



# MCI-West MCB Camp Pendleton

## Land Management Section



### *A Tale of a River: The Santa Margarita*

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**Land Management Section Head**  
**August 2013**



# MCI-West MCB Camp Pendleton

## Santa Margarita Hydrological Unit



### Santa Margarita Watershed Reference Map





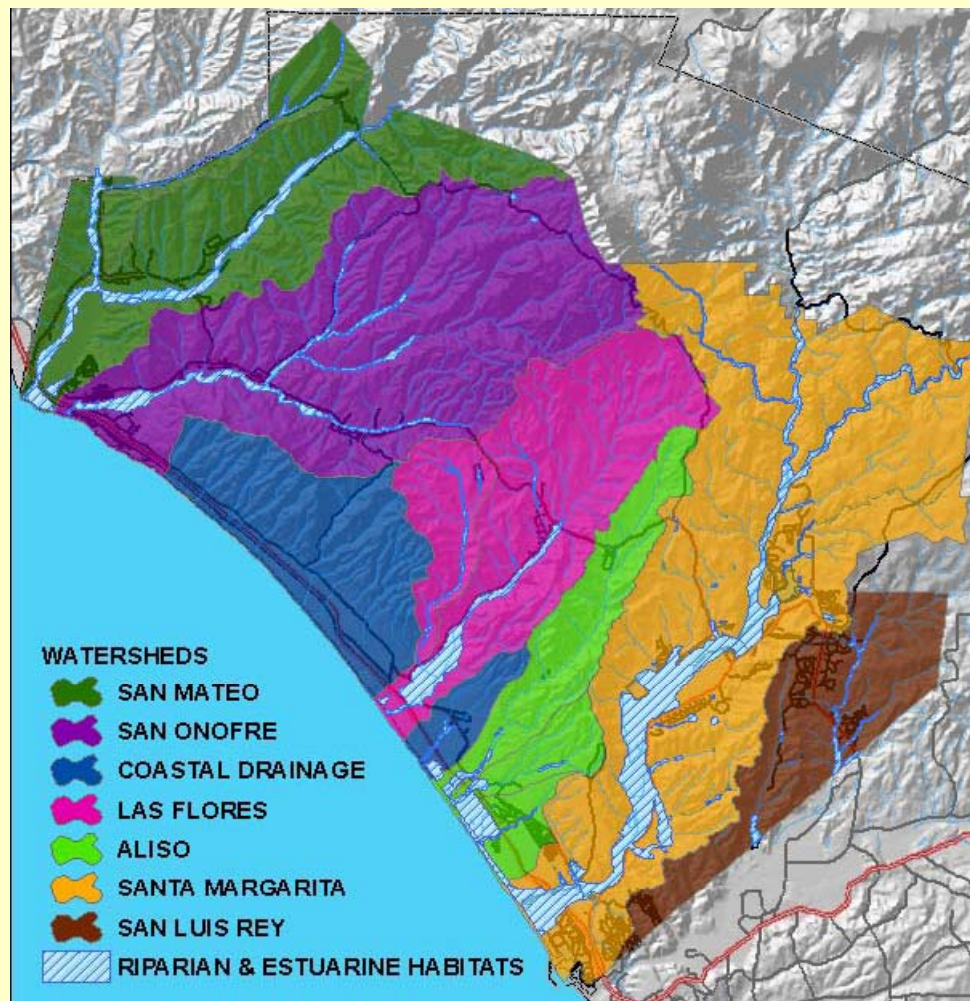


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## Watershed on Base



- 31,200 acres watershed on base
- 9,803 acres riparian (1994 baseline)
- 17 miles of river: Sandia, Del Luz, Roblar



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## Historic Land Uses



River has had waves of many peoples with different land uses over time:

- Luisueno native people: 9-10,000 ago:  
Burning, textiles, plant and animal food
- European explorers/miners:  
Plant and animal food, ores
- Spanish missionaries:  
Plant and animal food, divert water, weeds
- Ranching and agriculture:  
Large scale, landscape modification, weeds
- Marine Corps training base:  
Intensive landscape modification



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## 1845 Land Uses







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## 1930 Ysidora Flats Land Uses



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## 1977 Ysidora Flats Land Uses



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## 1970's Phreatophyte Control and River Rearrangement



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## River Rearrangement



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## Arundo and Tamarisk Infestations



