	% INFESTED	% SUITABLE INFESTED	% SPREADING	% MANAGED	% ERADICATED	% SUITABLE 2010	% SUITABLE 2050	SUITABILITY CHANGE
Lassen	-	M	-	9	29	20	0	0	16	43	↑↑
Plumas/Sierra	-	M	-	27	29	22	0	0	78	59	↓
Butte	-	M	-	94	100	0	0	0	41	39	-
Yuba/Sutter	-	M	-	51	100	0	0	0	15	2	↓
Nevada/Placer	-	M	-	49	59	0	0	0	61	30	↓
Lake Tahoe Basin	-	M	-	50	53	22	0	0	76	82	-
El Dorado	-	M	-	39	41	56	0	0	75	36	↓
Alpine	-	-	M	4	5	0	0	0	53	74	↑
Amador	-	M	-	11	15	100	0	0	49	27	↓
Central Sierra	-	M	-	6	8	60	0	1	43	26	↓
Sierra/San Joaquin	-	M	-	8	21	18	0	1	15	13	↓
Tulare	-	-	M	8	19	0	0	0	7	19	↑↑
Kern	-	-	L	4	46	0	0	0	1	2	-
Eastern Sierra	M	-	-	1	5	0	0	0	1	13	↑↑
All Sierra Nevada	L	M	-	16	23	24	0	0	38	28	↓

Abundance, Trend and Suitability

Ox-eye daisy (*Leucanthemum vulgare*)



SCOTCH THISTLE

(Onopordum acanthium)

Ratings: Cal-IPC High, CDFA A

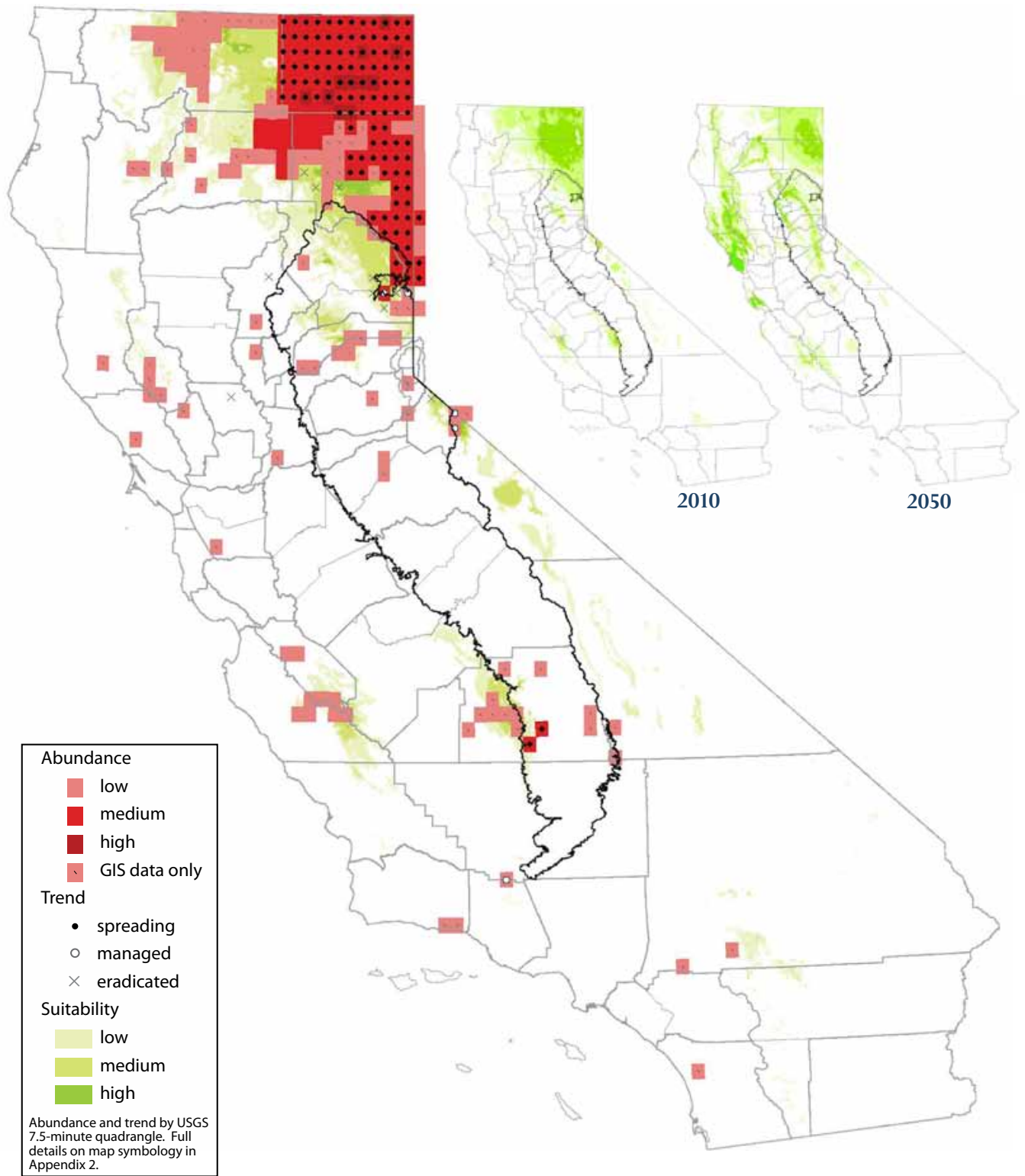
Scotch thistle is a coarse biennial, occasionally annual or short-lived perennial thistle with spines on the leaves, stems, and flower heads. It grows up to 10 feet (3 meters) tall. Scotch thistle can develop dense, impenetrable stands in some local areas, especially on fertile soils. It often grows on sites with high soil moisture. It invades disturbed areas, grasslands, riparian areas, canals and ditch banks. We recommend containment as a high priority to prevent the further spread of northern populations and eradication as a high priority throughout the Sierra. Our modeling suggests that the amount of suitable range for Scotch thistle in the Sierra Nevada will increase with future climate change.



WEED MANAGEMENT AREA	OPPORTUNITIES			STATISTICS							
	ERADICATION	CONTAINMENT	SURVEILLANCE	% INFESTED	% SUITABLE INFESTED	% SPREADING	% MANAGED	% ERADICATED	% SUITABLE 2010	% SUITABLE 2050	SUITABILITY CHANGE
Lassen	-	H	-	78	78	49	1	4	98	89	-
Plumas/Sierra	H	-	-	16	17	50	14	6	66	73	-
Butte	-	-	M	2	8	0	0	2	6	33	↑↑
Yuba/Sutter	-	-	M	3	13	0	0	0	11	19	↑
Nevada/Placer	-	H	-	13	24	0	0	0	19	41	↑↑
Lake Tahoe Basin	H	-	-	11	29	0	0	6	10	31	↑↑
El Dorado	H	-	-	7	43	0	0	0	1	48	↑↑
Alpine	H	-	-	13	25	0	67	4	15	16	-
Amador	-	-	H	4	-	0	0	0	0	41	-
Central Sierra	H	-	-	3	50	0	0	0	0	25	↑↑
Sierra/San Joaquin	-	-	H	1	2	0	0	0	6	8	↑
Tulare	-	H	-	14	31	14	0	0	17	7	↓
Kern	-	-	H	1	8	0	50	0	1	7	↑↑
Eastern Sierra	H	-	-	2	5	0	40	0	9	7	↓
All Sierra Nevada	H	H	-	9	23	26	10	1	16	27	↑

Abundance, Trend and Suitability

Scotch thistle (*Onopordum acanthium*)



Family Boraginaceae

HOUNDSTONGUE

(Cynoglossum officinale)

Ratings: Cal-IPC Moderate, CDFA not rated

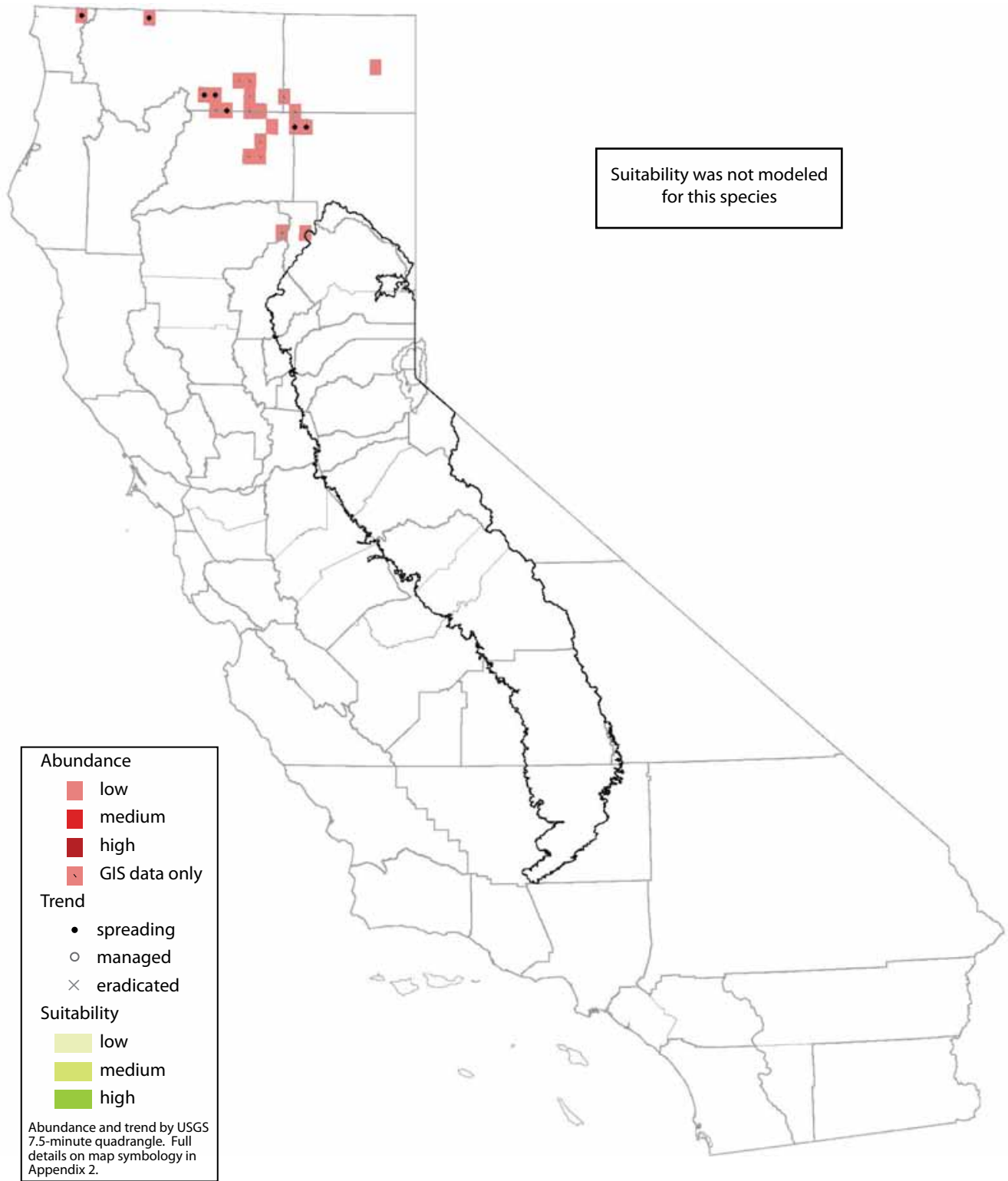
Houndstongue is a biennial, sometimes annual or short-lived perennial species with leafy stems and panicles of reddish-purple flowers. It inhabits open disturbed, often moist places, including open woodland and forests, pastures, rangeland, sand dunes and canal banks. It often grows on sandy or gravelly soil and typically colonizes bare soil. Mowing flowering stems before nutlets develop greatly reduces seed production. (The stems of nonweedy native houndstongue, *Cynoglossum grande*, are not leafy.) We did not model suitability for this species.



WEED MANAGEMENT AREA	OPPORTUNITIES			STATISTICS							
	ERADICATION	CONTAINMENT	SURVEILLANCE	% INFESTED	% SUITABLE INFESTED	% SPREADING	% MANAGED	% ERADICATED	% SUITABLE 2010	% SUITABLE 2050	SUITABILITY CHANGE
Lassen	-	-	M	3	-	67	0	0	-	-	-
Plumas/Sierra	-	-	M	2	-	0	0	0	-	-	-
Butte	-	-	M	2	-	0	0	0	-	-	-
Yuba/Sutter	-	-	-	0	-	-	-	0	-	-	-
Nevada/Placer	-	-	-	0	-	-	-	0	-	-	-
Lake Tahoe Basin	-	-	-	0	-	-	-	0	-	-	-
El Dorado	-	-	-	0	-	-	-	0	-	-	-
Alpine	-	-	-	0	-	-	-	0	-	-	-
Amador	-	-	-	0	-	-	-	0	-	-	-
Central Sierra	-	-	-	0	-	-	-	0	-	-	-
Sierra/San Joaquin	-	-	-	0	-	-	-	0	-	-	-
Tulare	-	-	-	0	-	-	-	0	-	-	-
Kern	-	-	-	0	-	-	-	0	-	-	-
Eastern Sierra	-	-	-	0	-	-	-	0	-	-	-
All Sierra Nevada	-	-	L	0	-	0	0	0	-	-	-

Abundance, Trend and Suitability

Houndstongue (*Cynoglossum officinale*)



Family Brassicaceae

LENS-PODDED WHITE-TOP AND HOARY CRESS

(*Cardaria chalepensis*, *C. draba*)

Ratings: *Cardaria chalepensis*: Cal-IPC Moderate Alert,
CDFA B

C. draba: Moderate; CDFA B

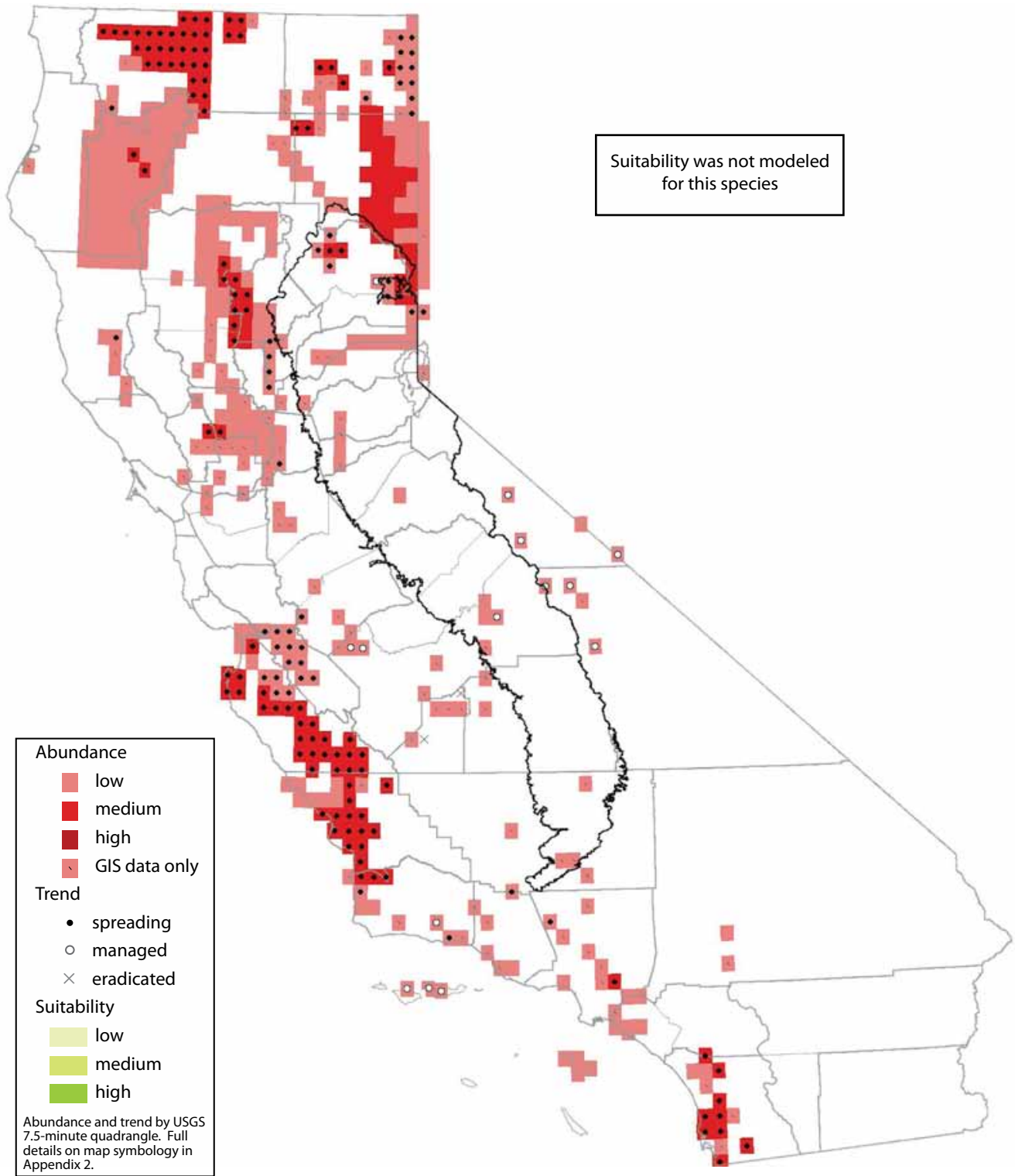
We combined these closely-related species for the purposes of this project because they have similar habitat requirements. In the upcoming *Jepson Manual*, these species are reclassified as *Lepidium draba* subsp. *draba* and *Lepidium draba* subsp. *chalepense*. They are perennials that form clonal colonies from creeping roots and can alter plant community composition. While primarily agricultural pests, they may become a problem along waterways or in high rainfall areas. Seeds and root fragments can be spread by vehicles, machinery, and hay or crop seed. We did not model suitability for these species.



WEED MANAGEMENT AREA	OPPORTUNITIES			STATISTICS							
	ERADICATION	CONTAINMENT	SURVEILLANCE	% INFESTED	% SUITABLE INFESTED	% SPREADING	% MANAGED	% ERADICATED	% SUITABLE 2010	% SUITABLE 2050	SUITABILITY CHANGE
Lassen	-	M	-	61	-	7	0	0	-	-	-
Plumas/Sierra	-	M	-	23	-	60	5	1	-	-	-
Butte	-	M	-	46	-	41	0	0	-	-	-
Yuba/Sutter	-	M	-	27	-	10	0	0	-	-	-
Nevada/Placer	-	M	-	19	-	0	0	0	-	-	-
Lake Tahoe Basin	M	-	-	11	-	0	0	0	-	-	-
El Dorado	M	-	-	7	-	0	0	0	-	-	-
Alpine	-	-	M	0	-	-	-	0	-	-	-
Amador	M	-	-	11	-	0	0	0	-	-	-
Central Sierra	M	-	-	3	-	0	0	0	-	-	-
Sierra/San Joaquin	M	-	-	6	-	0	31	1	-	-	-
Tulare	-	-	M	3	-	0	0	1	-	-	-
Kern	M	-	-	4	-	17	0	0	-	-	-
Eastern Sierra	M	-	-	3	-	0	75	0	-	-	-
All Sierra Nevada	M	M	-	11	-	23	6	0	-	-	-

Abundance, Trend and Suitability

Lens-podded white-top and hoary cress (*Cardaria chalepensis*, *C. draba*)



DYER'S WOAD
(Isatis tinctoria)

Ratings: Cal-IPC Moderate, CDFA B

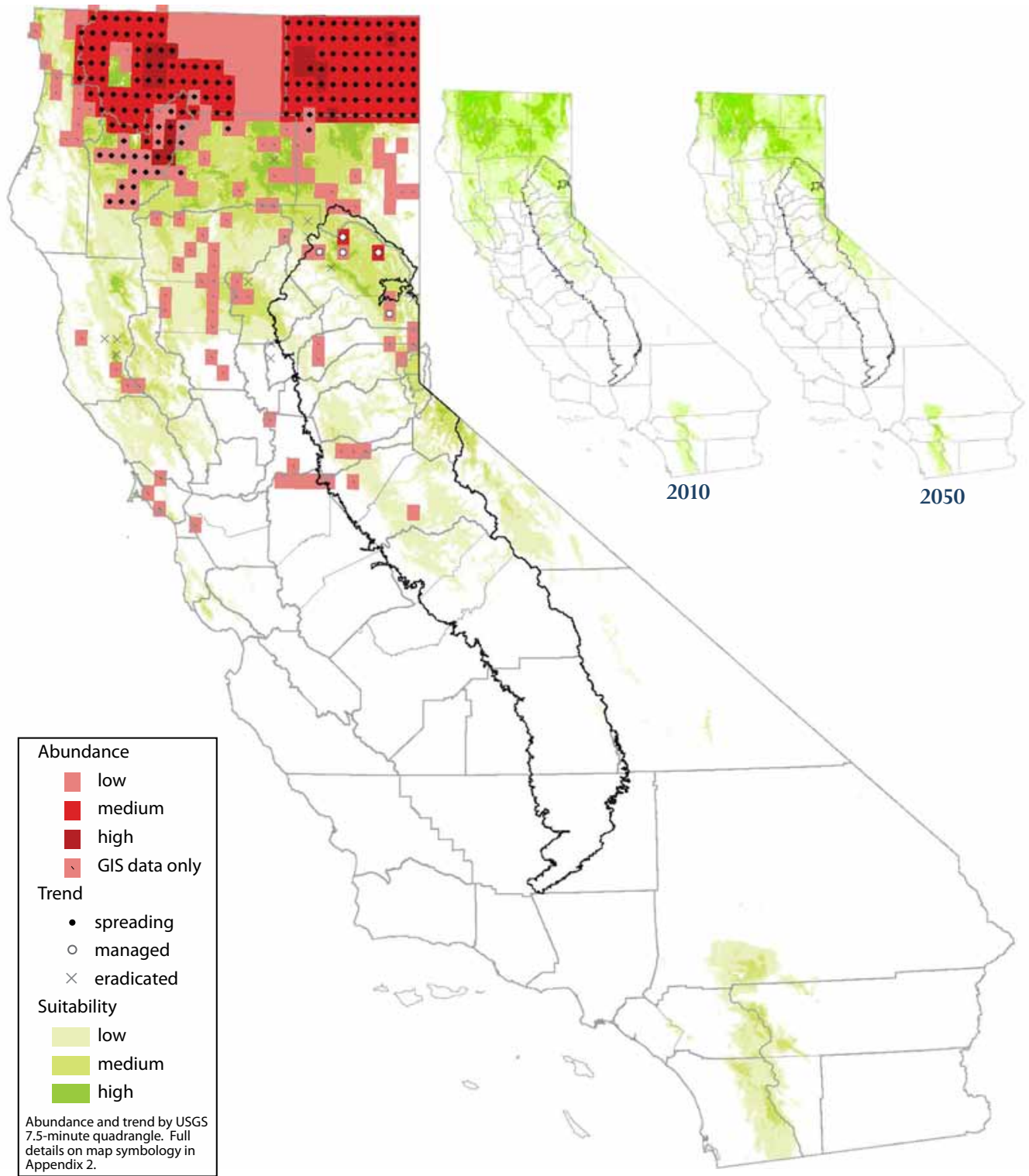
Dyer's woad is an erect biennial, winter annual, or short-lived perennial species with bright yellow flowers and dark, pendant fruits. The fruits distinguish it from other mustards. It grows on both disturbed and undisturbed sites such as roadsides, pastures, forest, rangeland, and agricultural areas, often on dry, rocky, or sandy soils. It competes with native shrubs and can dominate plant communities. Its deep root system can reduce water for native species. Plants cut above the crown can grow new shoots and may persist as short-lived perennials. Dyer's woad is a serious problem further north in California but has invaded few areas in the Sierra, so we recommend eradication as a high priority. Our modeling suggests that the amount of suitable range for dyer's woad in the Sierra Nevada will decrease with future climate change.



