

The Threat to California of Hydrilla and its Current Status



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Topics

- Biology: cause of problem
- Pathways of movement
 - Eg: between Clear Lake and the Delta
 - Hydrology – Cache Creek
 - Boats
- Impacts: California vs Florida
- Potential Impacts in California
- Current status



Biology



Hydrilla is difficult to manage

- Grows fast and thick: 2 wk doubling
- When heading to surface, can grow 10 ft in 8 days
- Spreads easily: fragments, turions
- Tubers survive 4-7 years in sediments; hard to reach
- Outcompetes egeria, milfoil, all other water weeds


Fragments make new plants





Clear Lake: hydrilla fragments picked
from water, in one day, by one
survey boat





Does Hydrilla Actually Grow an Inch a Day (M. Netherland)?

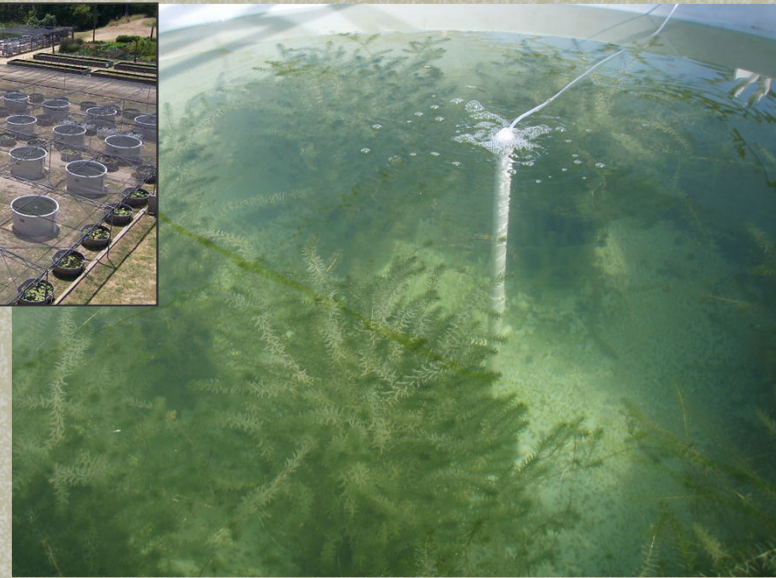
- Data often presented in terms of biomass
 - E.g. 19,600 Kg fresh wt. / acre
- Netherland designed a study to measure elongation
 - How many inches can hydrilla grow per day ?
 - Study conducted at US Army ERDC LAERF
 - Study initiated in July 2009