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## Arundo Wall

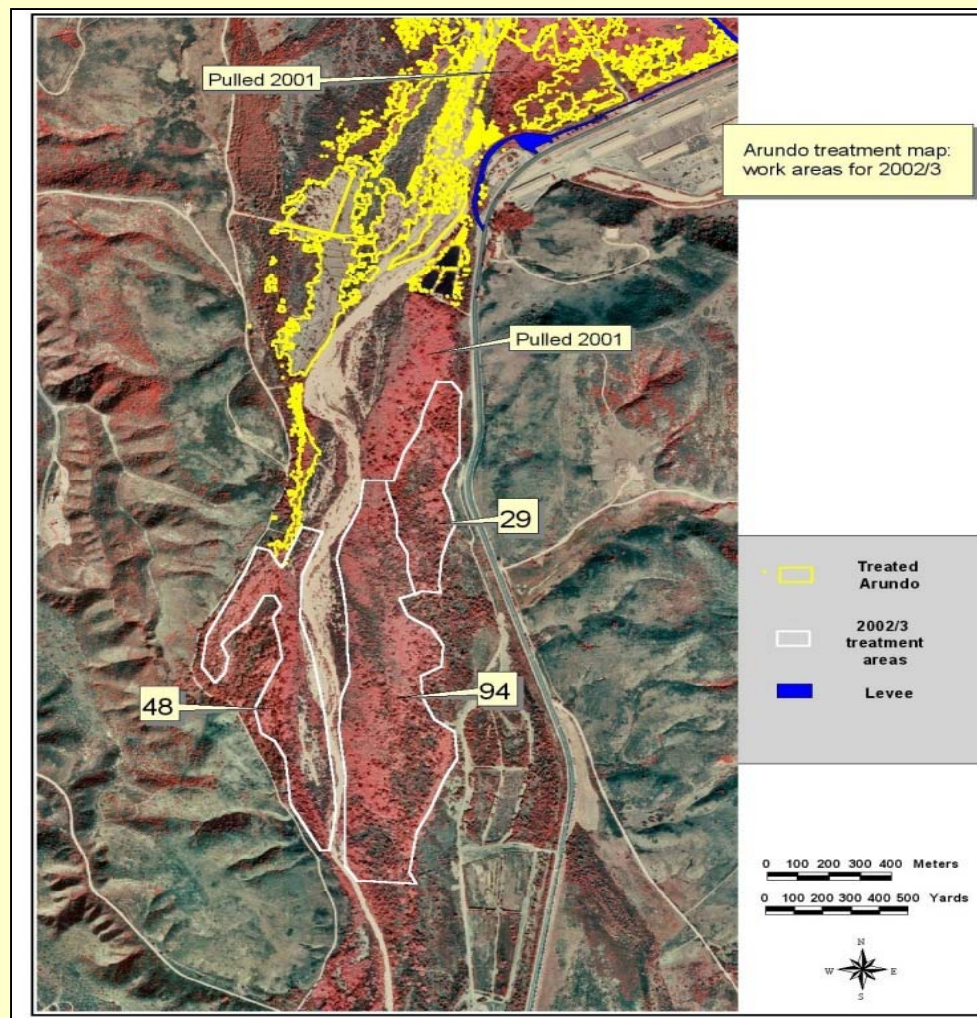


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## Planning Incremental Treatment



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## Grapple & Grind



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## Grind Arundo on site



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## Ground Arundo



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- Treat aggressively for 4 years
- Yearly maintenance







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## *Lepidium latifolium* preferred habitat