WEED MANAGEMENT AREA	OPPORTUNITIES			STATISTICS							
	ERADICATION	CONTAINMENT	SURVEILLANCE	% INFESTED	% SUITABLE INFESTED	% SPREADING	% MANAGED	% ERADICATED	% SUITABLE 2010	% SUITABLE 2050	SUITABILITY CHANGE
Lassen	H	-	-	30	32	35	3	1	76	97	↑
Plumas/Sierra	H	-	-	11	11	11	56	5	79	67	-
Butte	H	-	-	10	11	0	0	2	75	16	↓
Yuba/Sutter	-	-	H	5	13	0	0	0	26	2	↓
Nevada/Placer	H	-	-	10	12	0	0	0	40	16	↓
Lake Tahoe Basin	H	-	-	11	13	0	0	0	74	59	↓
El Dorado	-	-	H	0	0	-	-	0	49	19	↓
Alpine	-	-	H	0	0	-	-	0	67	65	-
Amador	-	H	-	18	21	0	0	0	40	13	↓
Central Sierra	H	-	-	5	6	0	0	0	40	21	↓
Sierra/San Joaquin	-	-	H	0	0	-	-	0	9	5	↓
Tulare	-	-	L	0	0	-	-	0	0	0	↓
Kern	-	-	L	0	-	-	-	0	0	0	-
Eastern Sierra	-	-	M	0	0	-	-	0	11	18	↑
All Sierra Nevada	H	-	-	5	8	4	22	1	33	20	↓

Abundance, Trend and Suitability

Dyer's woad (*Isatis tinctoria*)



CHARLOCK MUSTARD

(Sinapis arvensis)

Ratings: Cal-IPC Limited, CDFA not rated

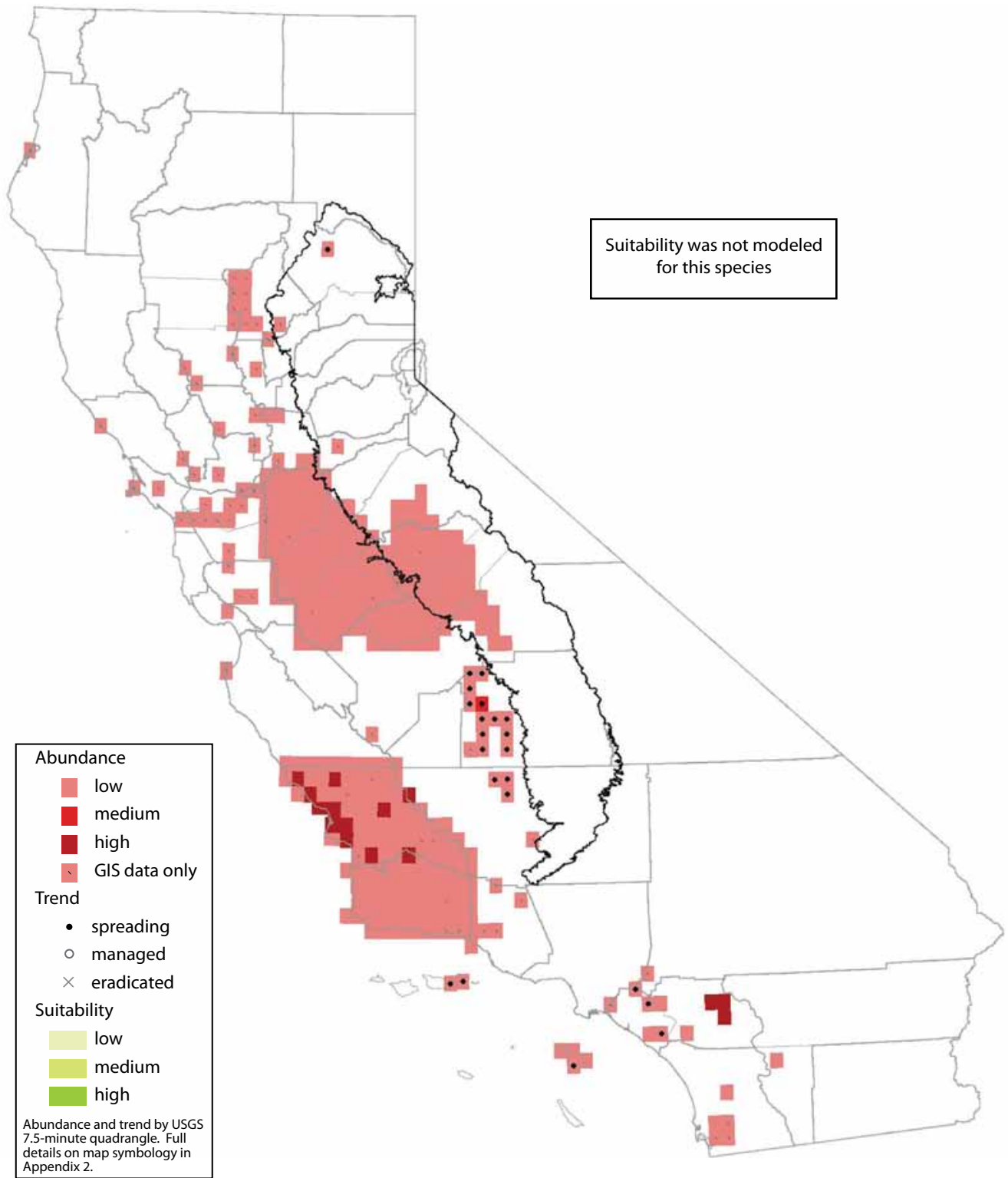
Charlock mustard grows as a winter or summer annual. Ingestion of large quantities of seed can be toxic to livestock, although the seeds are unpalatable. It mostly invades heavily disturbed areas such as roadsides and it also invasive in crops. It is infrequent in wildlands and does not typically spread. We did not model suitability for this species.



WEED MANAGEMENT AREA	OPPORTUNITIES			STATISTICS							
	ERADICATION	CONTAINMENT	SURVEILLANCE	% INFESTED	% SUITABLE INFESTED	% SPREADING	% MANAGED	% ERADICATED	% SUITABLE 2010	% SUITABLE 2050	SUITABILITY CHANGE
Lassen	-	-	L	0	-	-	-	0	-	-	-
Plumas/Sierra	M	-	-	1	-	100	0	0	-	-	-
Butte	L	-	-	23	-	0	0	0	-	-	-
Yuba/Sutter	-	-	L	16	-	0	0	0	-	-	-
Nevada/Placer	-	-	L	2	-	0	0	0	-	-	-
Lake Tahoe Basin	-	-	L	0	-	-	-	0	-	-	-
El Dorado	-	-	L	0	-	-	-	0	-	-	-
Alpine	-	-	L	0	-	-	-	0	-	-	-
Amador	L	-	-	14	-	0	0	0	-	-	-
Central Sierra	-	L	-	22	-	0	0	0	-	-	-
Sierra/San Joaquin	-	L	-	39	-	3	0	0	-	-	-
Tulare	-	-	L	13	-	92	0	0	-	-	-
Kern	-	-	L	12	-	16	0	0	-	-	-
Eastern Sierra	-	-	-	0	-	-	-	0	-	-	-
All Sierra Nevada	-	L	-	15	-	3	0	0	-	-	-

Abundance, Trend and Suitability

Charlock mustard (*Sinapis arvensis*)



Family Dipsacaceae

COMMON AND FULLER'S TEASELS (*Dipsacus fullonum*, *D. sativus*)

Ratings: Both species Cal-IPC Moderate, CDFA not rated

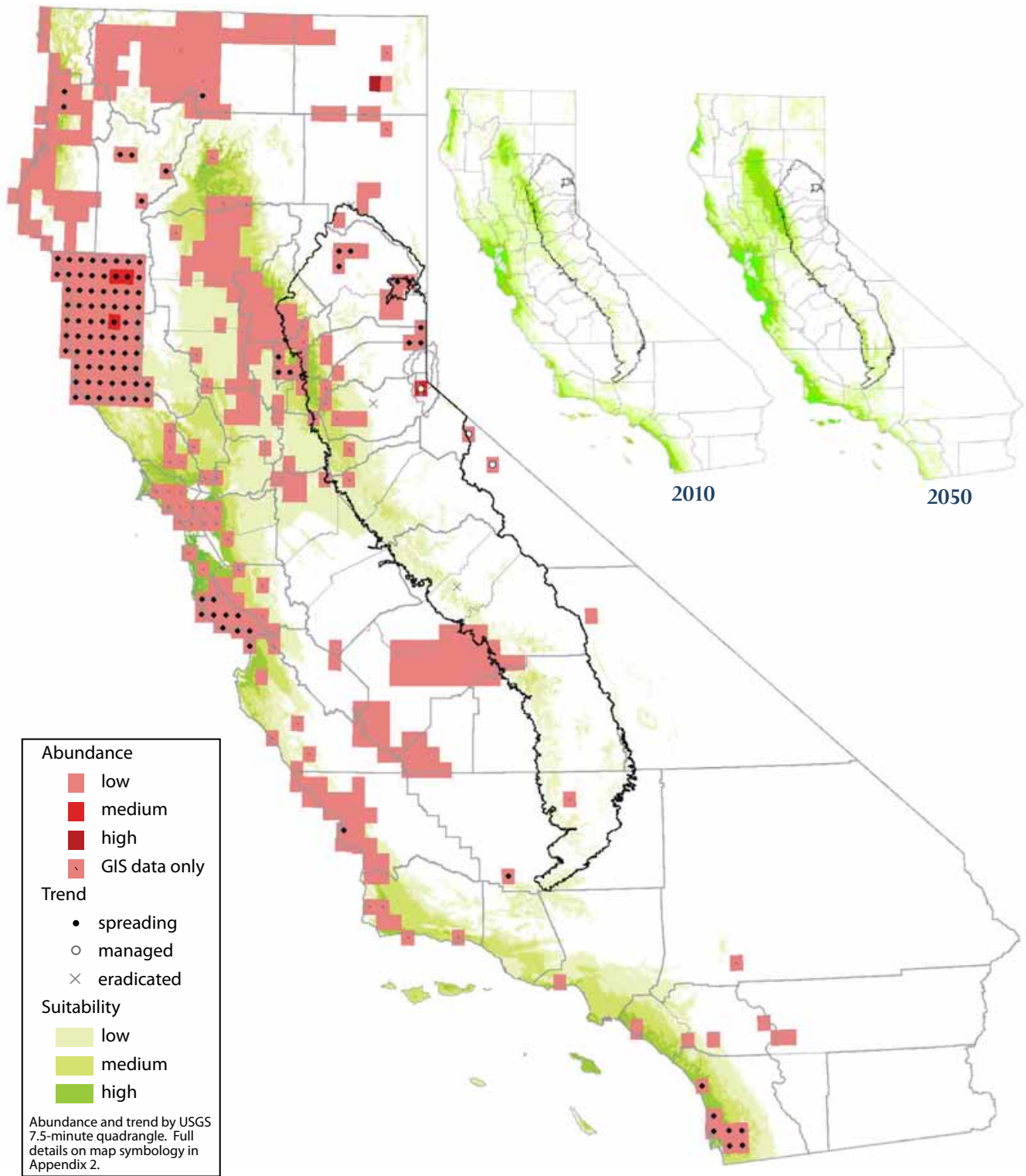
We combined the teasel species for this project due to the difficulty distinguishing them in the field and because they have similar habitat requirements. Both are biennials, occasionally short-lived perennials, with large spiny flower heads covered with lavender or white flowers. They grow in disturbed sites and establishment usually requires human-caused or natural disturbance. Teasels can form dominant stands, sometimes monocultures. They can be dispersed with water and soil movement and human activities. They are often found along steep roadside banks of new highways. Our modeling suggests that the amount of suitable range for both species in the Sierra Nevada will remain relatively unchanged with future climate change.



WEED MANAGEMENT AREA	OPPORTUNITIES			STATISTICS							
	ERADICATION	CONTAINMENT	SURVEILLANCE	% INFESTED	% SUITABLE INFESTED	% SPREADING	% MANAGED	% ERADICATED	% SUITABLE 2010	% SUITABLE 2050	SUITABILITY CHANGE
Lassen	M	-	-	9	71	0	0	1	1	9	↑↑
Plumas/Sierra	-	M	-	13	33	55	0	0	6	0	
Butte	-	M	-	52	53	0	0	0	75	62	↓
Yuba/Sutter	-	M	-	35	50	0	0	0	85	76	-
Nevada/Placer	-	M	-	21	28	23	0	0	45	33	↓
Lake Tahoe Basin	M	-	-	11	100	100	50	0	1	0	-
El Dorado	-	M	-	15	25	14	14	2	40	25	↓
Alpine	-	-	M	4	17	0	100	0	2	1	-
Amador	M	-	-	11	13	0	0	0	61	48	↓
Central Sierra	M	-	-	1	2	0	0	0	37	22	↓
Sierra/San Joaquin	-	M	-	24	61	0	0	1	11	9	↓
Tulare	-	-	M	6	12	0	0	0	14	20	↑
Kern	M	-	-	4	10	17	0	0	9	25	↑↑
Eastern Sierra	M	-	-	1	6	0	67	0	1	7	↑↑
All Sierra Nevada	M	M	-	11	16	18	4	1	26	25	-

Abundance, Trend and Suitability

Common and fuller's teasels (*Dipsacus fullonum*, *D. sativus*)



SCOTCH BROOM
(*Cytisus scoparius*)

Ratings: Cal-IPC High, CDFA C

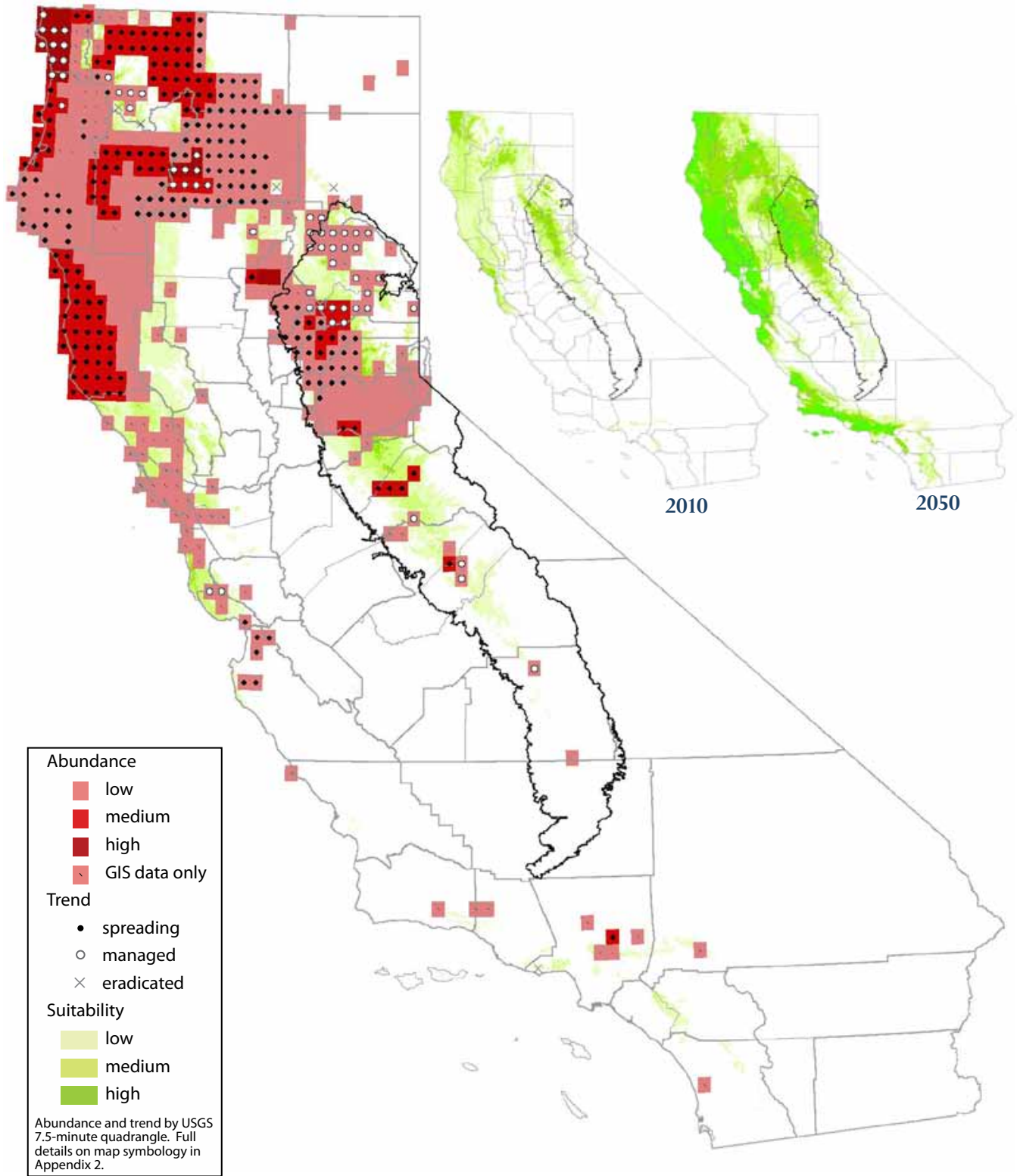
Scotch broom is a perennial shrub up to 16 ft (5 m) tall with green photosynthetic stems and pea-like flowers that range in color from yellow to red. Scotch broom inhabits a wide range of disturbed and undisturbed habitats and tolerates drought. Plants tolerate frost but die back after severe winter conditions. Brooms do not tolerate heavy shade. It was originally planted as an ornamental and for erosion control and now forms dense stands that displace native plants and wildlife. It also increases wild-land fire hazard. Brooms also are nitrogen fixers that alter soil chemistry. Established populations are difficult to eliminate due to long-lived seedbanks. French broom is evergreen with leafy stems, while Scotch and Spanish brooms are deciduous and have few (Scotch) or no (Spanish) leaves on the stems. For all brooms, we recommend eradication in isolated quads and containment elsewhere as a high priority. Our modeling suggests that the amount of suitable range for Scotch broom in the Sierra Nevada will increase with future climate change.