Plants were harvested at weekly intervals & measured for total length



1.2 M



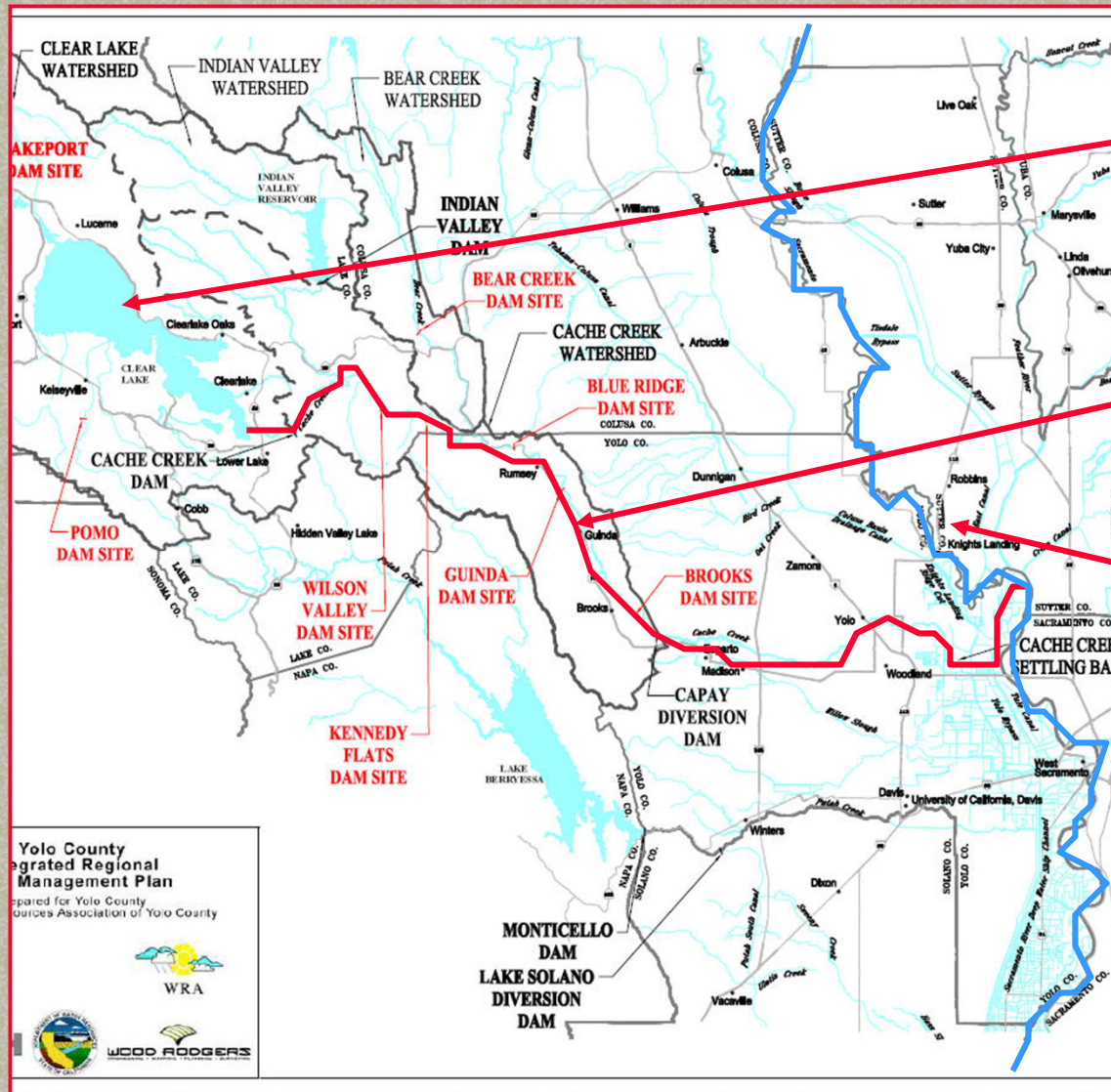
Study 2 – Planted Established hydrilla (~ 1 ft tall) in 10 ft tanks
How long until plants reach the surface ?