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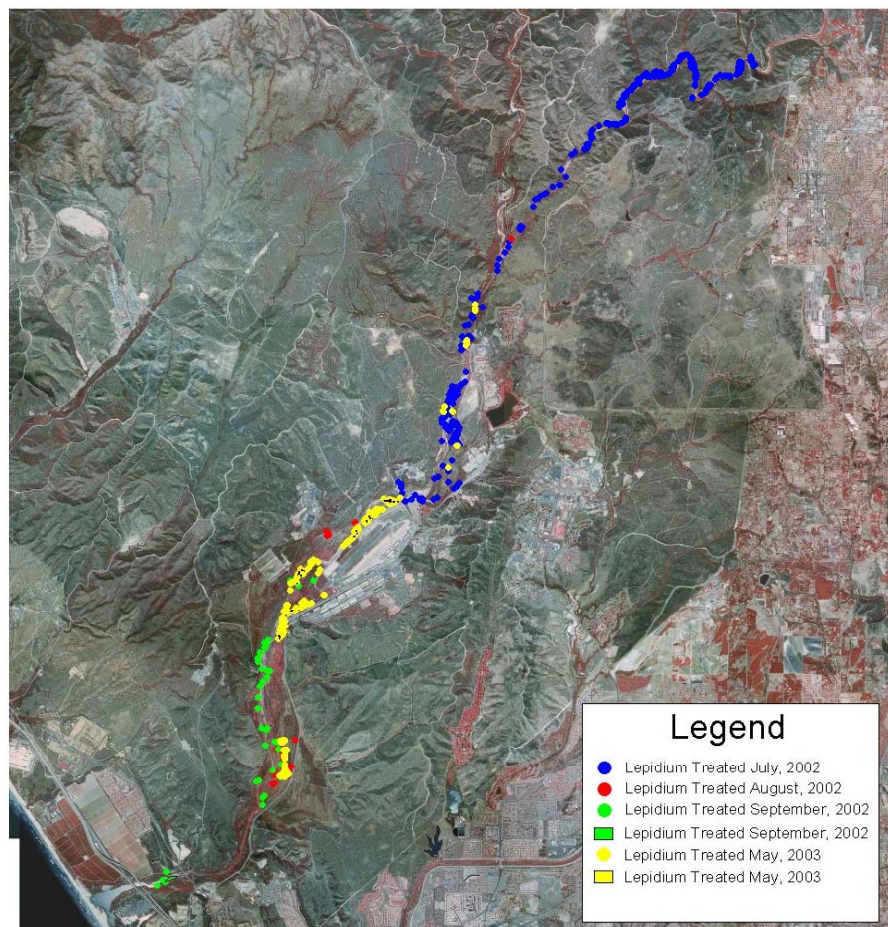


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## *Lepidium Control*



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Lepidium Treatments 2002-2003



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## Giessow Method



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## Unintended Results



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## 1995 Riparian Biological Opinion

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- Treat Arundo & Tamarisk for five years
- Map riparian associations every two years to reach a maximum of 'Ecosystem Health Points'
- Focus management on Least Bell's vireo, Southwestern willow flycatcher, and Arroyo toad
- No training in the Riparian Area



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## Goal

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25,500

1,200 acres Riparian Woodland

1000 acres Riparian Scrub





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## Ecosystem Health Points



Habitat Type	Points
Riparian Woodland	5
Open water/gravel	4
Riparian scrub	3
Fresh water marsh	3
Mixed woodland	2
Sycamore grassland	2
Grass/forb mix	1
Mixed willow exotic	1
Arundo	0
Tamarisk	0
Disturbed/develop	0



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## 1994 Baseline



Habitat Type	Acres	Points	EHV
Riparian Woodland	1467	5	7795
Open water/gravel	1160	4	4629
Riparian scrub	2020	3	8529
Fresh water marsh	254	3	335
Mixed woodland	651	2	1524
Sycamore grassland	172	2	696
Grass/forb mix	1236	1	1045
Mixed willow exotic	982	1	982
Arundo	283	0	0
Tamarisk	13	0	0
Disturbed/develop	1565	0	0
Total	9803	--	22661





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## 1994 and 2005 Comparison



Habitat Type	1994 Acres	1994 EHP	2005 Acres	2005 EHP
Riparian Woodland	1467	7335	1559	7795
Open water/gravel	1160	4629	1173	4692
Riparian scrub	2020	8529	2843	8529
Fresh water marsh	254	335	112	335
Mixed woodland	651	1524	771	1542
Sycamore grassland	172	696	348	696
Grass/forb mix	1236	1045	1088	1088
Mixed willow exotic	982	982	82	82
Arundo	283	0	123	0
Tamarisk	13	0	14	0
Disturbed/develop	1565	0	481	0
Total	9803	22661	8595	24759