WEED MANAGEMENT AREA	OPPORTUNITIES			STATISTICS							
	ERADICATION	CONTAINMENT	SURVEILLANCE	% INFESTED	% SUITABLE INFESTED	% SPREADING	% MANAGED	% ERADICATED	% SUITABLE 2010	% SUITABLE 2050	SUITABILITY CHANGE
Lassen	-	H	-	14	59	13	19	2	9	41	↑↑
Plumas/Sierra	-	H	-	41	49	51	66	0	53	93	↑
Butte	-	H	-	54	74	27	4	0	52	100	↑
Yuba/Sutter	-	H	-	30	92	73	18	0	36	100	↑↑
Nevada/Placer	-	H	-	59	67	76	14	0	61	99	↑
Lake Tahoe Basin	-	H	-	56	71	0	0	0	21	90	↑↑
El Dorado	-	H	-	94	98	19	0	0	75	97	↑
Alpine	-	H	-	13	20	0	0	0	11	78	↑↑
Amador	-	H	-	43	48	17	0	0	65	99	↑
Central Sierra	-	H	-	11	17	44	0	0	44	67	↑
Sierra/San Joaquin	-	H	-	3	12	14	0	0	12	29	↑↑
Tulare	H	-	-	2	17	0	0	0	1	23	↑↑
Kern	-	-	H	1	-	0	0	0	0	6	-
Eastern Sierra	-	-	L	0	0	-	-	0	0	5	↑↑
All Sierra Nevada	H	H	-	24	44	45	19	0	33	60	↑

Abundance, Trend and Suitability

Scotch broom (*Cytisus scoparius*)



FRENCH BROOM

(Genista monspessulana)

Ratings: Cal-IPC High, CDFA C

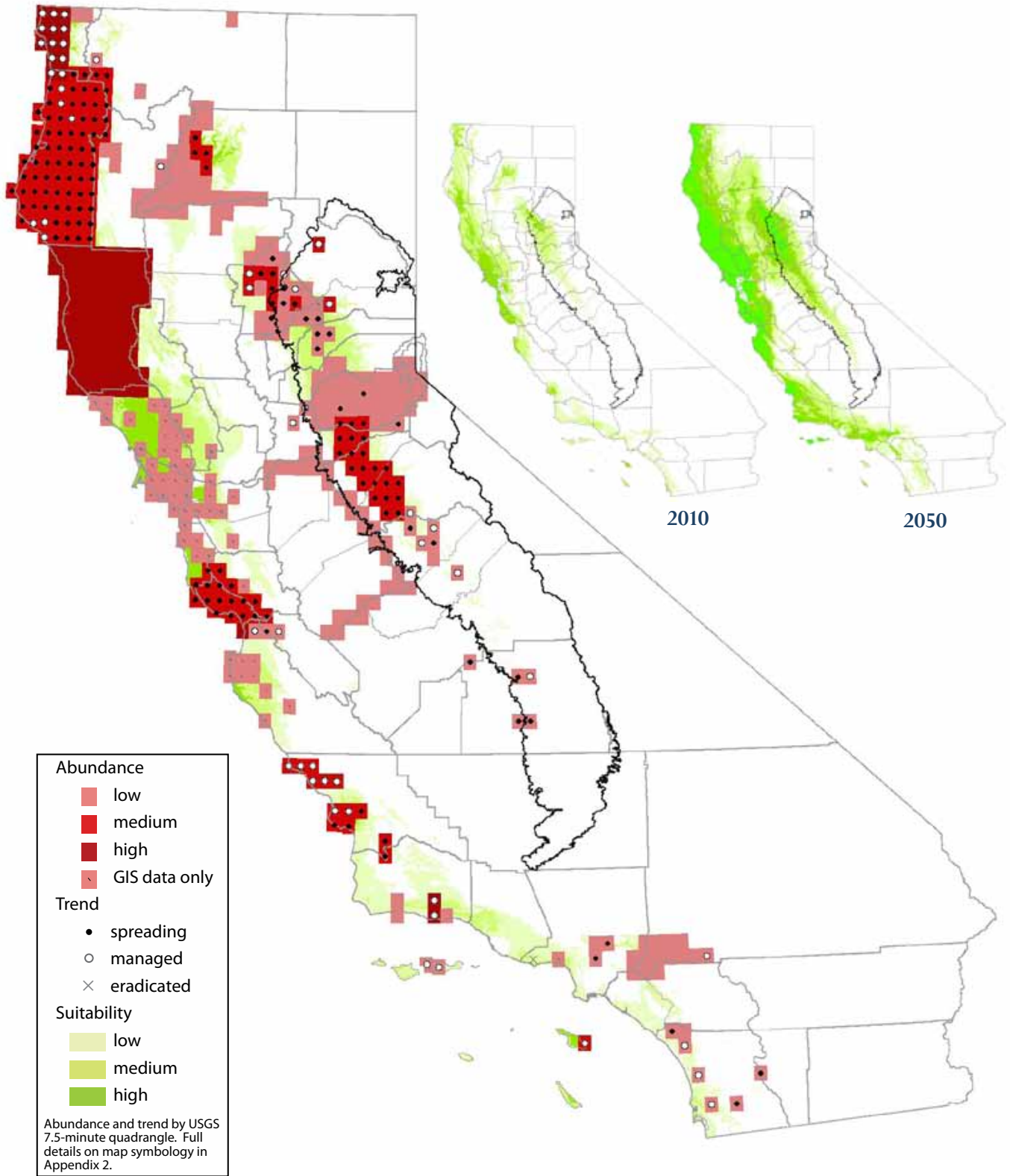
French broom is a perennial shrub with yellow pea-like flowers and green, photosynthetic stems. French broom inhabits a wide range of disturbed and undisturbed habitats and tolerates drought. Plants tolerate frost but die back after severe winter conditions. Brooms do not tolerate heavy shade. It was originally planted as an ornamental and for erosion control and now forms dense stands that displace native plants and wildlife. It also increases wildland fire hazard. Brooms are nitrogen fixers that alter soil chemistry. Established populations are difficult to eliminate due to long-lived seedbanks. French broom is evergreen with leafy stems, while Scotch and Spanish brooms are deciduous and have few (Scotch) or no (Spanish) leaves on the stems. For all brooms, we recommend eradication in isolated quads and containment elsewhere as a high priority. Our modeling suggests that the amount of suitable range for French broom in the Sierra Nevada will increase considerably with future climate change.



WEED MANAGEMENT AREA	OPPORTUNITIES			STATISTICS							
	ERADICATION	CONTAINMENT	SURVEILLANCE	% INFESTED	% SUITABLE INFESTED	% SPREADING	% MANAGED	% ERADICATED	% SUITABLE 2010	% SUITABLE 2050	SUITABILITY CHANGE
Lassen	-	-	M	0	-	-	-	0	0	0	-
Plumas/Sierra	-	H	-	8	32	14	29	0	10	29	↑↑
Butte	-	H	-	58	67	32	0	0	64	96	↑
Yuba/Sutter	-	H	-	24	56	33	0	0	48	100	↑↑
Nevada/Placer	-	H	-	29	39	28	0	0	55	73	↑
Lake Tahoe Basin	-	H	-	50	-	0	0	0	0	1	-
El Dorado	-	H	-	89	100	15	0	0	53	70	↑
Alpine	-	H	-	13	100	0	0	0	0	2	↑↑
Amador	-	H	-	68	91	53	0	0	50	84	↑
Central Sierra	-	H	-	33	72	65	0	0	23	60	↑↑
Sierra/San Joaquin	-	H	-	11	55	17	0	0	4	26	↑↑
Tulare	H	-	-	5	63	80	20	0	0	15	↑↑
Kern	-	-	M	0	0	-	-	0	0	9	↑↑
Eastern Sierra	-	-	L	0	-	-	-	0	0	0	-
All Sierra Nevada	H	H	-	22	64	38	3	0	19	41	↑↑

Abundance, Trend and Suitability

French broom (*Genista monspessulana*)



SPANISH BROOM
(Spartium junceum)

Ratings: Cal-IPC High, CDFA C

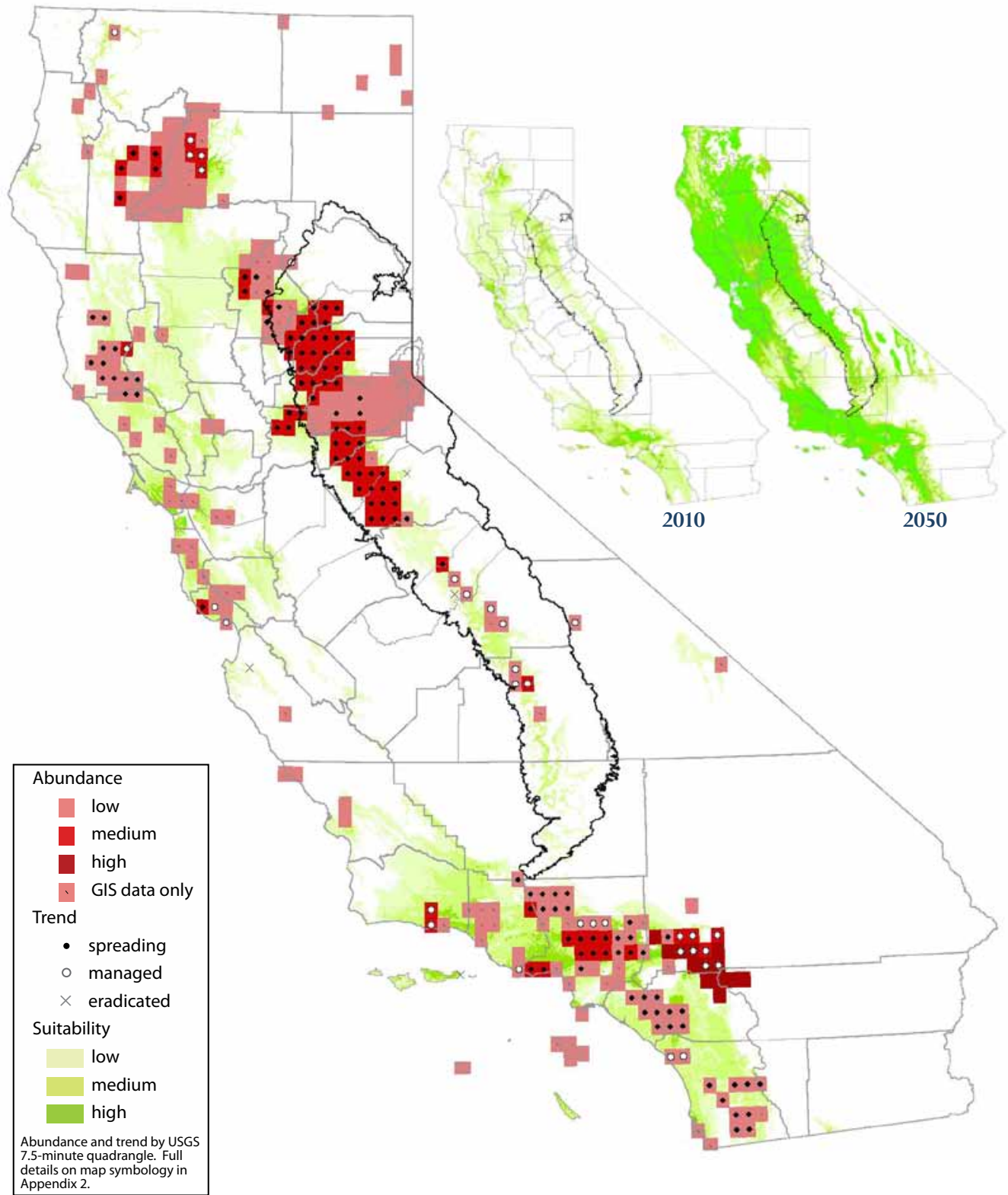
Spanish broom is a perennial shrub 10-16 ft. (3-5 m) tall with yellow pea-like flowers and green photosynthetic stems. Like other brooms, it inhabits a wide range of disturbed and undisturbed habitats and tolerates drought. However, Spanish broom seems less problematic than Scotch or French brooms in California. Plants tolerate frost but die back after severe winter conditions. Brooms do not tolerate heavy shade. It was originally planted as an ornamental and for erosion control and now forms dense stands that displace native plants and wildlife. It also increases wildland fire hazard. Brooms also are nitrogen fixers that alter soil chemistry. French broom is evergreen with leafy stems, while Scotch and Spanish brooms are deciduous and have few (Scotch) or no (Spanish) leaves on the stems. Established populations are difficult to eliminate due to long-lived seedbanks. For all brooms, we recommend eradication in isolated quads and containment elsewhere as a high priority. Our modeling suggests that the amount of suitable range for Spanish broom in the Sierra Nevada will increase considerably with future climate change.



WEED MANAGEMENT AREA	OPPORTUNITIES			STATISTICS							
	ERADICATION	CONTAINMENT	SURVEILLANCE	% INFESTED	% SUITABLE INFESTED	% SPREADING	% MANAGED	% ERADICATED	% SUITABLE 2010	% SUITABLE 2050	SUITABILITY CHANGE
Lassen	-	-	H	1	100	0	0	0	0	21	↑↑
Plumas/Sierra	-	H	-	8	27	71	14	0	9	65	↑↑
Butte	-	H	-	46	49	41	0	0	73	98	↑
Yuba/Sutter	-	H	-	27	46	60	0	0	51	100	↑
Nevada/Placer	-	H	-	51	68	81	0	0	54	79	↑
Lake Tahoe Basin	-	H	-	50	-	0	0	0	0	26	-
El Dorado	-	H	-	89	100	29	0	0	56	76	↑
Alpine	-	H	-	13	100	0	0	0	0	25	↑↑
Amador	-	H	-	57	70	56	0	0	60	88	↑
Central Sierra	-	H	-	25	46	95	0	1	31	67	↑↑
Sierra/San Joaquin	-	H	-	4	12	33	11	1	14	56	↑↑
Tulare	-	H	-	4	11	0	75	0	13	51	↑↑
Kern	-	-	H	0	0	-	-	0	12	69	↑↑
Eastern Sierra	H	-	-	1	11	0	50	0	2	35	↑↑
All Sierra Nevada	H	H	-	22	40	57	5	0	28	68	↑↑

Abundance, Trend and Suitability

Spanish broom (*Spartium junceum*)



BLACK LOCUST
(Robinia pseudoacacia)

Ratings: Cal-IPC Limited, CDFA not rated

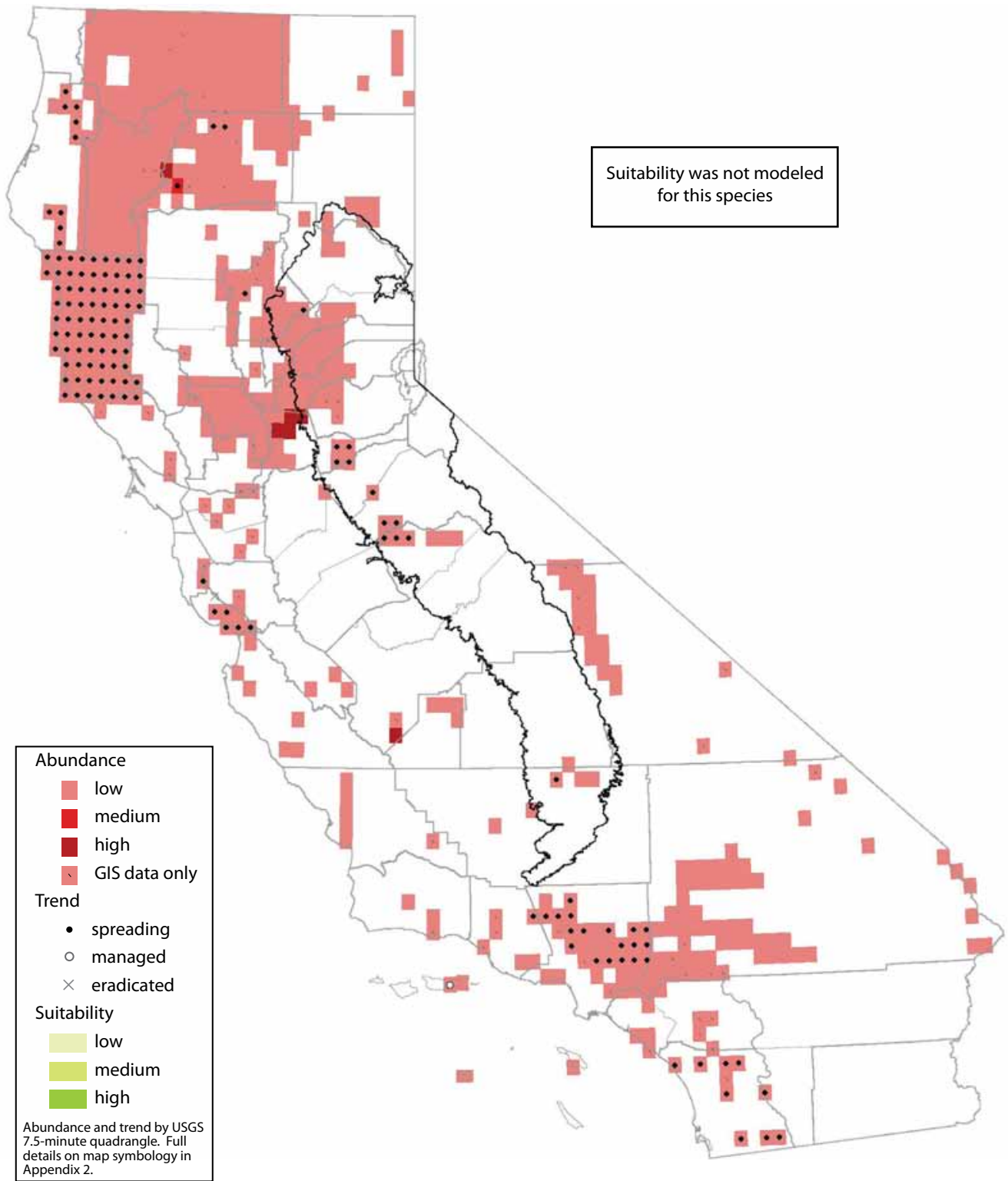
Black locust is a fast-growing, deciduous tree with pinnately-compound leaves and highly fragrant, pea-like flowers. It has escaped cultivation in some areas of California, including some old homesites. Most infestations in California are small and are not spreading. As an early successional species, black locust needs open areas for colonization, such as clear-cuts, abandoned pastures, or roadsides. We did not model suitability for this species.



WEED MANAGEMENT AREA	OPPORTUNITIES			STATISTICS							
	ERADICATION	CONTAINMENT	SURVEILLANCE	% INFESTED	% SUITABLE INFESTED	% SPREADING	% MANAGED	% ERADICATED	% SUITABLE 2010	% SUITABLE 2050	SUITABILITY CHANGE
Lassen	-	L	-	10	-	0	0	0	-	-	-
Plumas/Sierra	-	L	-	13	-	0	0	0	-	-	-
Butte	-	L	-	58	-	11	0	0	-	-	-
Yuba/Sutter	-	L	-	65	-	4	0	0	-	-	-
Nevada/Placer	-	L	-	56	-	0	0	0	-	-	-
Lake Tahoe Basin	-	-	L	0	-	-	-	0	-	-	-
El Dorado	-	L	-	22	-	0	0	0	-	-	-
Alpine	-	-	L	0	-	-	-	0	-	-	-
Amador	-	L	-	14	-	100	0	0	-	-	-
Central Sierra	-	L	-	10	-	88	0	0	-	-	-
Sierra/San Joaquin	-	L	-	5	-	40	0	0	-	-	-
Tulare	L	-	-	3	-	0	0	0	-	-	-
Kern	-	L	-	4	-	17	0	0	-	-	-
Eastern Sierra	-	-	L	8	-	0	0	0	-	-	-
All Sierra Nevada	L	L	-	15	-	18	0	0	-	-	-

Abundance, Trend and Suitability

Black locust (*Robinia pseudoacacia*)



RED SESBANIA
(Sesbania punicea)

Ratings: Cal-IPC High Alert, CDFA B

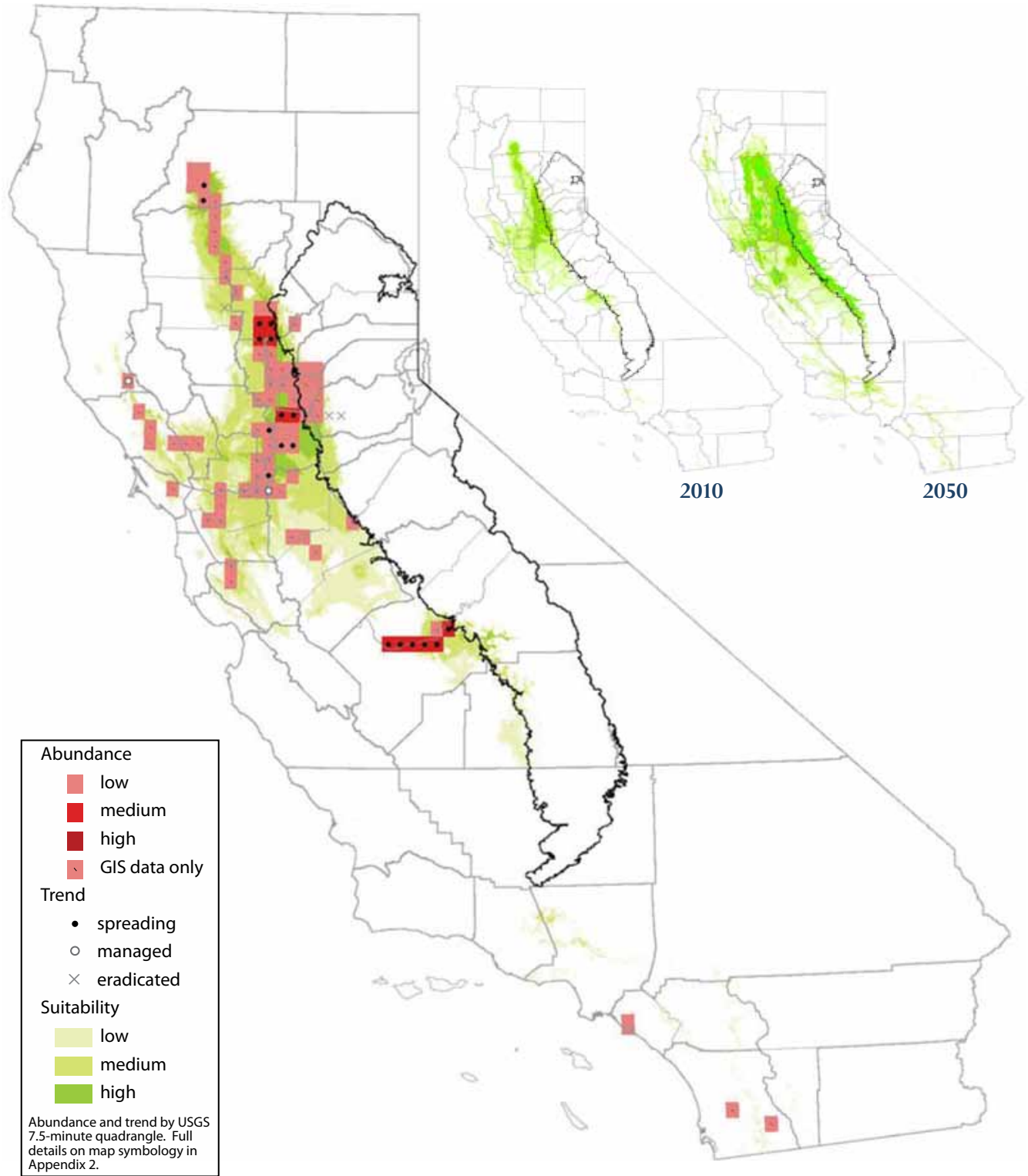
Red sesbania is a deciduous shrub or small tree that spreads along riparian areas, in disturbed, moist places, and on the margins of ditches and canals. It creates dense thickets that reduce water flow, may increase stream roughness, and block both wildlife and humans from accessing streambanks. Its seedlings can regenerate in its own shade, giving it the potential to maintain dominance at a site through recurrent recruitment. Red sesbania was introduced as an ornamental plant. It is present at the western edge of the Sierra and we recommend eradication where possible at a high priority and containment at a high priority elsewhere. Our modeling suggests that the amount of suitable range for red sesbania in the Sierra Nevada will increase considerably with future climate change.



WEED MANAGEMENT AREA	OPPORTUNITIES			STATISTICS							
	ERADICATION	CONTAINMENT	SURVEILLANCE	% INFESTED	% SUITABLE INFESTED	% SPREADING	% MANAGED	% ERADICATED	% SUITABLE 2010	% SUITABLE 2050	SUITABILITY CHANGE
Lassen	-	-	L	0	-	-	-	0	0	0	-
Plumas/Sierra	-	-	M	0	-	-	-	0	0	0	-
Butte	H	-	-	23	33	36	0	2	54	66	↑
Yuba/Sutter	H	-	-	35	52	31	0	0	73	81	-
Nevada/Placer	-	H	-	24	68	20	0	0	27	40	↑
Lake Tahoe Basin	-	-	-	0	-	-	-	0	0	0	-
El Dorado	-	H	-	9	40	0	0	4	15	42	↑↑
Alpine	-	-	-	0	-	-	-	0	0	0	-
Amador	-	-	H	0	0	-	-	0	33	66	↑↑
Central Sierra	-	-	H	1	7	0	0	0	9	36	↑↑
Sierra/San Joaquin	-	-	H	3	12	86	0	0	11	39	↑↑
Tulare	-	-	L	0	0	-	-	0	11	31	↑↑
Kern	-	-	-	0	0	-	-	0	1	11	↑↑
Eastern Sierra	-	-	-	0	-	-	-	0	0	0	-
All Sierra Nevada	H	H	-	4	16	24	0	0	11	28	↑↑

Abundance, Trend and Suitability

Red sesbania (*Sesbania punicea*)



Gorse (*Ulex europaeus*)

Ratings: Cal-IPC High, CDFA B

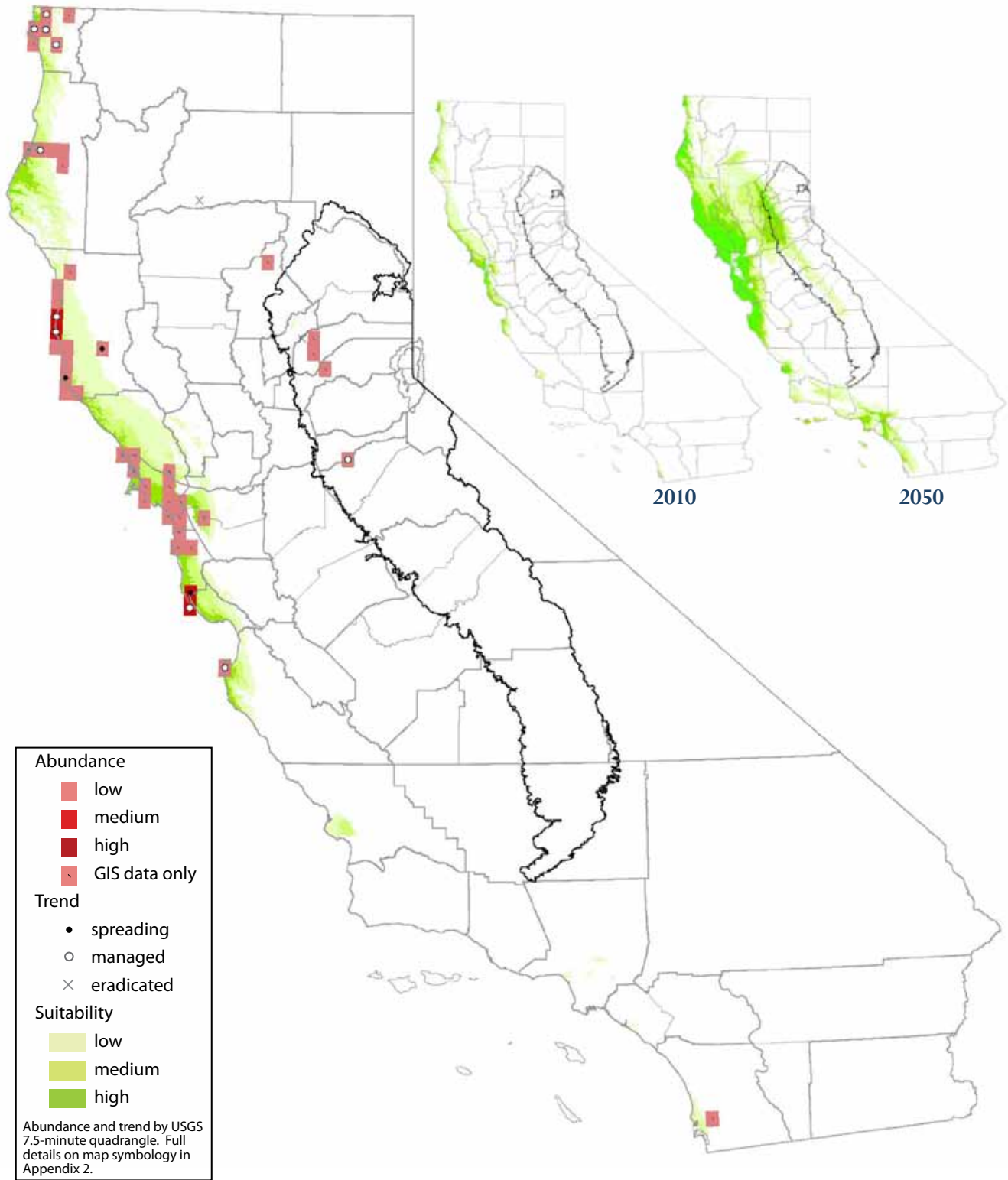
Gorse is a spiny, evergreen shrub with yellow pea-like flowers. It can form dense, impenetrable thickets and individual plants can live for 30 years. Older shrubs develop a layer of litter that is highly flammable. Gorse invades disturbed sites, sand dunes, coastal bluffs, fields, riparian corridors, logged areas and burned sites. Plants can resprout from the crown or roots even when cut or burned to ground level. In California, it was sometimes planted around mines and homesteads. Due to limited data available for our modeling, the risk maps may be too conservative, although this species does not seem to spread in the Sierra. Our modeling suggests that the amount of suitable range for gorse in the Sierra Nevada will increase considerably with future climate change.



WEED MANAGEMENT AREA	OPPORTUNITIES			STATISTICS							
	ERADICATION	CONTAINMENT	SURVEILLANCE	% INFESTED	% SUITABLE INFESTED	% SPREADING	% MANAGED	% ERADICATED	% SUITABLE 2010	% SUITABLE 2050	SUITABILITY CHANGE
Lassen	-	-	-	0	-	-	-	0	0	0	-
Plumas/Sierra	-	-	L	0	-	-	-	0	0	8	-
Butte	-	-	L	2	50	0	0	0	1	84	↑↑
Yuba/Sutter	-	-	L	0	0	-	-	3	1	96	↑↑
Nevada/Placer	-	M	-	5	100	0	0	2	0	48	↑↑
Lake Tahoe Basin	-	-	L	0	-	-	-	0	0	0	-
El Dorado	-	-	L	0	-	-	-	0	0	38	-
Alpine	-	-	-	0	-	-	-	0	0	0	-
Amador	-	-	L	4	-	0	0	0	0	63	-
Central Sierra	M	-	-	1	-	0	0	0	0	30	-
Sierra/San Joaquin	-	-	-	0	-	-	-	0	0	18	-
Tulare	-	-	-	0	-	-	-	0	0	5	-
Kern	-	-	-	0	-	-	-	0	0	2	-
Eastern Sierra	-	-	-	0	-	-	-	0	0	0	-
All Sierra Nevada	L	-	-	1	100	0	0	0	0	23	↑↑

Abundance, Trend and Suitability

Gorse (*Ulex europaeus*)



Family Poaceae

GIANT REED (*Arundo donax*)

Ratings: Cal-IPC High; CDFA B

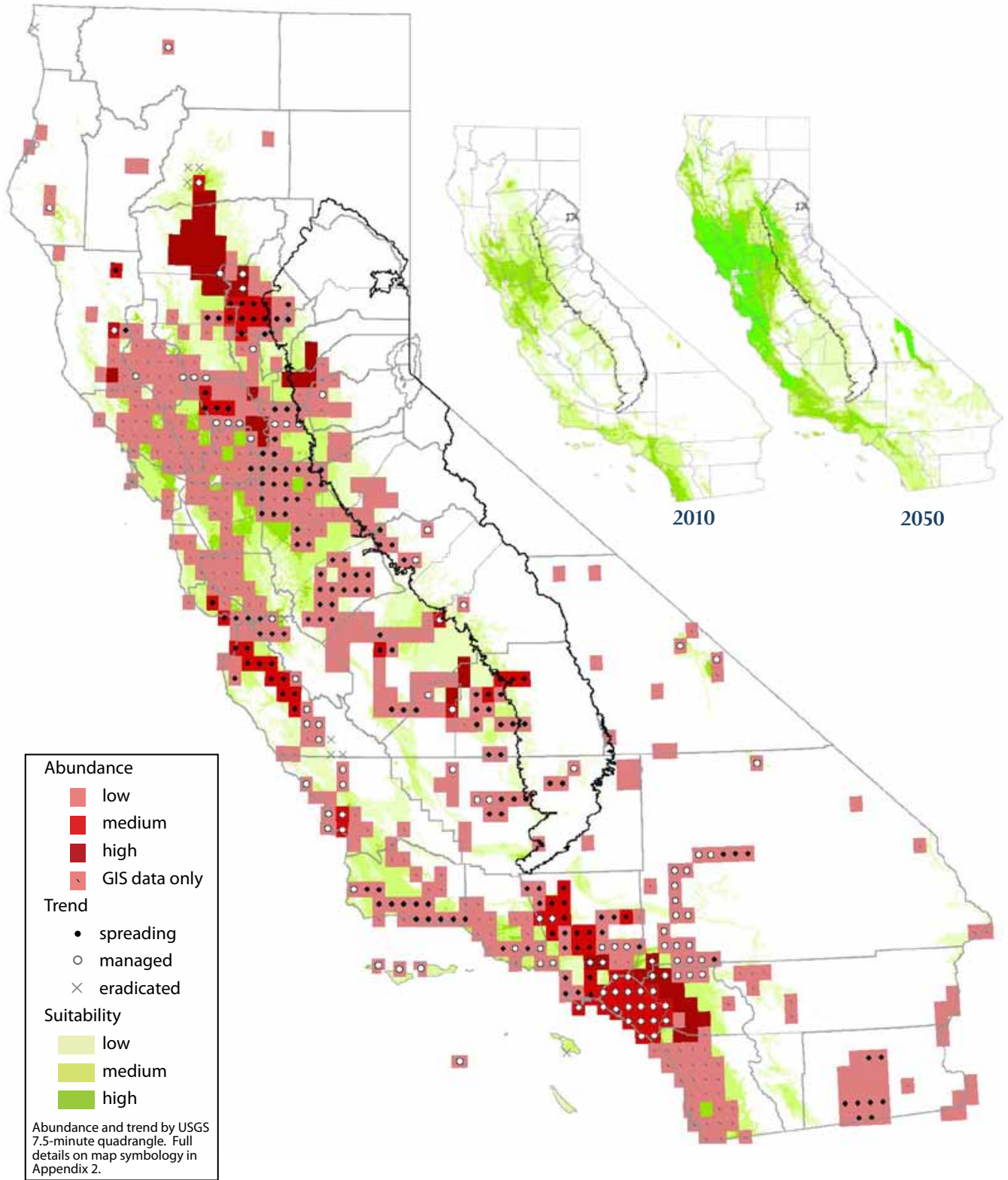
Giant reed is a very large grass that forms clumps and grows up to 30 feet (9 m) tall in riparian areas or other locations where water is available. It tolerates a wide range of environmental conditions, including some salinity and extended drought, but does not grow well in areas with prolonged freezing temperatures. Giant reed can fill a stream channel, displacing native vegetation, increasing flooding, and increasing fire fuel loads. Birds nest much less in arundo compared to native willows and the insects they eat are less abundant in arundo. Giant reed reproduces vegetatively from fragments of roots and shoots; rhizomes can resprout even when buried under several feet of silt. We recommend containment as a high priority. Our modeling suggests that the amount of suitable range for giant reed in the Sierra Nevada will increase with future climate change.



WEED MANAGEMENT AREA	OPPORTUNITIES			STATISTICS							
	ERADICATION	CONTAINMENT	SURVEILLANCE	% INFESTED	% SUITABLE INFESTED	% SPREADING	% MANAGED	% ERADICATED	% SUITABLE 2010	% SUITABLE 2050	SUITABILITY CHANGE
Lassen	-	-	L	0	-	-	-	0	0	0	-
Plumas/Sierra	-	-	H	0	0			0	1	8	↑↑
Butte	-	H	-	56	66	63	0	0	67	81	↑
Yuba/Sutter	-	H	-	46	63	35	0	0	85	96	-
Nevada/Placer	-	H	-	24	43	20	0	0	40	58	↑
Lake Tahoe Basin	-	-	L	0	-	-	-	0	0	0	-
El Dorado	-	H	-	22	42	10	0	0	35	51	↑
Alpine	-	-	L	0	-	-	-	0	0	0	-
Amador	-	H	-	21	29	33	0	0	58	71	↑
Central Sierra	-	H	-	20	41	19	0	0	27	47	↑
Sierra/San Joaquin	-	H	-	21	32	24	0	0	30	44	↑
Tulare	-	H	-	21	37	67	0	0	30	51	↑
Kern	-	H	-	15	28	42	17	0	14	50	↑↑
Eastern Sierra	M	-	-	3	33	0	0	0	2	13	↑↑
All Sierra Nevada	L	H	-	13	28	36	2	0	23	38	↑

Abundance, Trend and Suitability

Giant reed (*Arundo donax*)



ANNUAL FALSE BROME

(Brachypodium distachyon)

Ratings: Cal-IPC Moderate; CDFA B

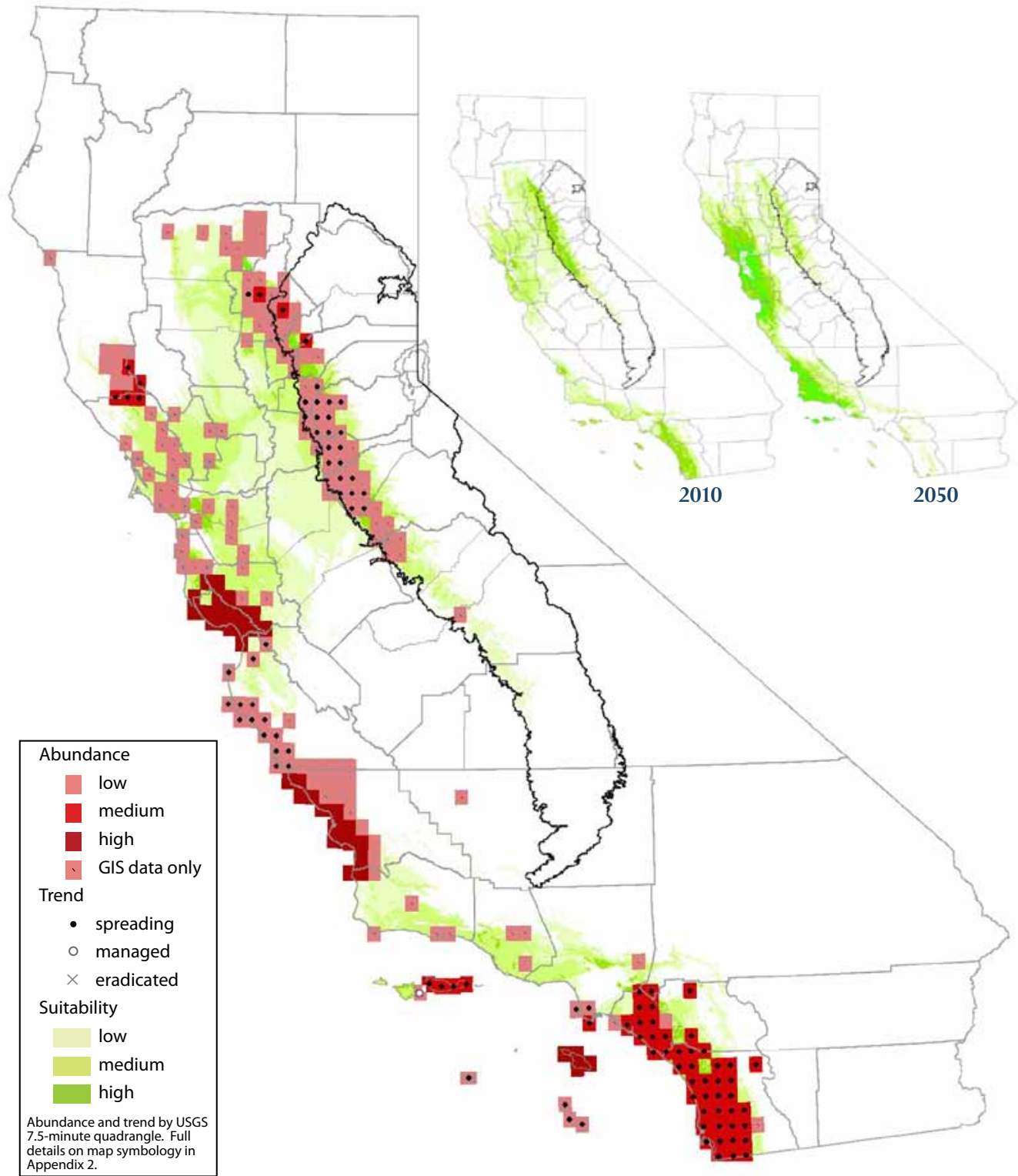
Annual false brome is a winter annual grass with spikes that often have a purplish color. It is locally abundant in some areas of California, especially on poor, rocky soils and it is a poor source of forage. It typically invades dry slopes and fields, roadsides, disturbed grasslands, and the margins of shrub thickets. It can also tolerate some shade in oak woodlands. False brome disperses when florets that fall near the parent plant are carried away by animals, vehicle tires, and human activities. Our modeling suggests that the amount of suitable range for annual false brome in the Sierra Nevada will remain relatively unchanged with future climate change.