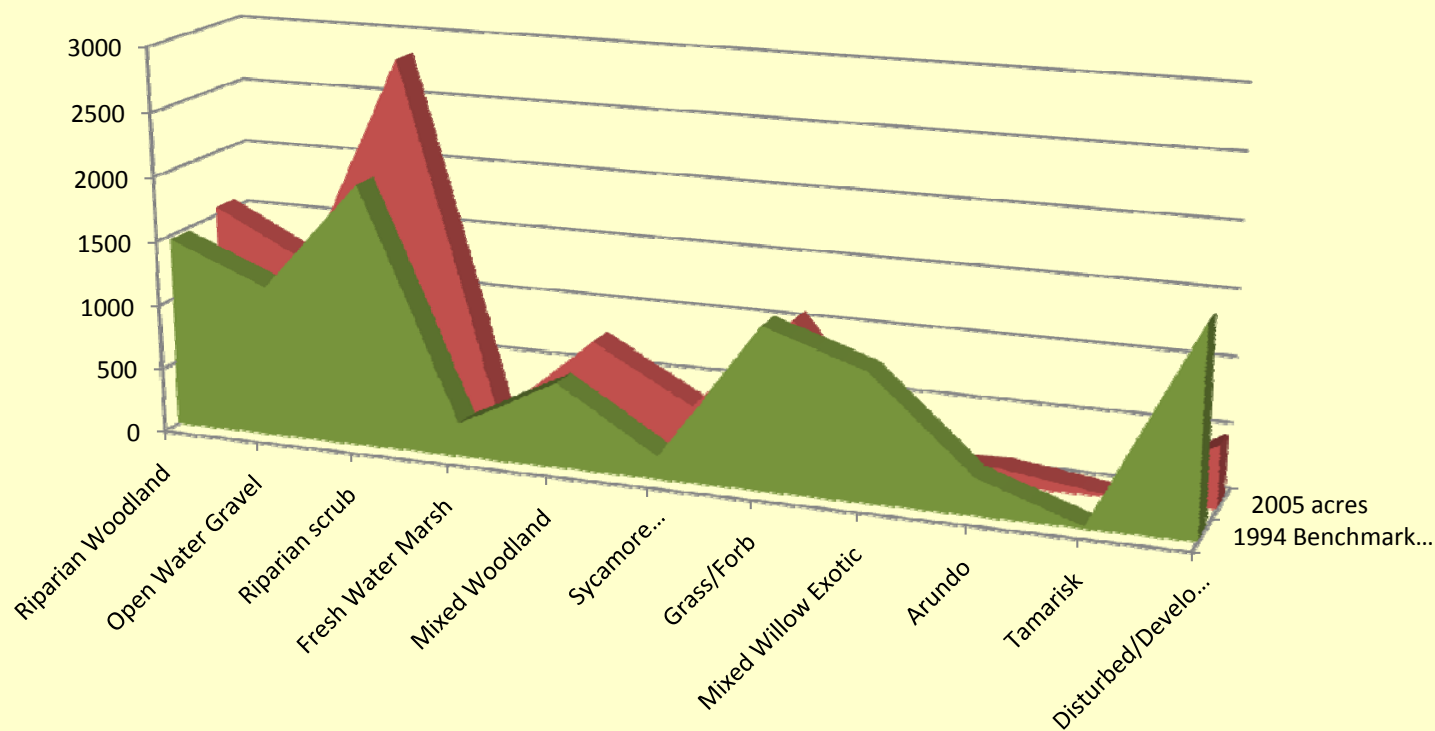


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## 1994 & 2005 Acres Comparison



1994 vs 2005 (acres)





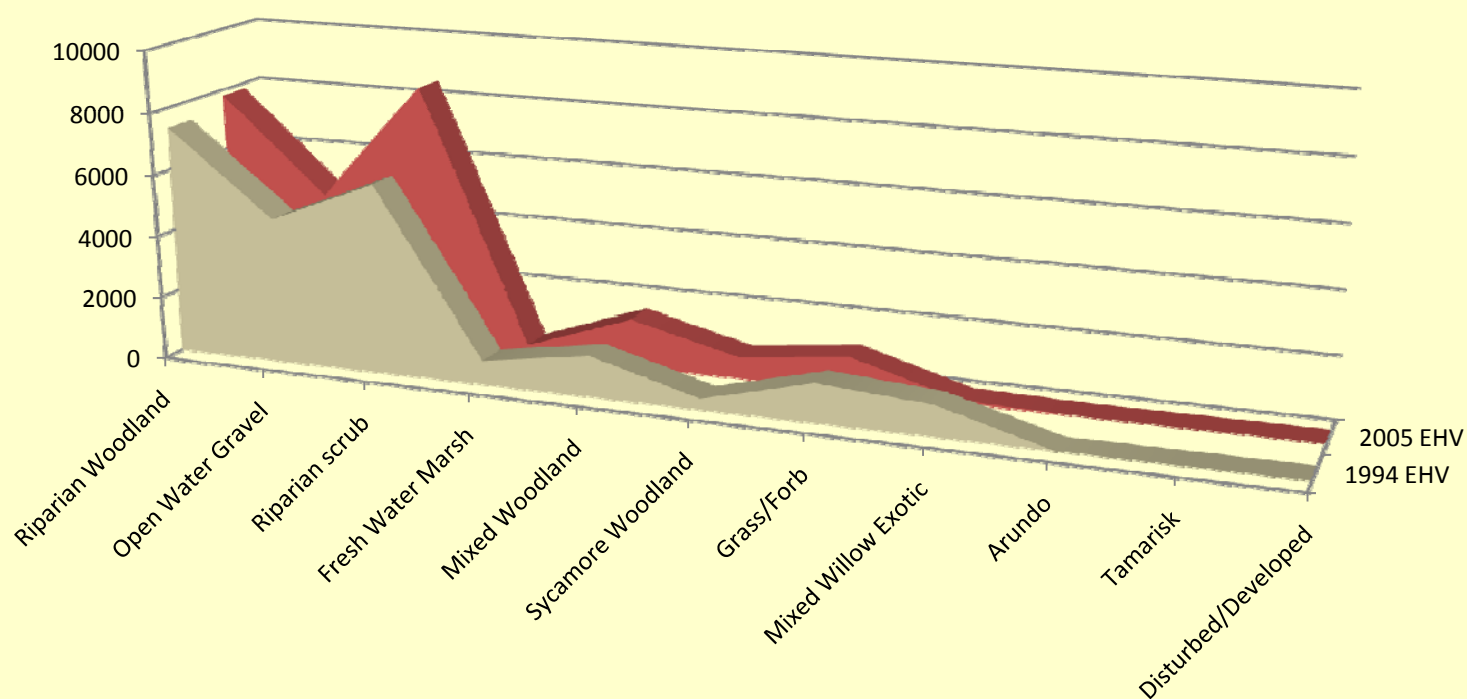


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## 1994 & 2005 EHP Comparison



1994 vs. 2005 (EHP)





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## Alternative Riparian Monitoring

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- Developed Riparian Habitat Monitoring Program in 2007
- **Primary Success Criteria:** 50% Cover of trees and shrubs,  $1 \leq$  *Arundo*, *Tamarix*, *Lepidium*
- **Secondary Success Criteria:** CRAM, forb frequency
- Stratified by treatment classes

Implemented in 2009 and 2013





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## Methods



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- Line-intercept transects; tree, shrub absolute cover
  - Quadrats: forb frequency
  - CRAM: Landscape context, hydrology, physical structure, biotic structure.
  - Stratified by treatment classes



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## Success Standards



Time since initial treatment	Absolute Native Tree and Shrub Cover	Three main Exotics Cover	Frequency of Native Herb Species Mean and Lowest CI	CRAM Meet score of Previous Treatment Class +10
0-1 Years	$X \geq 50\%$	$< 1\%$	$X \geq 5\%$ (CI) 0-5%	Baseline
2-4 Years	$X \geq 50\%$	$< 1\%$	$X, (CI) \geq 10\%$	>CRAM score for 0-1 Year
5-10 Years	$X \geq 50\%$	$< 1\%$	$X, (CI) \geq 50\%$	> CRAM score for 2-4 Years
11-20 Years	$X \geq 50\%$	$< 1\%$	$X, (CI) \geq 50\%$	> CRAM score for 5-10 Years





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## 0-1 Years Treatment Class



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## 2009 Primary Success Results



Treatment Category	Total Native Cover $X \geq 50\%$	Three main Exotics Cover $X \leq 1\%$	Primary Success standards Met
0-1 Years	24.28	0.00	No
2-4 Years	51.73	8.13	No
5-10 Years	70.30	4.06	No
11-20 Years	60.27	0.00 (0, 0)	Yes!