WEED MANAGEMENT AREA	OPPORTUNITIES			STATISTICS							
	ERADICATION	CONTAINMENT	SURVEILLANCE	% INFESTED	% SUITABLE INFESTED	% SPREADING	% MANAGED	% ERADICATED	% SUITABLE 2010	% SUITABLE 2050	SUITABILITY CHANGE
Lassen	-	-	L	0	-	-	-	0	0	0	-
Plumas/Sierra	-	-	L	1	50	0	0	0	0	1	↑↑
Butte	-	M	-	44	57	14	0	0	64	63	-
Yuba/Sutter	-	M	-	24	36	11	0	0	79	79	-
Nevada/Placer	-	M	-	18	33	55	0	0	38	39	-
Lake Tahoe Basin	-	-	L	0	-	-	-	0	0	0	-
El Dorado	-	M	-	22	46	100	0	0	35	35	-
Alpine	-	-	L	0	-	-	-	0	0	0	-
Amador	-	M	-	43	63	67	0	0	61	61	-
Central Sierra	-	M	-	23	46	44	0	0	38	34	-
Sierra/San Joaquin	M	-	-	3	11	0	0	0	12	6	↓
Tulare	-	-	M	0	0	-	-	0	5	1	↓
Kern	-	-	L	1	7	0	0	0	1	6	↑↑
Eastern Sierra	-	-	L	0	-	-	-	0	0	0	-
All Sierra Nevada	-	L	-	12	34	43	0	0	21	18	-

Abundance, Trend and Suitability

Annual false brome (*Brachypodium distachyon*)



JAPANESE BROME
(Bromus japonicus)

Ratings: Cal-IPC Limited; CDFA not rated

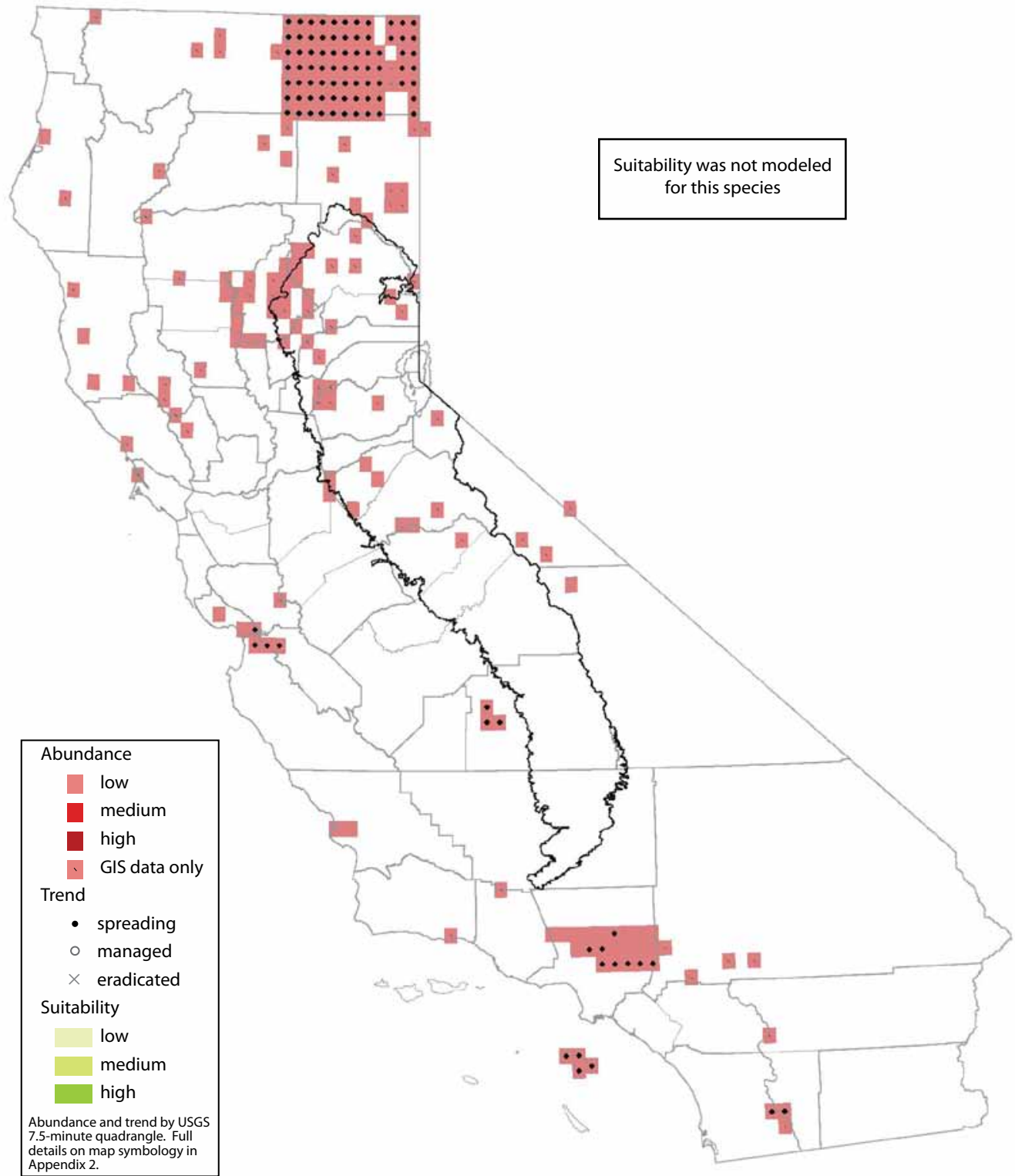
Japanese brome is a cool season, annual grass. While it can provide desirable livestock forage early in the season when it is immature, Japanese brome also competes for moisture with other vegetation early in the season and displaces desirable perennial grasses that would extend the grazing season. Japanese brome occasionally hybridizes with soft brome (*Bromus hordeaceus*) and rattlesnake brome (*Bromus briziformis*). Japanese brome occurs throughout California but it more common in the north. Florets disperse with animals, vehicle tires, human activities, and as seed contaminants. Many land managers are not familiar with this species, so it is likely more widespread than our map indicates. We did not model suitability for this species.



WEED MANAGEMENT AREA	OPPORTUNITIES			STATISTICS							
	ERADICATION	CONTAINMENT	SURVEILLANCE	% INFESTED	% SUITABLE INFESTED	% SPREADING	% MANAGED	% ERADICATED	% SUITABLE 2010	% SUITABLE 2050	SUITABILITY CHANGE
Lassen	L	-	-	17	-	45	0	0	-	-	-
Plumas/Sierra	-	L	-	17	-	0	0	0	-	-	-
Butte	-	L	-	46	-	0	0	0	-	-	-
Yuba/Sutter	-	L	-	19	-	0	0	0	-	-	-
Nevada/Placer	-	L	-	10	-	0	0	0	-	-	-
Lake Tahoe Basin	-	-	L	0	-	-	-	0	-	-	-
El Dorado	-	L	-	11	-	0	0	0	-	-	-
Alpine	L	-	-	4	-	0	0	0	-	-	-
Amador	-	-	L	7	-	0	0	0	-	-	-
Central Sierra	-	L	-	10	-	0	0	0	-	-	-
Sierra/San Joaquin	L	-	-	2	-	0	0	0	-	-	-
Tulare	-	-	L	3	-	100	0	0	-	-	-
Kern	-	-	L	1	-	0	0	0	-	-	-
Eastern Sierra	-	-	L	1	-	0	0	0	-	-	-
All Sierra Nevada	L	L	-	8	-	0	0	0	-	-	-

Abundance, Trend and Suitability

Japanese brome (*Bromus japonicus*)



RED BROME

(Bromus madritensis subsp. rubens)

Ratings: Cal-IPC High; CDFA not rated

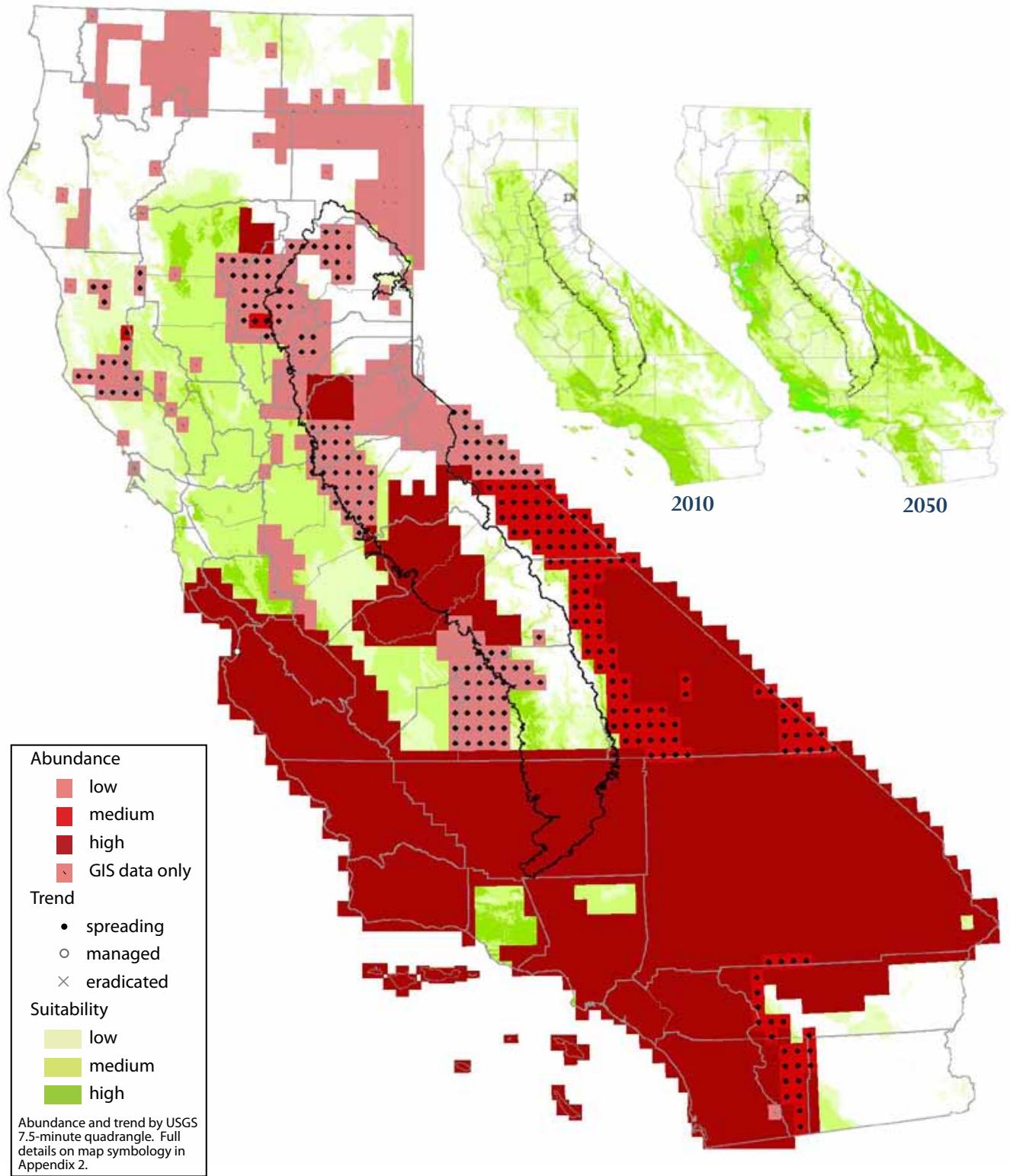
Red brome is a cool season, annual grass. Like other annual grasses, it is highly flammable when dry and can increase the spread and frequency of wildfires. It grows in open disturbed areas, roadsides, fields, rangelands, forestry sites, and many natural plant communities. Red brome occurs throughout California but it most abundant in the southern part of the state. Overgrazing can increase the dominance of brome grasses. Burning a site before spikelets shatter can reduce the seedbank but may increase the susceptibility of the site to reinvasion. Our modeling suggests that the amount of suitable range for red brome in the Sierra Nevada will decrease with future climate change.



WEED MANAGEMENT AREA	OPPORTUNITIES			STATISTICS							
	ERADICATION	CONTAINMENT	SURVEILLANCE	% INFESTED	% SUITABLE INFESTED	% SPREADING	% MANAGED	% ERADICATED	% SUITABLE 2010	% SUITABLE 2050	SUITABILITY CHANGE
Lassen	-	M	-	64	100	3	0	0	23	60	↑↑
Plumas/Sierra	-	M	-	34	66	48	0	0	18	18	-
Butte	-	M	-	90	90	58	0	0	88	84	-
Yuba/Sutter	-	M	-	54	77	15	0	0	97	96	-
Nevada/Placer	-	M	-	62	98	10	0	0	50	44	-
Lake Tahoe Basin	-	M	-	78	100	0	0	0	3	2	-
El Dorado	-	M	-	94	100	9	0	0	41	25	↓
Alpine	-	M	-	83	100	5	0	0	5	4	↓
Amador	-	M	-	86	100	67	0	0	66	49	↓
Central Sierra	-	M	-	60	77	45	0	0	51	34	↓
Sierra/San Joaquin	-	M	-	52	53	8	0	0	79	65	↓
Tulare	-	M	-	52	53	69	0	0	85	68	↓
Kern	-	-	-	100	100	0	0	0	98	90	-
Eastern Sierra	-	H	-	85	100	95	0	0	68	72	-
All Sierra Nevada	-	M	-	62	77	25	0	0	59	47	↓

Abundance, Trend and Suitability

Red brome (*Bromus madritensis* subsp. *rubens*)



JUBATAGRASS
(*Cortaderia jubata*)

Ratings: Cal-IPC High, CDFA B

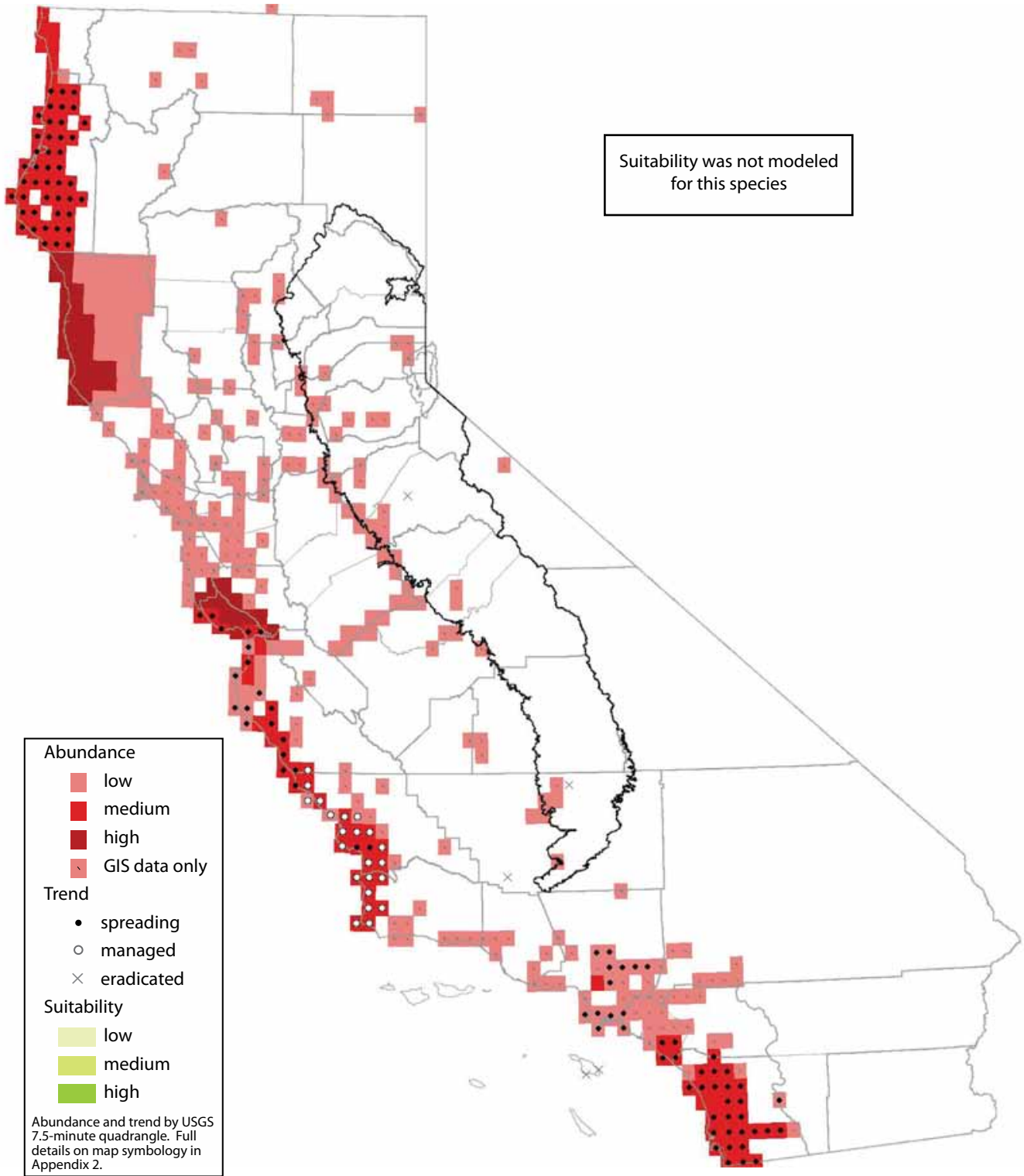
Cortaderia spp. are large perennial grasses with showy, plume-like inflorescences. Pampasgrass tolerates more climate variation than jubatagrass, but jubatagrass can reproduce asexually with apomictic seed while pampasgrass can only develop seed when male and female plants are within pollination range. Both species are serious problems in coastal California but less so in the Sierra Nevada. Due to the difficulty of distinguishing between them, we are not certain which species is present in mapped quads, so the abundance information should be viewed with caution. While commonly planted as ornamental species in the Sierra, *Cortaderias* are rarely seen spreading from plantings. We did not model suitability for this species.



WEED MANAGEMENT AREA	OPPORTUNITIES			STATISTICS							
	ERADICATION	CONTAINMENT	SURVEILLANCE	% INFESTED	% SUITABLE INFESTED	% SPREADING	% MANAGED	% ERADICATED	% SUITABLE 2010	% SUITABLE 2050	SUITABILITY CHANGE
Lassen	-	-	L	2	-	0	0	0	-	-	-
Plumas/Sierra		-	M	0	-	-	-	0	-	-	-
Butte	-	M	-	17	-	0	0	0	-	-	-
Yuba/Sutter	-	-	M	11	-	0	0	0	-	-	-
Nevada/Placer	-		M	14	-	0	0	0	-	-	-
Lake Tahoe Basin	-	M	-	6	-	0	0	0	-	-	-
El Dorado	-	M	-	13	-	0	0	0	-	-	-
Alpine	-	-	M	0	-	-	-	0	-	-	-
Amador	-	-	M	18	-	0	0	0	-	-	-
Central Sierra	-	M	-	15	-	0	0	1	-	-	-
Sierra/San Joaquin	M		-	10	-	0	0	0	-	-	-
Tulare	-	-	M	3	-	0	0	0	-	-	-
Kern	-	M	-	4	-	0	0	1	-	-	-
Eastern Sierra	-	-	M	0	-	0	0	0	-	-	-
All Sierra Nevada	-	L	-	9	-	0	0	0	-	-	-

Abundance, Trend and Suitability

Jubatagrass (*Cortaderia jubata*)



PAMPASGRASS
(Cortaderia selloana)

Ratings: Cal-IPC High, CDFA not rated

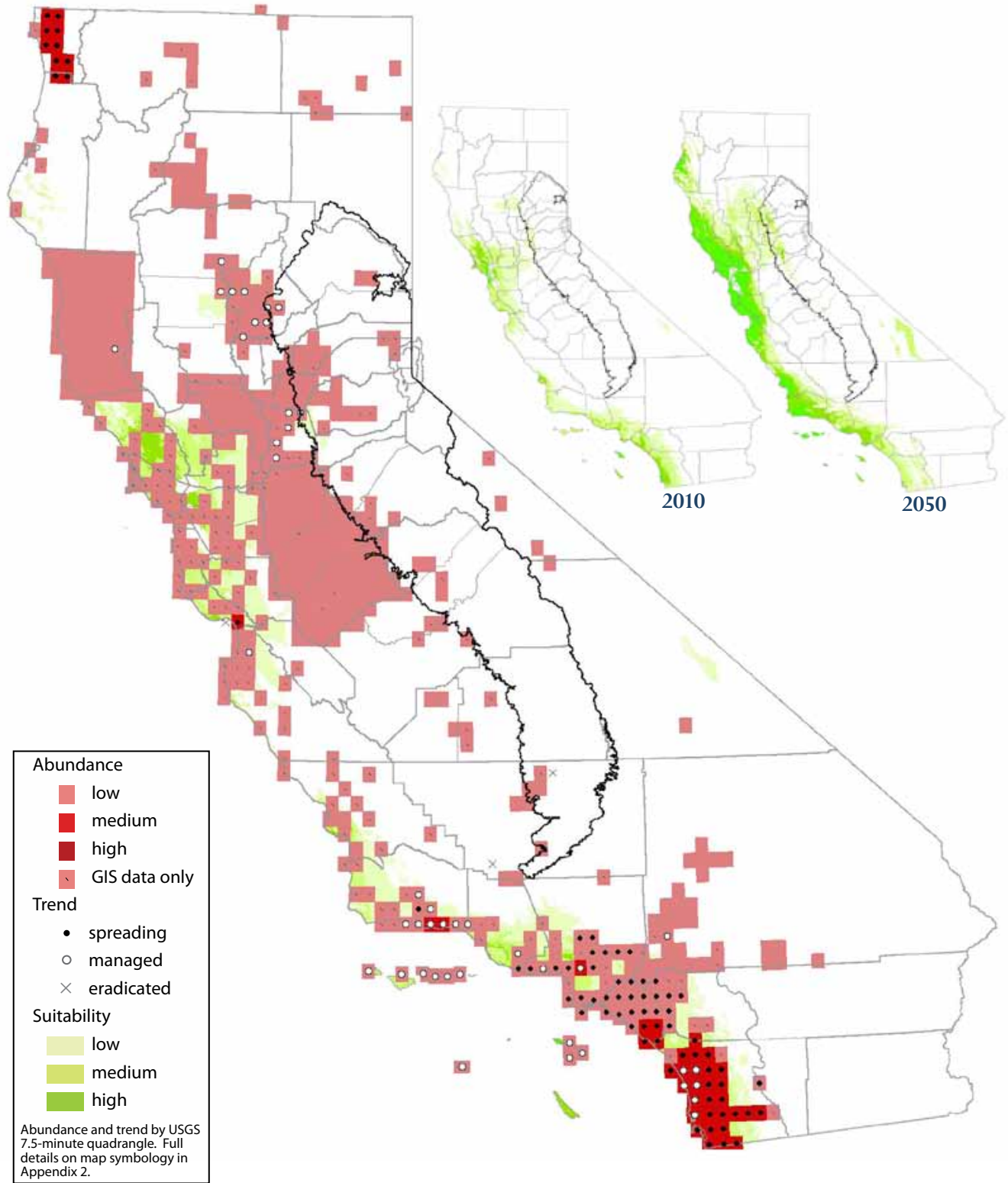
Cortaderia spp. are large perennial grasses with showy, plume-like inflorescences. Pampasgrass tolerates more climate variation than jubatagrass, but jubatagrass can reproduce asexually with apomictic seed while pampasgrass can only develop seed when male and female plants are within pollination range. Both species are serious problems in coastal California but less so in the Sierra Nevada. Due to the difficulty of distinguishing between them, we are not certain which species is present in mapped quads, so the abundance information should be viewed with caution. While commonly planted as ornamental species in the Sierra, *Cortaderias* are rarely seen spreading from plantings. Our modeling suggests that the amount of suitable range for pampasgrass in the Sierra Nevada will increase considerably with future climate change.