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## 2009 Secondary Success Results



Treatment Category	Average CRAM Score	CRAM Success Standard	Herbaceous Frequency X (CI)	Herbaceous Success Requirements	Secondary Success standards Met
0-1 Years	77.33	Disturbed Baseline	20.00 (2, 38)	X > 5% 0-5% (CI)	No
2-4 Years	N/A	N/A	46.67 (7, 86)	>10%	No
5-10 Years	80.67	>2-4 Years No data 2-4	73.75 (63, 85)	>50%	Yes
11-20 Years	80.57	5-10 Years (80.67)	73.33 (60, 87)	>50%	Yes



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## 2013 Primary Success Results



Treatment Category	Total Native Cover X>50%	Three main Exotics Cover X<1%	Primary Success standards Met
2–4 Years	40.7	0	No
5–10 Years	63.7	0.003	Yes!
11–20 Years	76.0	0.002	Yes!



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## 2013 Secondary Success Results



Treatment Category	Average CRAM Score	CRAM Success Standard	Herbaceous Frequency X, (CI)	Herbaceous Success Requirements	Secondary Success standards Met
2-4 Years	N/A	N/A	46.7 (34.2, 59.1)	>10%	Y
5-10 Years	80.34	>2-4 Years (77.46 )	46.7 (26.2, 67.2)	>50%	N
11-20 Years	82.61	5-10 Years (74.71 )	52.9 (42.8, 62.9)	>50%	N





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## 2013 Secondary Success Results

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What does this mean?

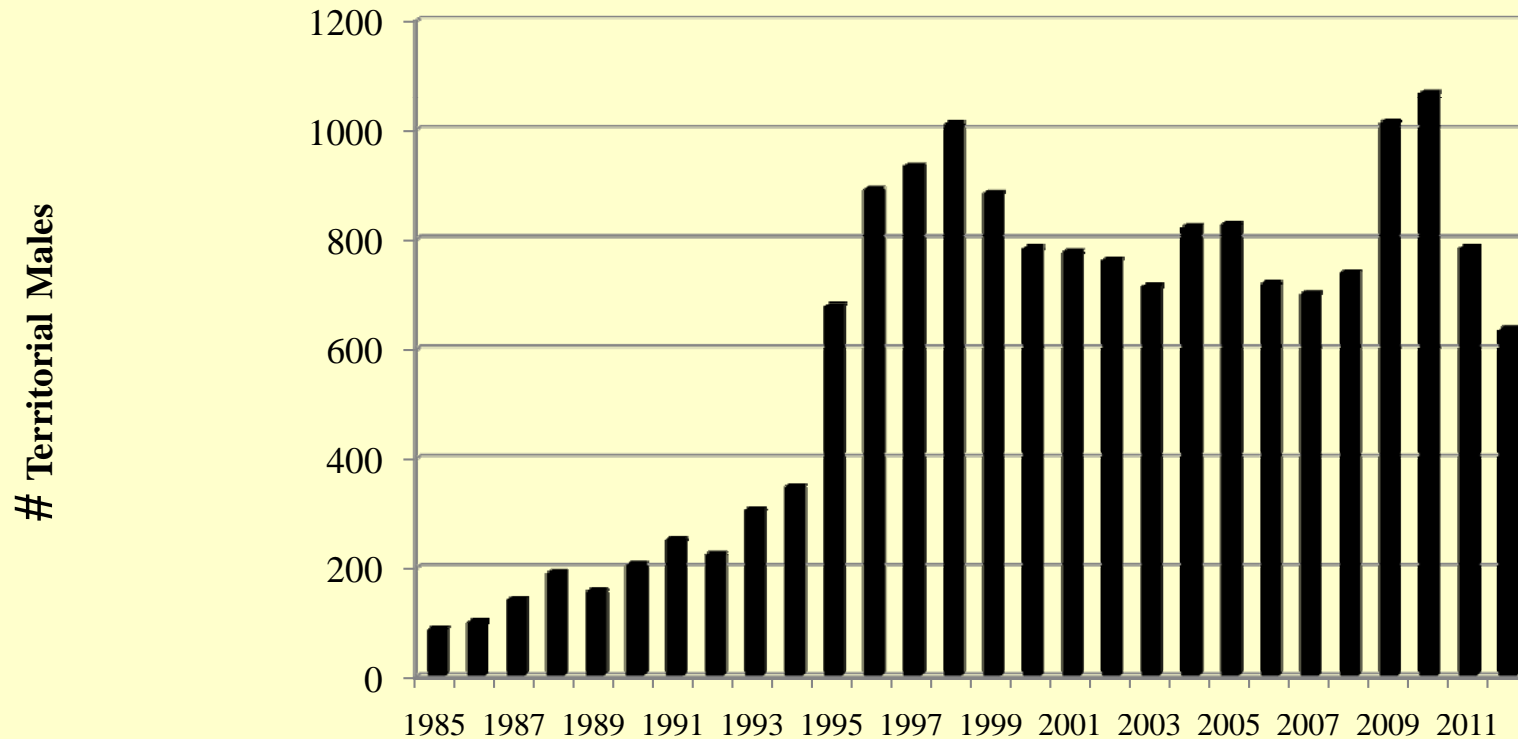
The river is creating a canopy structure  
We are succeeding in reducing top 3  
weeds to trace

Have the listed species increased during this  
time period?



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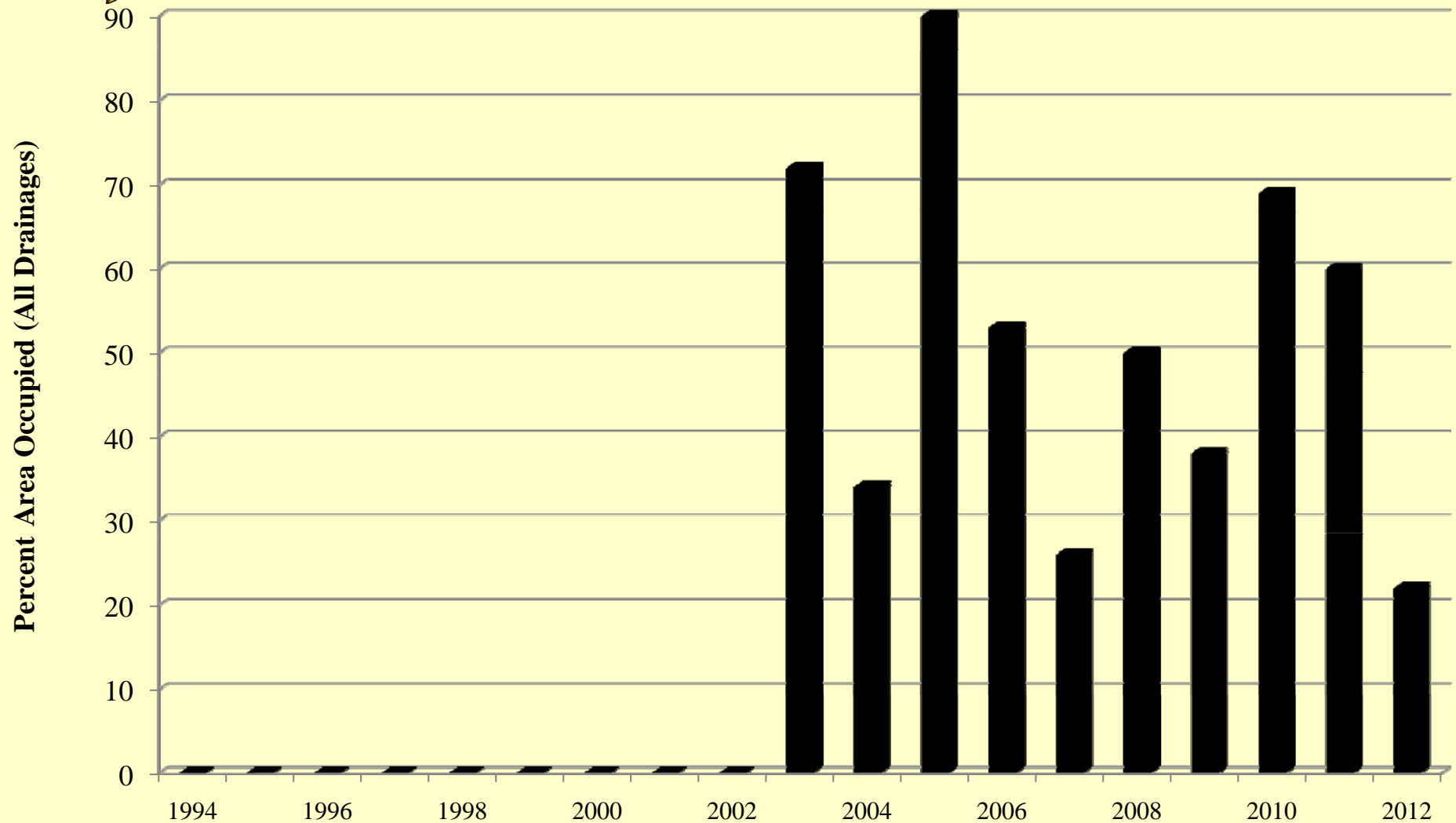
## least Bell's vireo