WEED MANAGEMENT AREA	OPPORTUNITIES			STATISTICS							
	ERADICATION	CONTAINMENT	SURVEILLANCE	% INFESTED	% SUITABLE INFESTED	% SPREADING	% MANAGED	% ERADICATED	% SUITABLE 2010	% SUITABLE 2050	SUITABILITY CHANGE
Lassen	-	-	L	3	-	0	0	0	0	0	-
Plumas/Sierra	M	-	-	2	-	0	0	0	0	1	-
Butte	-	M	-	48	85	0	0	0	21	64	↑↑
Yuba/Sutter	-	-	M	46	100	0	0	0	5	78	↑↑
Nevada/Placer	-	M	-	40	100	0	0	0	11	35	↑↑
Lake Tahoe Basin	-	M	-	6	-	0	0	0	0	0	-
El Dorado	-	M	-	24	100	0	0	0	8	26	↑↑
Alpine	-	-	M	0	-	-	-	0	0	0	-
Amador	-	-	M	14	80	0	0	0	7	30	↑↑
Central Sierra	-	M	-	17	-	0	0	0	0	8	-
Sierra/San Joaquin	-	M	-	12	-	0	0	0	0	1	-
Tulare	-	-	M	4	100	0	0	0	0	1	-
Kern	-	M	-	6	-	0	0	1	0	3	-
Eastern Sierra	-	-	M	1	36	0	0	0	1	9	↑↑
All Sierra Nevada	-	L	-	14	100	0	0	0	2	10	↑↑

Abundance, Trend and Suitability

Pampasgrass (*Cortaderia selloana*)



ORCHARDGRASS
(Dactylis glomerata)

Ratings: Cal-IPC Limited, CDFA not rated

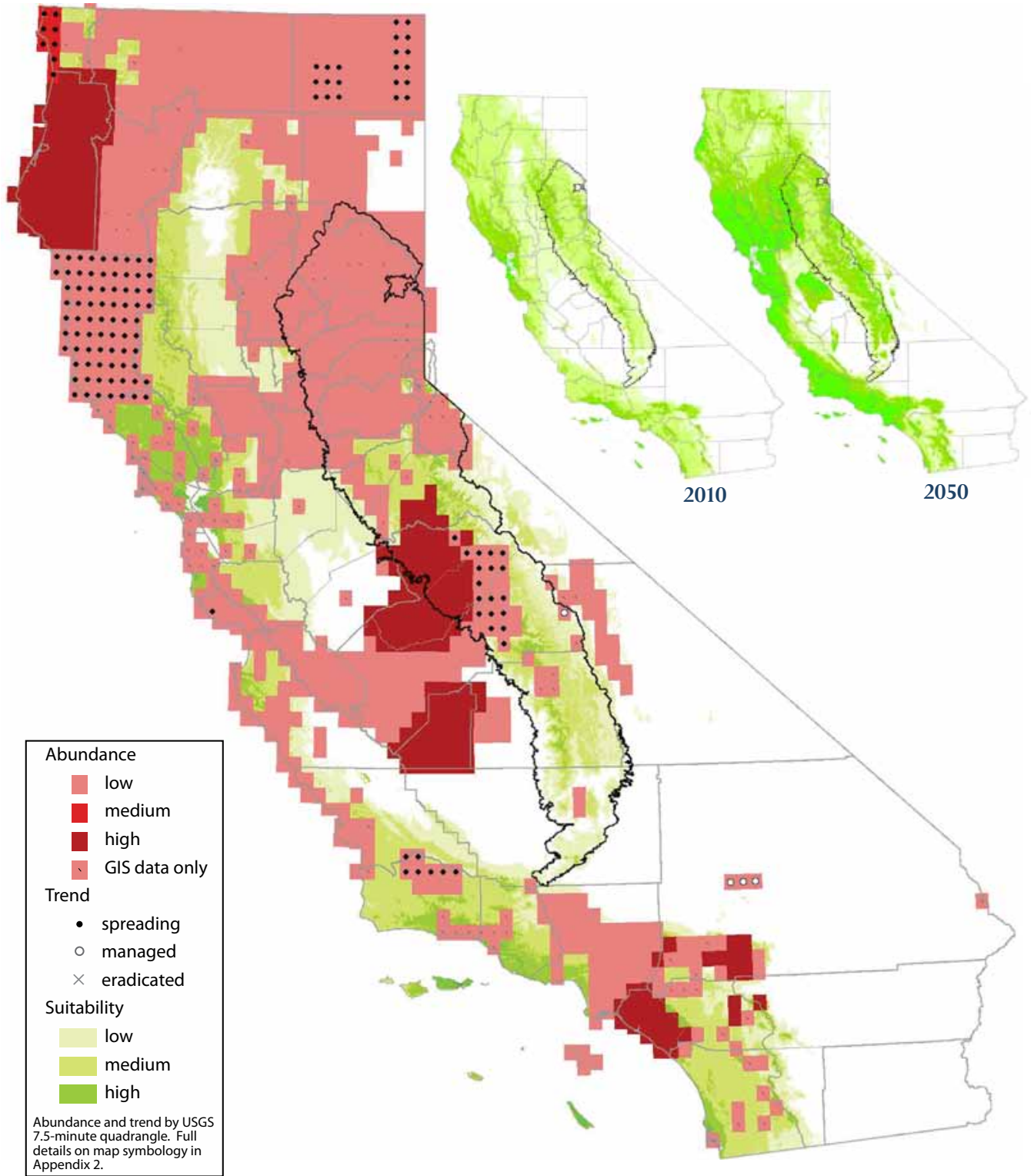
Orchardgrass is a tufted or clumping cool-season perennial grass with panicles of lumpy, spikelet clusters. Although cultivated as forage and as a cover crop, it is considered invasive because it can invade oak woodlands and serpentine habitats and is an emerging threat in coastal prairie grasslands. It has escaped cultivation and invaded many natural areas throughout the United States, although it seldom occurs in high densities and its impacts are low compared to other invasive plants. Our modeling suggests that the amount of suitable range for orchardgrass in the Sierra Nevada will remain relatively unchanged with future climate change.



WEED MANAGEMENT AREA	OPPORTUNITIES			STATISTICS							
	ERADICATION	CONTAINMENT	SURVEILLANCE	% INFESTED	% SUITABLE INFESTED	% SPREADING	% MANAGED	% ERADICATED	% SUITABLE 2010	% SUITABLE 2050	SUITABILITY CHANGE
Lassen	-	L	-	64	100	0	0	0	26	65	↑↑
Plumas/Sierra	-	L	-	99	100	0	0	0	88	98	-
Butte	-	L	-	98	100	0	0	0	100	100	-
Yuba/Sutter	-	L	-	73	100	0	0	0	100	100	-
Nevada/Placer	-	L	-	100	100	0	0	0	100	100	-
Lake Tahoe Basin	-	L	-	72	87	0	0	0	92	100	-
El Dorado	-	L	-	91	93	0	0	0	98	100	-
Alpine	-	L	-	75	82	0	0	0	92	97	-
Amador	-	L	-	68	68	0	0	0	99	100	-
Central Sierra	-	L	-	37	37	0	0	0	96	96	-
Sierra/San Joaquin	-	L	-	70	100	13	1	0	50	74	↑
Tulare	-	L	-	21	30	0	0	0	55	64	-
Kern	-	L	-	5	9	0	0	0	28	34	↑
Eastern Sierra	-	L	-	9	24	0	4	0	20	35	↑
All Sierra Nevada	-	L	-	58	60	6	0	0	84	91	-

Abundance, Trend and Suitability

Orchardgrass (*Dactylis glomerata*)



COMMON VELVET GRASS

(Holcus lanatus)

Ratings: Cal-IPC Moderate, CDFG not rated

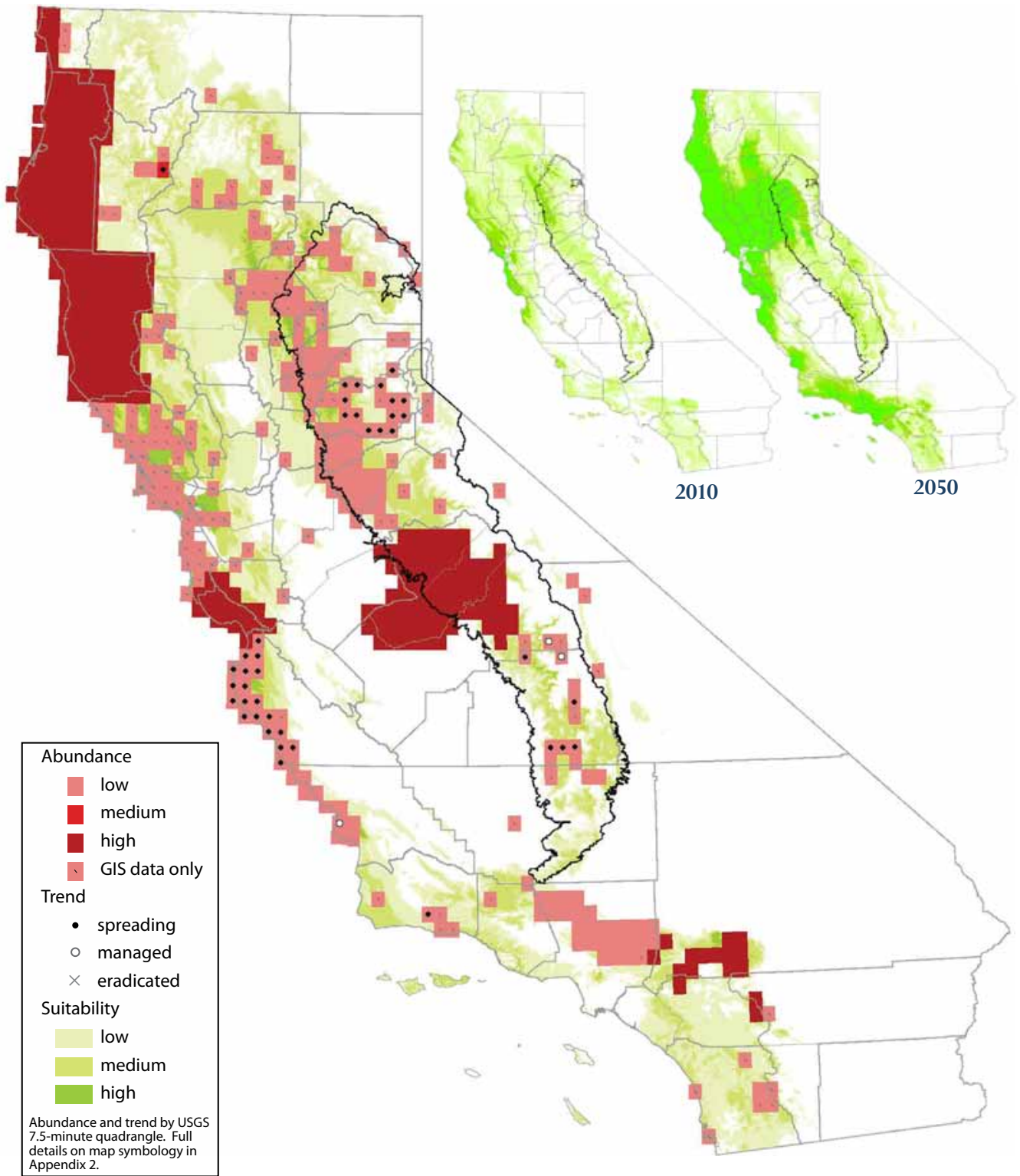
Common velvet grass is a tufted perennial grass with gray-green foliage. It is sometimes cultivated as a pasture grass for forage and hay but is considered invasive in coastal grasslands and wetlands in California. It tolerates high levels of heavy metals in the soil and sulphur dioxide in the air. It grows best in moist conditions, and is a facultative wetland indicator species, but can tolerate some drought. Velvet grass grows in disturbed grasslands, cultivated fields and other moist areas. Manual removal, burning, cultivation, intensive mowing or grazing, and elimination of irrigation can reduce velvetgrass. While most land managers in the foothills do not consider this species a priority, it is a serious concern at in national forests and national parks in the Sierra. We recommend eradication or containment at a medium priority, focused on preventing spread at higher elevations. Our modeling suggests that the amount of suitable range for common velvet grass in the Sierra Nevada will increase with future climate change.



WEED MANAGEMENT AREA	OPPORTUNITIES			STATISTICS							
	ERADICATION	CONTAINMENT	SURVEILLANCE	% INFESTED	% SUITABLE INFESTED	% SPREADING	% MANAGED	% ERADICATED	% SUITABLE 2010	% SUITABLE 2050	SUITABILITY CHANGE
Lassen	-	M	-	4	11	0	0	0	17	72	↑↑
Plumas/Sierra	-	M	-	19	20	0	0	0	72	97	↑
Butte	-	M	-	46	46	0	0	0	99	99	-
Yuba/Sutter	-	M	-	32	48	0	0	0	89	100	-
Nevada/Placer	-	M	-	41	41	15	0	0	77	93	↑
Lake Tahoe Basin	-	-	M	22	27	50	0	0	43	70	↑
El Dorado	-	M	-	54	56	56	0	0	78	88	-
Alpine	-	M	-	13	14	0	0	0	35	77	↑↑
Amador	-	M	-	68	68	21	0	0	89	91	-
Central Sierra	-	M	-	30	36	0	0	0	63	83	↑
Sierra/San Joaquin	-	M	-	39	71	1	3	0	30	49	↑
Tulare	-	M	-	11	18	46	9	0	37	55	↑
Kern	-	M	-	4	8	0	0	0	21	31	↑
Eastern Sierra	-	M	-	1	7	0	0	0	4	35	↑↑
All Sierra Nevada	-	M	-	34	39	11	1	0	60	82	↑

Abundance, Trend and Suitability

Common velvet grass (*Holcus lanatus*)



MEDITERRANEAN BARLEY

(*Hordeum marinum*)

Ratings: Cal-IPC Moderate, CDFA not rated

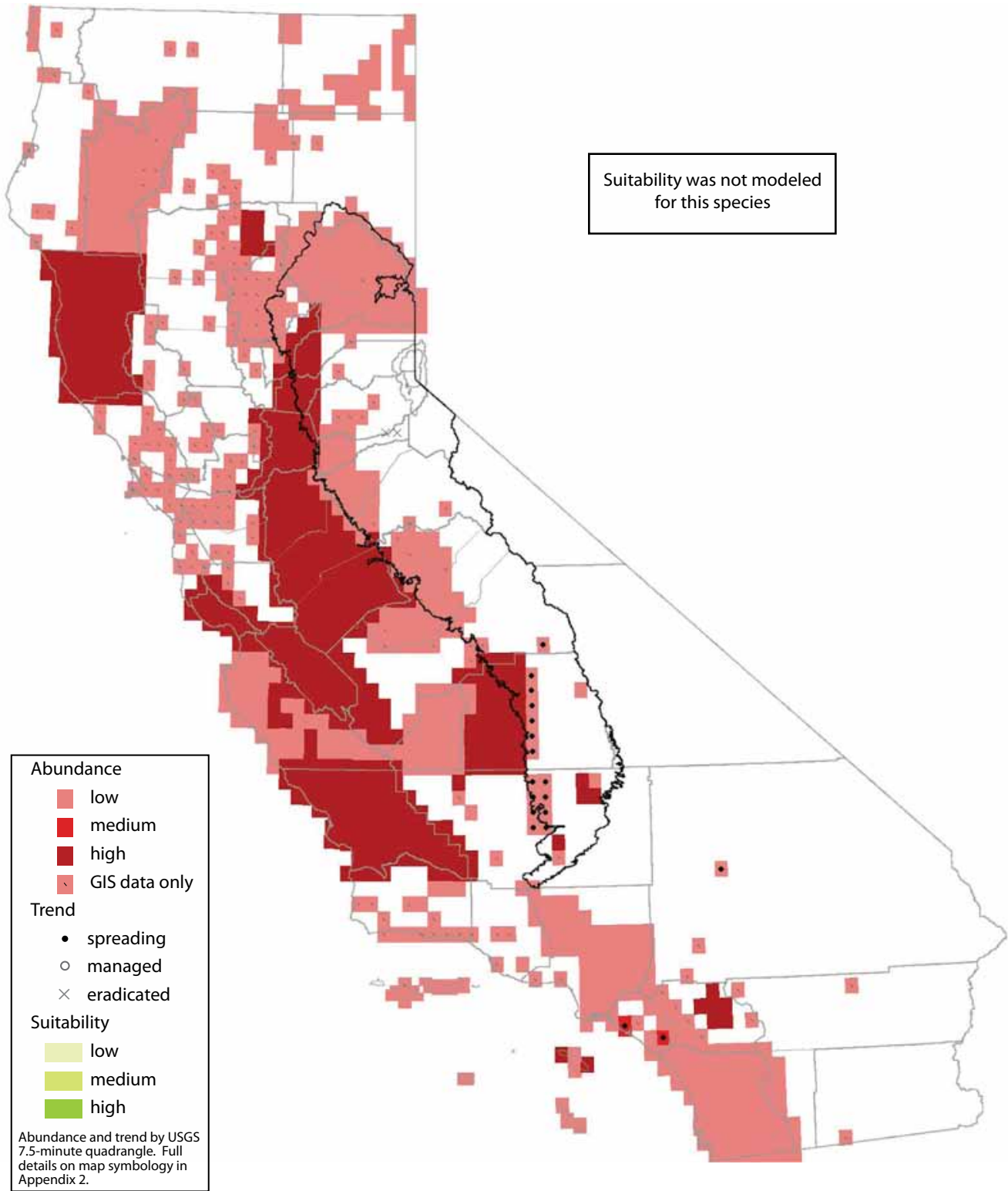
Hordeum species are cool-season annuals with dense, bristly spikes of stiff-awned spikelets. Before the flower spikes develop, barleys are livestock forage. However, the barbed awns and stiff bases on mature spikelets can injure animals. Mediterranean barley stems grow to 20 in. (50 cm) tall with leaves 2-8 in. (5-20 cm) while hare barley stems grow to 40 in. (1 m) with leaves often >8 in. (20 cm) long. Barleys grow in roadsides, fields, annual grassland, oak savannah, agricultural areas, and other disturbed sites. Mediterranean barley grows in moist or dry places while hare barley usually inhabits moist sites. Like other invasive annual grasses, *Hordeum* species outcompete native perennial grasses. Seeds disperse by clinging to vehicles, equipment, humans and animals. In pastures, close grazing early in the season or mowing to prevent seed production can control *Hordeum*. We did not model suitability for this species.



WEED MANAGEMENT AREA	OPPORTUNITIES			STATISTICS							
	ERADICATION	CONTAINMENT	SURVEILLANCE	% INFESTED	% SUITABLE INFESTED	% SPREADING	% MANAGED	% ERADICATED	% SUITABLE 2010	% SUITABLE 2050	SUITABILITY CHANGE
Lassen	-	M	-	24	-	0	0	0	-	-	-
Plumas/Sierra	-	M	-	93	-	0	0	0	-	-	-
Butte	-	M	-	88	-	0	0	0	-	-	-
Yuba/Sutter	-	M	-	62	-	0	0	0	-	-	-
Nevada/Placer	-	M	-	57	-	0	0	0	-	-	-
Lake Tahoe Basin	-	-	M	0	-	-	-	0	-	-	-
El Dorado	-	M	-	28	-	0	0	4	-	-	-
Alpine	-	-	M	0	-	-	-	0	-	-	-
Amador	-	M	-	54	-	0	0	7	-	-	-
Central Sierra	-	M	-	30	-	0	0	0	-	-	-
Sierra/San Joaquin	-	M	-	43	-	1	0	0	-	-	-
Tulare	-	M	-	53	-	11	0	0	-	-	-
Kern	-	M	-	26	-	19	0	0	-	-	-
Eastern Sierra	-	-	M	0	-	-	-	0	-	-	-
All Sierra Nevada	-	M	-	45	-	7	0	0	-	-	-

Abundance, Trend and Suitability

Mediterranean barley (*Hordeum marinum*)



HARE BARLEY
(Hordeum murinum)

Ratings: Cal-IPC Moderate; CDFA not rated

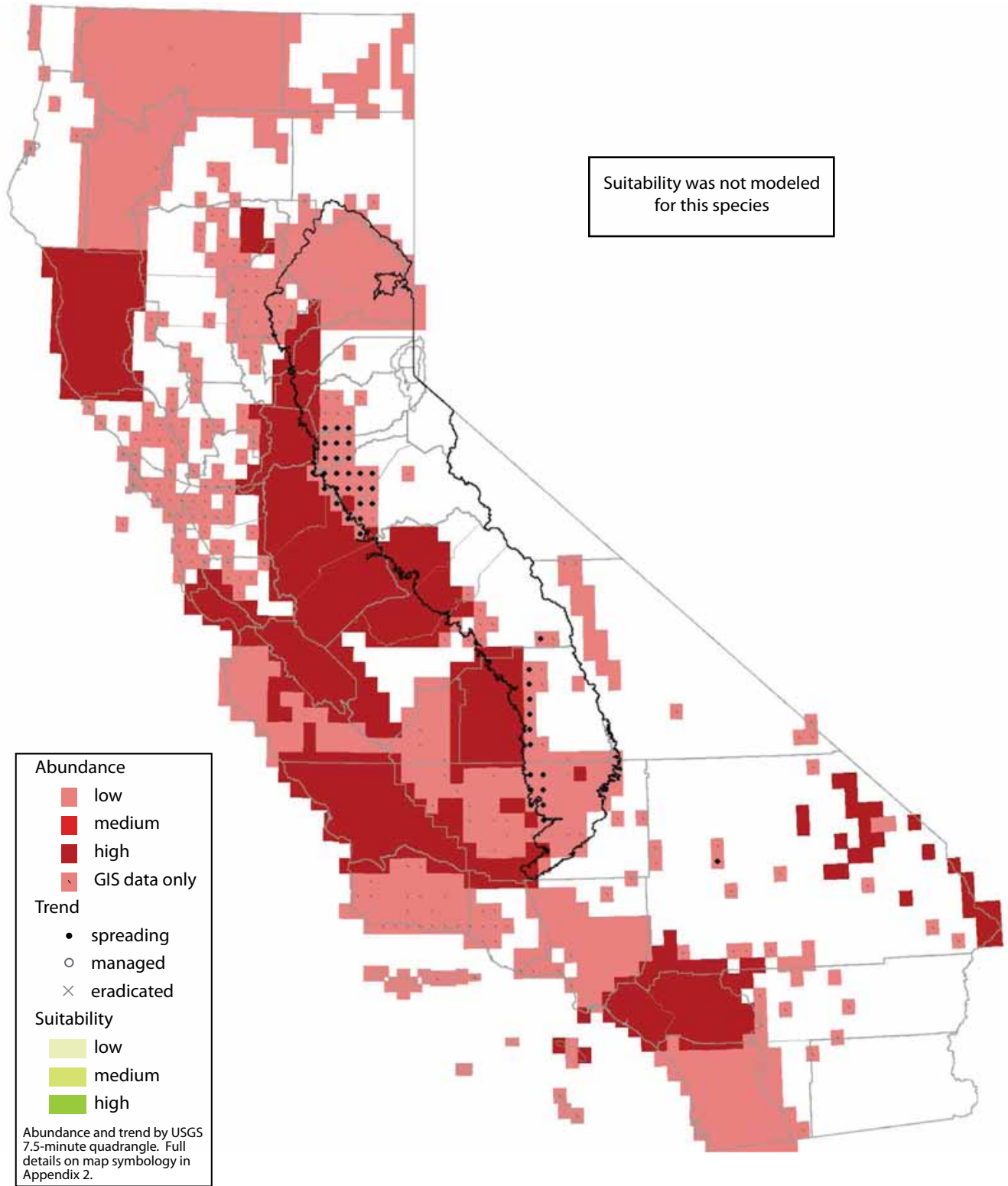
Hordeum species are cool-season annuals with dense, bristly spikes of stiff-awned spikelets. Before the flower spikes develop, barleys are livestock forage. However, the barbed awns and stiff bases on mature spikelets can injure animals. Mediterranean barley stems grow to 20 in. (50 cm) tall with leaves 2-8 in. (5-20 cm) while hare barley stems grow to 40 in. (1 m) with leaves often >8 in. (20 cm) long. Barleys grow in roadsides, fields, annual grassland, oak savannah, agricultural areas, and other disturbed sites. Mediterranean barley grows in moist or dry places while hare barley usually inhabits moist sites. Like other invasive annual grasses, *Hordeum* species outcompete native perennial grasses. Seeds disperse by clinging to vehicles, equipment, humans and animals. We did not model suitability for this species.