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## arroyo toad

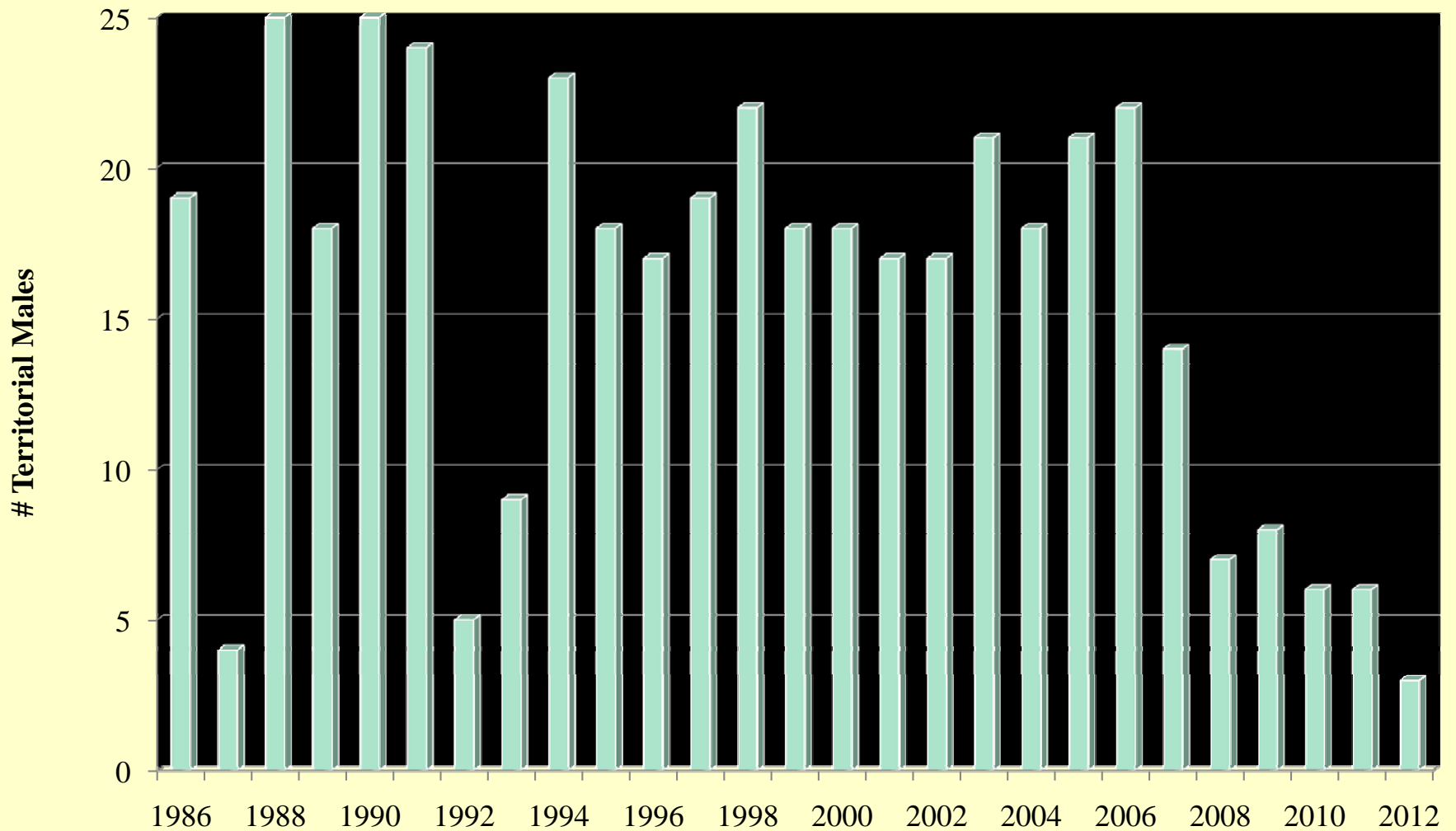






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## SW Willow flycatcher





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## What is Next?



- 
- 2015 Vegetation Mapping
  - 2015 Riparian Habitat Monitoring
  - Recalculate scores
  - Investigate herbaceous species diversity
  - Continue yearly herbicide treatment
  - Re-consult on Riparian BO



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## Questions?



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