WEED MANAGEMENT AREA	OPPORTUNITIES			STATISTICS							
	ERADICATION	CONTAINMENT	SURVEILLANCE	% INFESTED	% SUITABLE INFESTED	% SPREADING	% MANAGED	% ERADICATED	% SUITABLE 2010	% SUITABLE 2050	SUITABILITY CHANGE
Lassen	-	M	-	25	-	0	0	0	-	-	-
Plumas/Sierra	-	M	-	94	-	0	0	0	-	-	-
Butte	-	M	-	90	-	0	0	0	-	-	-
Yuba/Sutter	-	M	-	65	-	0	0	0	-	-	-
Nevada/Placer	-	M	-	56	-	0	0	0	-	-	-
Lake Tahoe Basin	-	-	M	0	-	-	-	0	-	-	-
El Dorado	-	M	-	30	-	21	0	0	-	-	-
Alpine	-	-	M	0	-	-	-	0	-	-	-
Amador	-	M	-	54	-	80	0	0	-	-	-
Central Sierra	-	M	-	29	-	78	0	0	-	-	-
Sierra/San Joaquin	-	M	-	45	-	1	0	0	-	-	-
Tulare	-	M	-	64	-	9	0	0	-	-	-
Kern	-	M	-	76	-	6	0	0	-	-	-
Eastern Sierra	-	-	M	8	-	0	0	0	-	-	-
All Sierra Nevada	-	M	-	54	-	15	0	0	-	-	-

Abundance, Trend and Suitability

Hare barley (*Hordeum murinum*)



ITALIAN RYEGRASS
*(Lolium multiflorum and
L. perenne)*

Ratings: Cal-IPC Moderate, CDFG not rated

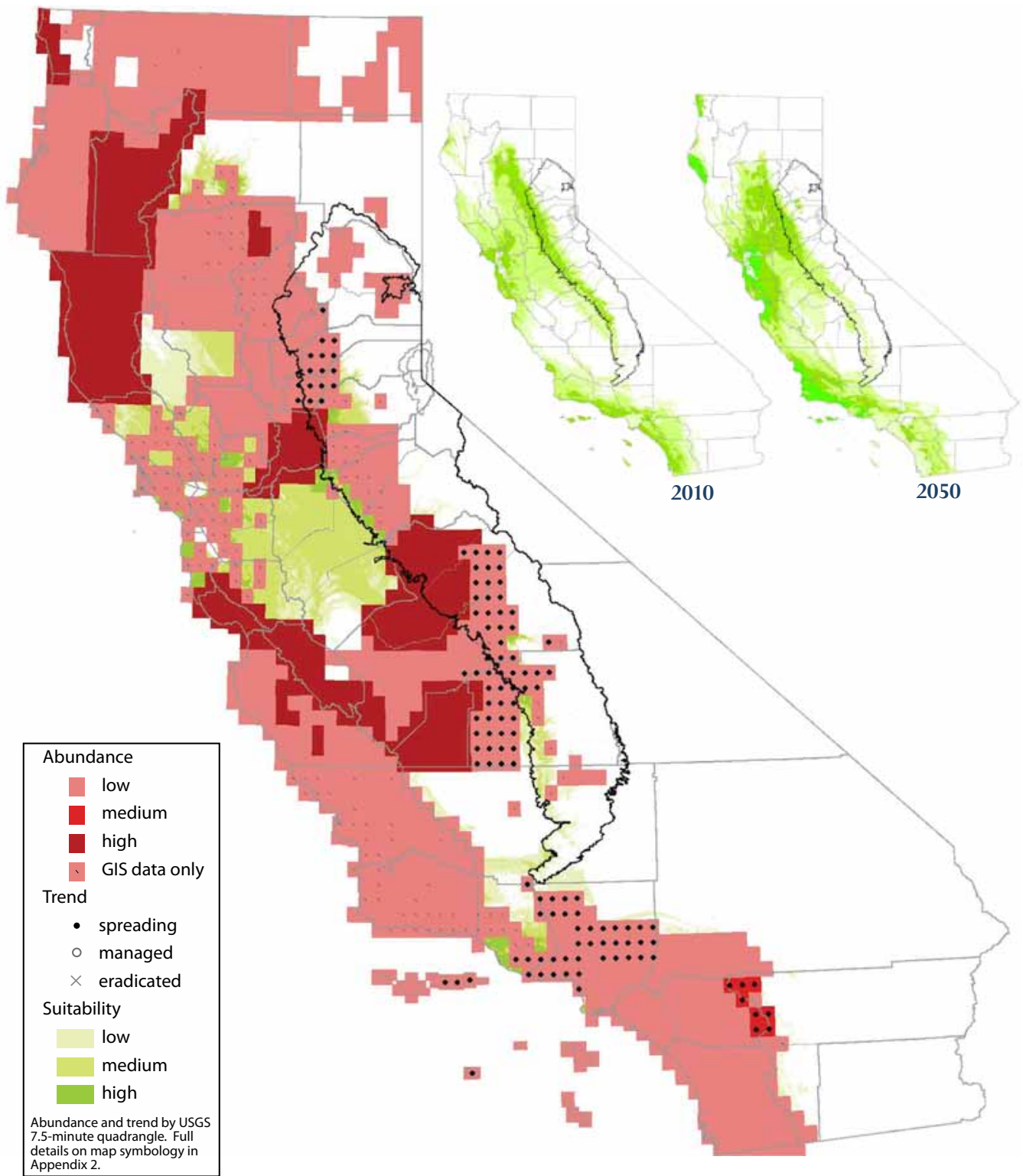
Annual (*Lolium multiflorum*) and perennial (*L. perenne*) Italian ryegrasses are extremely widespread grasses widely planted for pasture forage and as cover crops. Both species have spikelike inflorescences to 3 ft. (0.9 m) tall. They readily hybridize and recent research indicates that they may be genetically the same species. Ryegrasses are considered invasive because they can move into relatively undisturbed grasslands where they displace native species and threaten vernal pools. Our modeling suggests that the amount of suitable range for Italian ryegrass in the Sierra Nevada will remain relatively unchanged with future climate change.



WEED MANAGEMENT AREA	OPPORTUNITIES			STATISTICS							
	ERADICATION	CONTAINMENT	SURVEILLANCE	% INFESTED	% SUITABLE INFESTED	% SPREADING	% MANAGED	% ERADICATED	% SUITABLE 2010	% SUITABLE 2050	SUITABILITY CHANGE
Lassen	-	M	-	12	-	0	0	0	0	0	-
Plumas/Sierra	-	M	-	35	100	7	0	0	3	3	-
Butte	M	-	-	94	98	4	0	0	77	72	-
Yuba/Sutter	M	-	-	78	100	35	0	0	88	84	-
Nevada/Placer	M	-	-	44	67	86	0	0	46	44	-
Lake Tahoe Basin	-	-	M	0	0	NA	NA	0	0	0	-
El Dorado	-	M	-	33	65	20	0	0	53	42	↓
Alpine	-	-	M	0	0	-	-	0	1	0	-
Amador	-	M	-	71	80	0	0	0	67	59	-
Central Sierra	-	M	-	38	55	0	0	0	46	40	-
Sierra/San Joaquin	-	M	-	74	100	19	0	0	39	50	↑
Tulare	-	M	-	47	71	75	0	0	38	23	↓
Kern	-	M	-	18	35	13	0	0	21	33	↑
Eastern Sierra	-	-	L	0	0	-	-	0	0	0	-
All Sierra Nevada	-	M	-	40	66	28	0	0	37	35	-

Abundance, Trend and Suitability

Italian ryegrass (*Lolium multiflorum* and *L. perenne*)



Family Polygonaceae

JAPANESE KNOTWEED
(*Polygonum cuspidatum*)

Ratings: Cal-IPC Moderate Alert, CDFA B

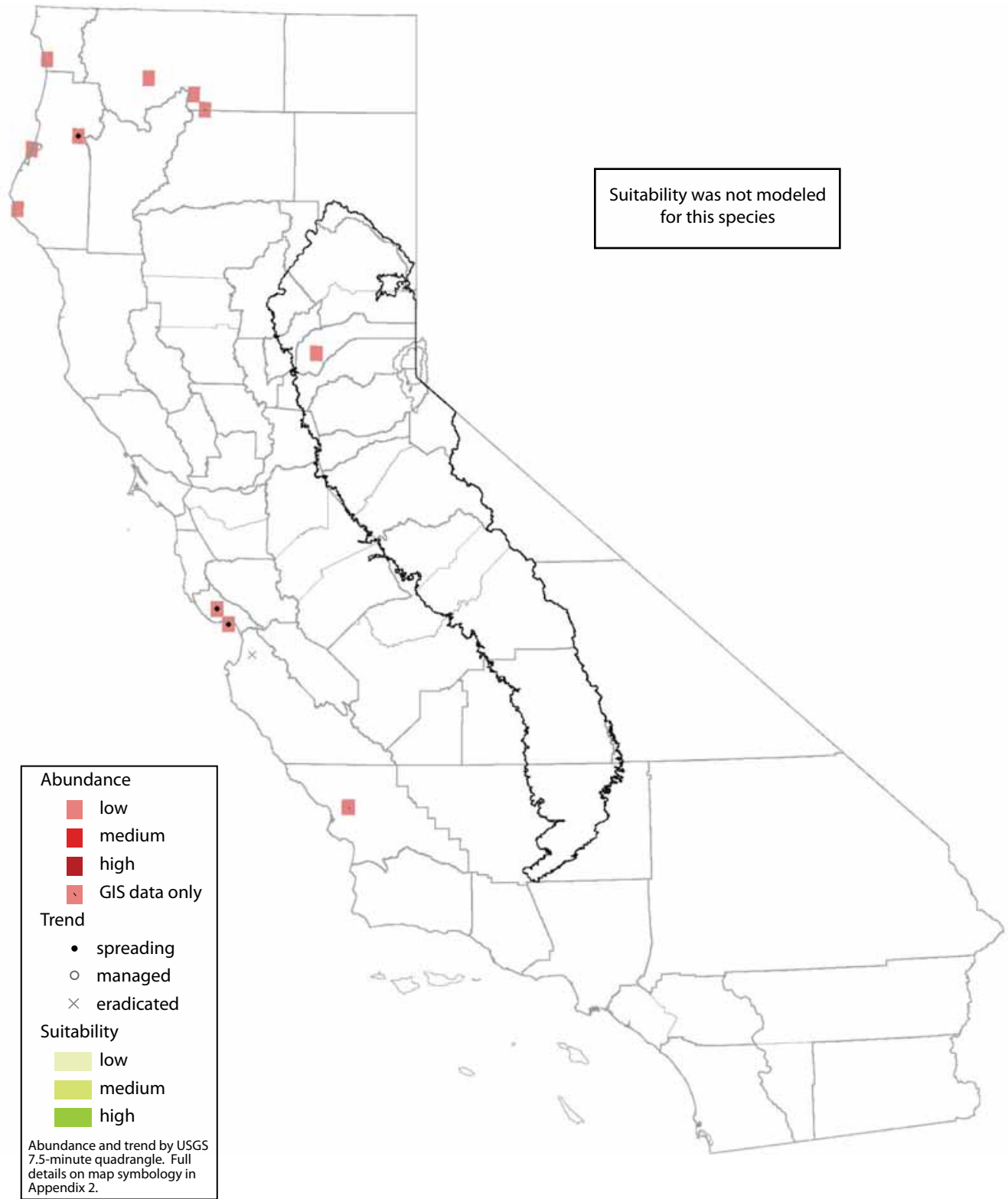
Knotweeds have very limited distribution in California but cause serious problems in Pacific Northwest wetlands and riparian areas. They grow as large clumping perennials with coarse foliage, hollow stems, and aggressive, creeping rhizomes. Fragments of rhizomes can develop into new plants. Knotweeds create dense colonies that displace other vegetation and are extremely difficult to remove. Japanese and giant knotweed readily hybridize. Japanese knotweed also grows in upland sites with shallow water tables or sufficient seasonal rainfall. It can tolerate a wide range of soil types, including volcanic soils, and some soil dryness. *Polygonum cuspidatum* is also known as *Fallopia japonica*. We did not model suitability for this species.



WEED MANAGEMENT AREA	OPPORTUNITIES			STATISTICS							
	ERADICATION	CONTAINMENT	SURVEILLANCE	% INFESTED	% SUITABLE INFESTED	% SPREADING	% MANAGED	% ERADICATED	% SUITABLE 2010	% SUITABLE 2050	SUITABILITY CHANGE
Lassen	-	-	-	0	-	-	-	0	-	-	-
Plumas/Sierra	-	-	L	0	-	-	-	0	-	-	-
Butte	-	-	-	0	-	-	-	0	-	-	-
Yuba/Sutter	-	-	L	0	-	-	-	0	-	-	-
Nevada/Placer	M	-	-	2	-	0	0	0	-	-	-
Lake Tahoe Basin	-	-	-	0	-	-	-	0	-	-	-
El Dorado	-	-	-	0	-	-	-	0	-	-	-
Alpine	-	-	-	0	-	-	-	0	-	-	-
Amador	-	-	-	0	-	-	-	0	-	-	-
Central Sierra	-	-	-	0	-	-	-	0	-	-	-
Sierra/San Joaquin	-	-	-	0	-	-	-	0	-	-	-
Tulare	-	-	-	0	-	-	-	0	-	-	-
Kern	-	-	-	0	-	-	-	0	-	-	-
Eastern Sierra	-	-	-	0	-	-	-	0	-	-	-
All Sierra Nevada	L			0	-	0	0	0	-	-	-

Abundance, Trend and Suitability

Japanese knotweed (*Polygonum cuspidatum*)



GIANT KNOTWEED

(Polygonum sachalinense)

Ratings: Cal-IPC Moderate Alert, CDFA B

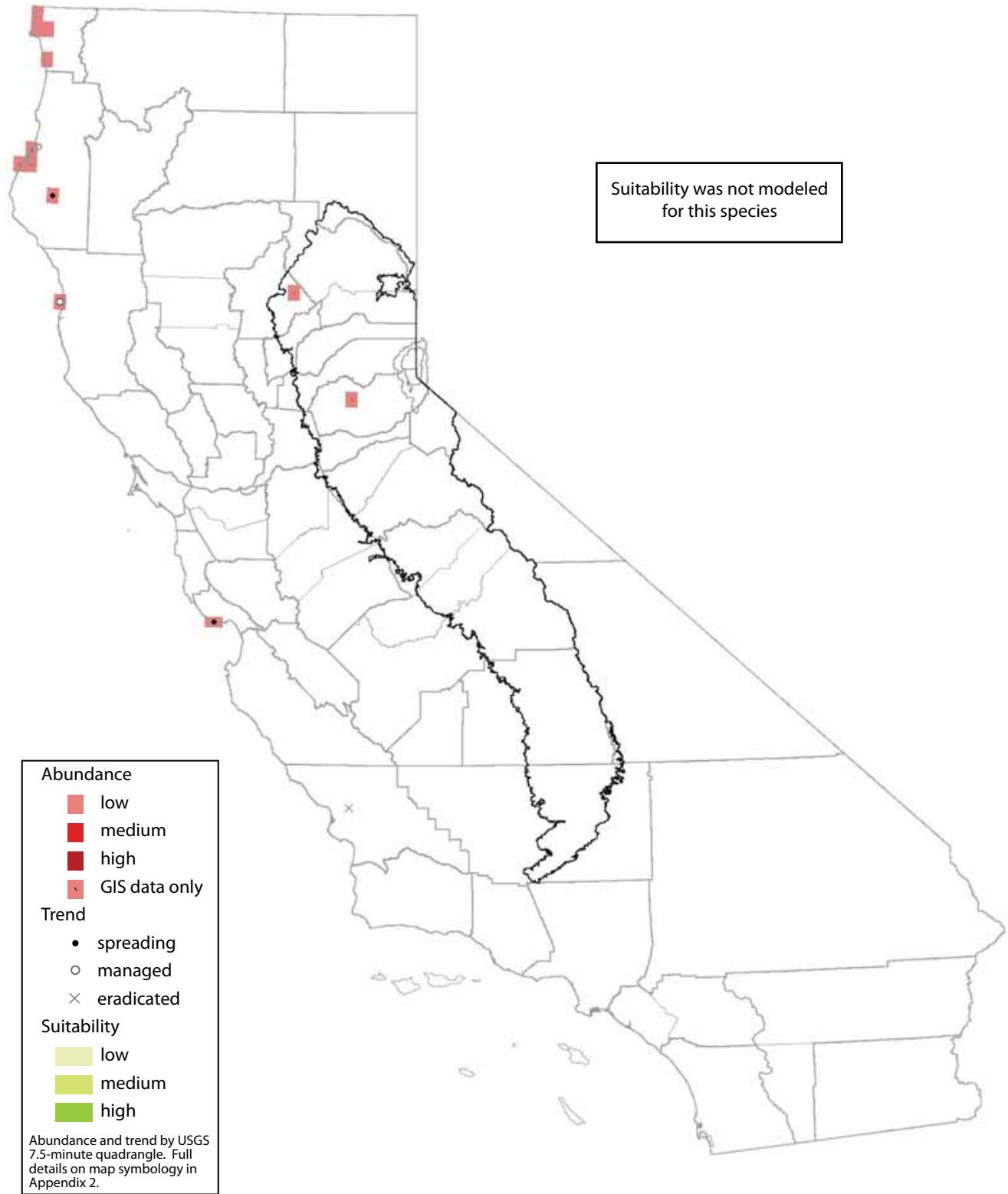
Knotweeds have very limited distribution in California but cause serious problems in Pacific Northwest wetlands and riparian areas. They grow as large clumping perennials with coarse foliage, hollow stems, and aggressive, creeping rhizomes. Fragments of rhizomes can develop into new plants. Knotweeds create dense colonies that displace other vegetation and are extremely difficult to remove. Japanese and giant knotweed readily hybridize. We did not model suitability for this species.



WEED MANAGEMENT AREA	OPPORTUNITIES			STATISTICS							
	ERADICATION	CONTAINMENT	SURVEILLANCE	% INFESTED	% SUITABLE INFESTED	% SPREADING	% MANAGED	% ERADICATED	% SUITABLE 2010	% SUITABLE 2050	SUITABILITY CHANGE
Lassen	-	-	-	0	-	-	-	0	-	-	-
Plumas/Sierra	-	-	-	0	-	-	-	0	-	-	-
Butte	L	-	-	2	-	0	0	0	-	-	-
Yuba/Sutter	-	-	-	0	-	-	-	0	-	-	-
Nevada/Placer	-	-	-	0	-	-	-	0	-	-	-
Lake Tahoe Basin	-	-	-	0	-	-	-	0	-	-	-
El Dorado	L	-	-	2	-	0	0	0	-	-	-
Alpine	-	-	-	0	-	-	-	0	-	-	-
Amador	-	-	-	0	-	-	-	0	-	-	-
Central Sierra	-	-	-	0	-	-	-	0	-	-	-
Sierra/San Joaquin	-	-	-	0	-	-	-	0	-	-	-
Tulare	-	-	-	0	-	-	-	0	-	-	-
Kern	-	-	-	0	-	-	-	0	-	-	-
Eastern Sierra	-	-	-	0	-	-	-	0	-	-	-
All Sierra Nevada	L	-	-	0	-	0	0	0	-	-	-

Abundance, Trend and Suitability

Giant knotweed (*Polygonum sachalinense*)



Family Scrophulariaceae

DALMATIAN TOADFLAX

(*Linaria genistifolia* subsp. *dalmatica*)

Ratings: Cal-IPC Moderate, CDFA A

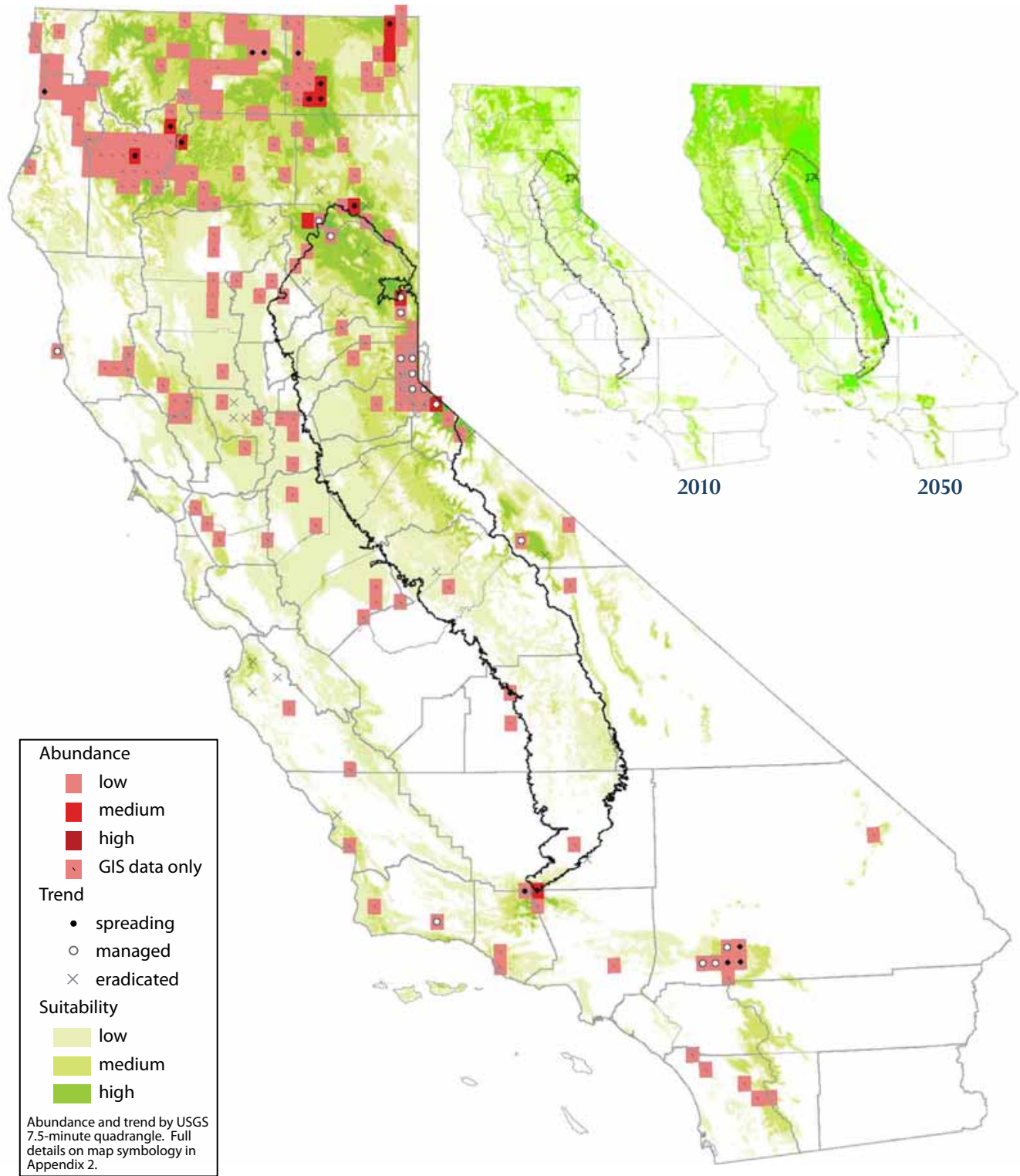
Dalmatian toadflax is an herbaceous perennial to 4 ft. (1.2 m) tall with creeping roots and yellow flowers. Plants outcompete other species for soil moisture and can develop large colonies that displace other vegetation. Dalmatian toadflax roots can extend > 80 in. (2 m) deep. Dalmatian toadflax is unable to survive rapid or extreme temperature changes. Toadflaxes have limited distribution in California but create significant problems in the Pacific Northwest by reducing livestock carrying capacity on infested rangeland. Toadflaxes invade disturbed open sites, fields, pastures, forest clearings and crops. Dalmatian toadflax prefers cool, semiarid climates, and dry, coarse soils with neutral to alkaline pH. We recommend eradication as a high priority in isolated quads and containment as a high priority elsewhere. Our modeling suggests that the amount of suitable range for Dalmatian toadflax in the Sierra Nevada will increase with future climate change.



WEED MANAGEMENT AREA	OPPORTUNITIES			STATISTICS							
	ERADICATION	CONTAINMENT	SURVEILLANCE	% INFESTED	% SUITABLE INFESTED	% SPREADING	% MANAGED	% ERADICATED	% SUITABLE 2010	% SUITABLE 2050	SUITABILITY CHANGE
Lassen	-	H	-	10	10	18	27	3	90	100	-
Plumas/Sierra	H	-	-	13	13	9	36	4	94	100	-
Butte	H	-	-	8	9	0	0	2	67	79	↑
Yuba/Sutter	-	-	H	5	8	0	0	0	62	94	↑
Nevada/Placer	-	H	-	19	19	25	25	0	79	90	-
Lake Tahoe Basin	-	H	-	67	80	50	50	0	79	100	↑
El Dorado	-	H	-	20	20	33	33	0	89	77	-
Alpine	-	H	-	21	22	40	40	0	63	97	↑
Amador	-	-	H	0	0	-	-	4	92	74	↓
Central Sierra	-	-	H	0	0	-	-	1	71	67	-
Sierra/San Joaquin	H	-	-	2	2	0	0	1	33	68	↑↑
Tulare	-	-	H	2	3	50	0	0	24	74	↑↑
Kern	H	-	-	2	4	33	33	1	12	42	↑↑
Eastern Sierra	H	-	-	1	3	0	25	1	20	50	↑↑
All Sierra Nevada	H	H	-	7	8	31	28	1	60	77	↑

Abundance, Trend and Suitability

Dalmatian toadflax (*Linaria genistifolia* subsp. *dalmatica*)



YELLOW TOADFLAX

(Linaria vulgaris)

Ratings: Cal-IPC Moderate, CDFA not rated

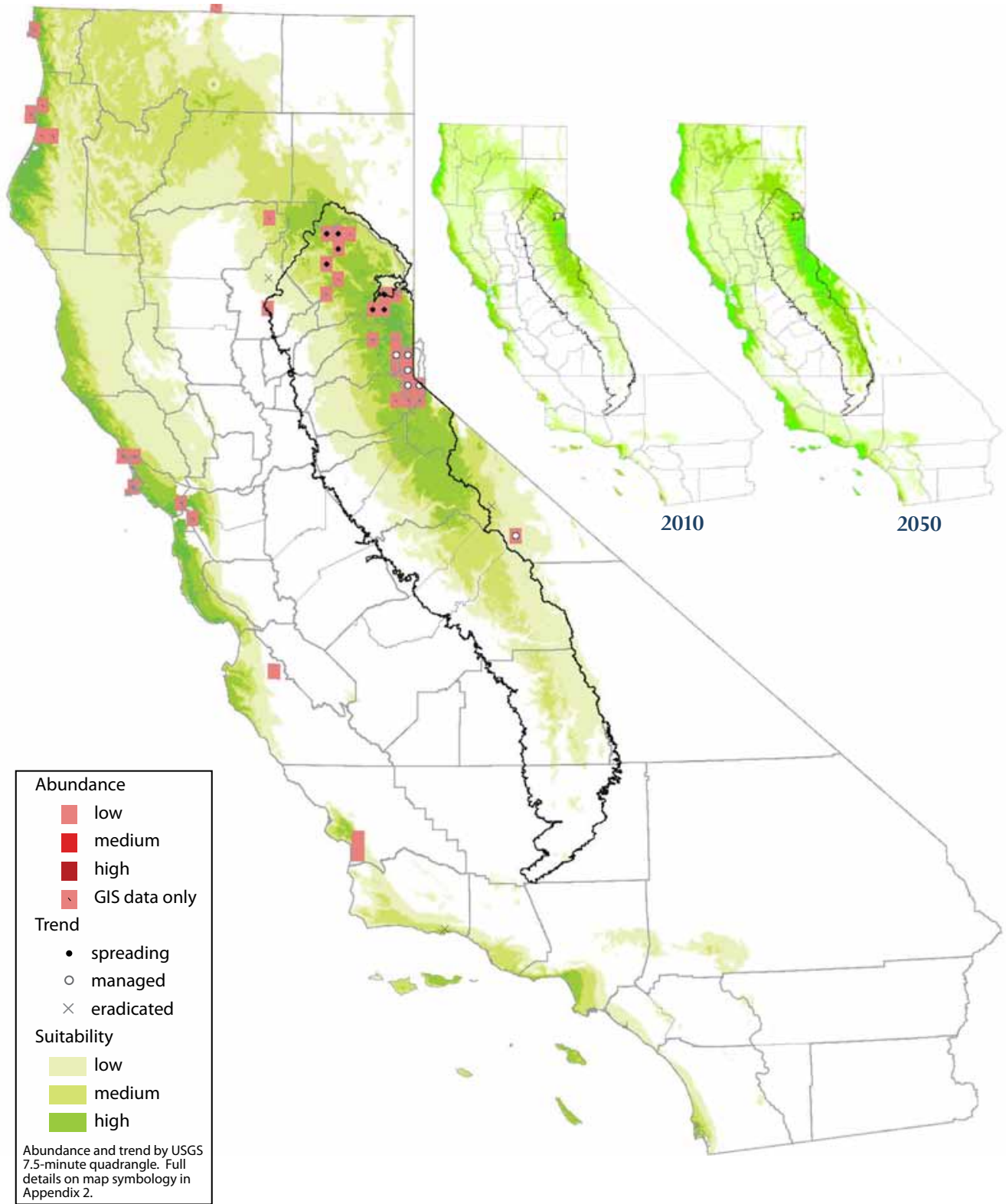
Yellow toadflax is an herbaceous perennial to 4 ft. (1.2 m) tall with creeping roots and yellow flowers. Plants outcompete other species for soil moisture and can develop large colonies that displace other vegetation. Toadflaxes have limited distribution in California but create significant problems in the Pacific Northwest by reducing livestock carrying capacity on infested rangeland. Toadflaxes invade disturbed open sites, fields, pastures, forest clearings and crops. Yellow toadflax also invades relatively undisturbed prairies and riparian habitats. Yellow toadflax often inhabits moist, coarse soils and can tolerate subarctic conditions. We recommend eradication as a high priority in isolated quads and containment as a high priority elsewhere. Our modeling suggests that the amount of suitable range for yellow toadflax in the Sierra Nevada will increase with future climate change.



WEED MANAGEMENT AREA	OPPORTUNITIES			STATISTICS							
	ERADICATION	CONTAINMENT	SURVEILLANCE	% INFESTED	% SUITABLE INFESTED	% SPREADING	% MANAGED	% ERADICATED	% SUITABLE 2010	% SUITABLE 2050	SUITABILITY CHANGE
Lassen	-	-	H	3	3	67	0	0	47	70	↑
Plumas/Sierra	-	H	-	13	13	64	0	0	95	99	-
Butte	-	H	-	2	3	0	0	2	47	100	↑↑
Yuba/Sutter	-	-	H	0	0	-	-	0	24	100	↑↑
Nevada/Placer	-	H	-	10	12	50	50	0	70	100	↑
Lake Tahoe Basin	-	H	-	50	60	56	56	0	99	100	-
El Dorado	-	H	-	15	16	43	43	0	89	100	-
Alpine	-	-	H	8	9	50	50	0	99	100	-
Amador	-	-	H	0	0	-	-	0	64	100	↑
Central Sierra	-	-	H	0	0	-	-	1	72	97	↑
Sierra/San Joaquin	-	-	M	0	0	-	-	0	38	54	↑
Tulare	-	L	-	0	0	-	-	0	34	56	↑
Kern	-	L	-	0	0	-	-	0	2	15	↑↑
Eastern Sierra	H	-	-	0	1	0	100	0	24	35	↑
All Sierra Nevada	H	H	-	5	6	52	22	0	62	85	↑

Abundance, Trend and Suitability

Yellow toadflax (*Linaria vulgaris*)



Family Simaroubaceae

TREE-OF-HEAVEN
(*Ailanthus altissima*)

Ratings: Cal-IPC Moderate; CDFA not rated

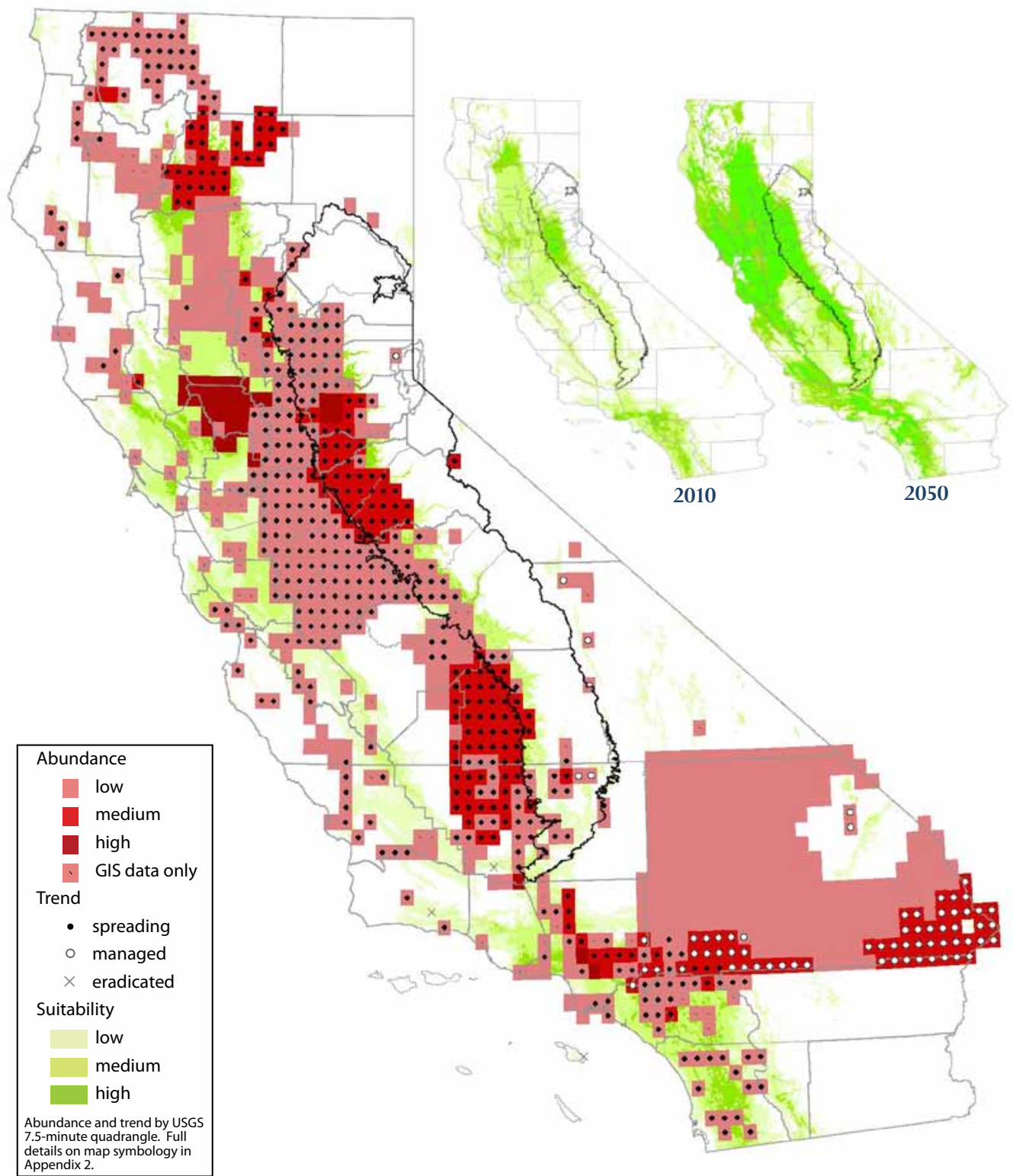
Tree of heaven is deciduous tree that grows 30-60 feet (9-18 m) high, with gray bark, large compound leaves, and root sprouts. It mostly invades riparian areas but can invade forests and grasslands. Tree-of-heaven displaces riparian vegetation and produces allelopathic chemicals that prevent other plants from growing around it. In the Sierra foothills, it invades disturbed semi-natural habitat. It has been used as a street tree and for revegetating acidic mine soils. Gardeners sometimes share tree of heaven seedlings. Tree-of-heaven produces many seeds, produces root sprouts up to 50 feet from the nearest shoot, and resprouts when cut, making it difficult to remove. Our modeling suggests that the amount of suitable range for tree-of-heaven in the Sierra Nevada will increase with future climate change.



WEED MANAGEMENT AREA	OPPORTUNITIES			STATISTICS							
	ERADICATION	CONTAINMENT	SURVEILLANCE	% INFESTED	% SUITABLE INFESTED	% SPREADING	% MANAGED	% ERADICATED	% SUITABLE 2010	% SUITABLE 2050	SUITABILITY CHANGE
Lassen	-	-	L	3	38	0	0	0	2	25	↑↑
Plumas/Sierra	-	M	-	11	41	100	0	0	3	31	↑↑
Butte	-	M	-	67	71	44	0	0	74	88	↑
Yuba/Sutter	-	M	-	65	89	71	0	0	87	98	-
Nevada/Placer	-	M	-	57	75	94	3	0	57	68	↑
Lake Tahoe Basin	H	-	-	6	100	0	100	0	0	7	↑↑
El Dorado	-	M	-	52	75	67	0	0	55	65	↑
Alpine	-	-	M	4	20	100	0	0	1	14	↑↑
Amador	-	M	-	71	80	85	0	0	73	79	-
Central Sierra	-	M	-	44	64	100	0	0	50	58	↑
Sierra/San Joaquin	-	M	-	33	52	67	0	0	40	70	↑
Tulare	-	M	-	49	79	94	2	0	34	74	↑↑
Kern	-	M	-	39	62	80	3	1	36	80	↑↑
Eastern Sierra	H	-	-	9	23	4	12	0	5	29	↑↑
All Sierra Nevada	L	M	-	37	55	83	2	0	44	62	↑

Abundance, Trend and Suitability

Tree-of-heaven (*Ailanthus altissima*)



Family Solanaceae

TREE TOBACCO (*Nicotiana glauca*)

Ratings: Cal-IPC Moderate, CDFA not rated

Tree tobacco is a shrub or tree that grows up to 23 ft. (7 m) tall with tubular flowers. Its foliage has a strong, unpleasant scent and all plant parts are toxic to humans and livestock. It inhabits roadsides, fields, disturbed areas, and riparian areas, and often grows on open, sandy, or gravelly slopes. Tree tobacco escaped from gardens where it was planted as an ornamental and today many infestations occur downstream from old dwellings. It is seen occasionally in the Sierra and appears to have cyclical abundance. In California, it is currently more of a problem south of the Tehachapi Mountains. Our modeling suggests that the amount of suitable range for tree tobacco in the Sierra Nevada will increase with future climate change.



WEED MANAGEMENT AREA	OPPORTUNITIES			STATISTICS							
	ERADICATION	CONTAINMENT	SURVEILLANCE	% INFESTED	% SUITABLE INFESTED	% SPREADING	% MANAGED	% ERADICATED	% SUITABLE 2010	% SUITABLE 2050	SUITABILITY CHANGE
Lassen	-	-	L	0	-	-	-	0	0	0	-
Plumas/Sierra	-	-	L	0	-	-	-	0	0	0	-
Butte	-	-	M	35	90	0	0	0	12	17	↑
Yuba/Sutter	-	-	M	27	83	0	0	0	20	42	↑↑
Nevada/Placer	-	-	M	3	17	0	0	0	10	4	↓
Lake Tahoe Basin	-	-	L	0	-	-	-	0	0	0	-
El Dorado	M	-	-	4	22	0	0	0	9	1	↓
Alpine	-	-	L	0	-	-	-	0	0	0	-
Amador	M	-	-	11	23	0	0	4	30	15	↓
Central Sierra	M	-	-	11	50	33	0	0	4	10	↑↑
Sierra/San Joaquin	-	M	-	47	100	1	0	0	7	41	↑↑
Tulare	-	-	M	21	51	10	0	0	21	43	↑↑
Kern	-	M	-	72	100	0	0	0	16	48	↑↑
Eastern Sierra	-	-	L	0	100	0	0	0	0	5	↑↑
All Sierra Nevada	L	L	-	17	69	5	0	0	9	12	↑

Abundance, Trend and Suitability

Tree tobacco (*Nicotiana glauca*)