Pathways of Movement

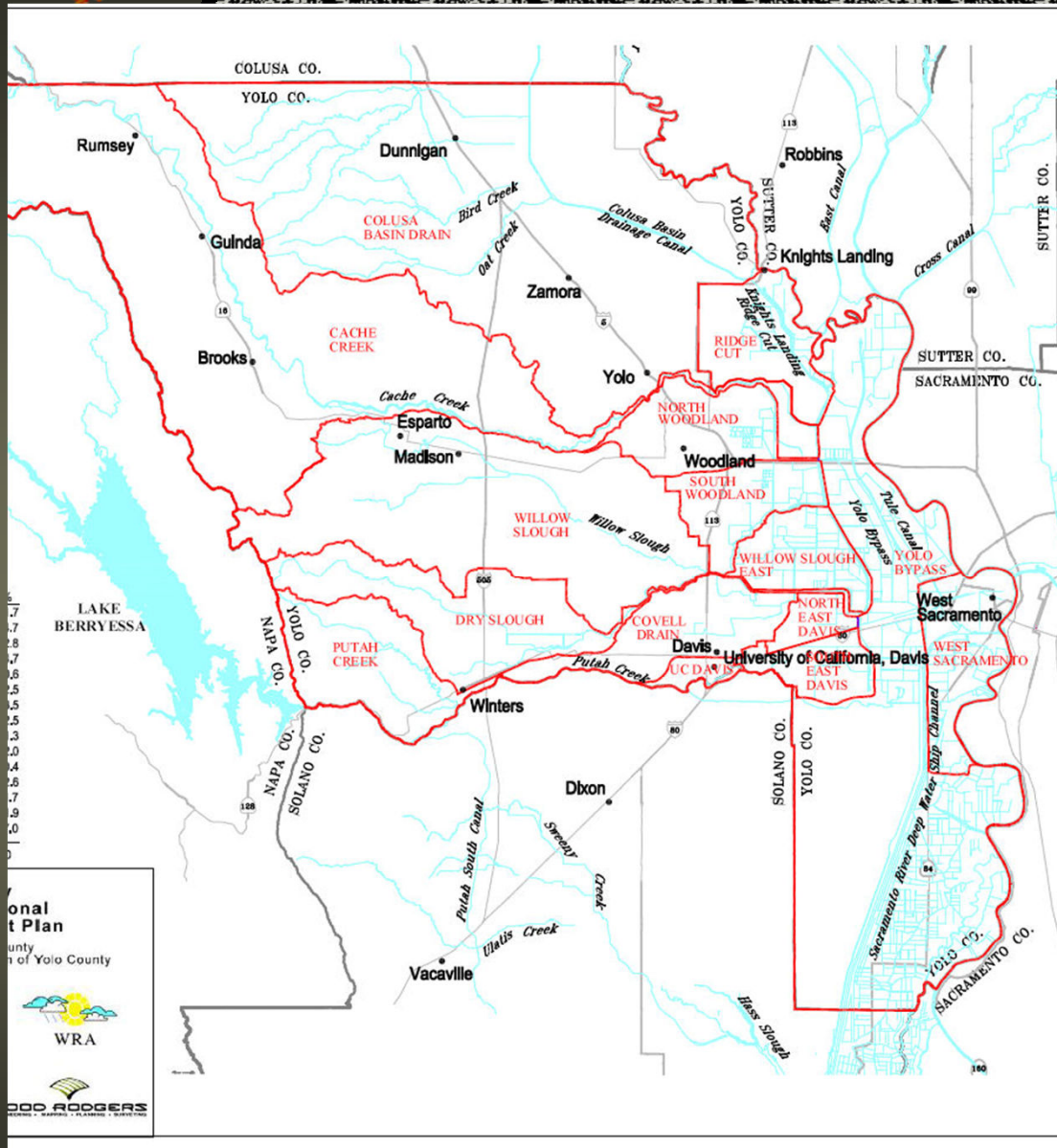
Cache Creek Overview



Clear Lake

Cache Creek

Sacramento River



Cache
Creek: feeds
Yolo Bypass
and Willow
Slough



Hydrilla in an Irrigation Canal





Pathways #2: Boats

- **Boat and trailers easily pick up fragments**
- **Fragments viable unless completely dried – weeks in protected locations**



Hydrilla on boat
Hydrilla verticillata
Photo by Jeff Schardt
Copyright 2001 Florida D.E.P.





Boat Travel between Clear Lake and Delta

- **Clear Lake: 2008 new boat inspection sticker program, with questionnaire. About 19,000 collected.**
- **6349 evaluated (~ 33%)**



Boat Travel

- Of 2861 from Clear Lake zip codes, only 30 (1%) say also take boat to Delta
- Most of rest from Bay Area and local counties
- Of 3488, 607 (17%), take boat to both Clear Lake and Delta



Boating events in Clear Lake

- Ca 70 non-fishing events/yr
- 82 bass tournaments/yr
- 157 bass tournaments/yr in Delta
- 16 instances where group has tournament in Clear Lake and then tournament in Delta within 7 days



Other major pathways

- Infested water lily bulbs
- Shipments of warm-water fish for stocking
- Aquariums (in past; rare in trade now)



What happens if we let
hydrilla go?



Impacts in Florida

- Florida let hydrilla go (1960's)
- By 1990s infested 346 public water bodies, over 140,000 acres
- Now “manages” hydrilla, at \$20-35 million per year



Hydrilla in Florida



Hydrilla
Hydrilla verticillata
on Lake Rousseau
Photo by J. Schardt
2003 Florida D.E.P.



Hydrilla in Florida



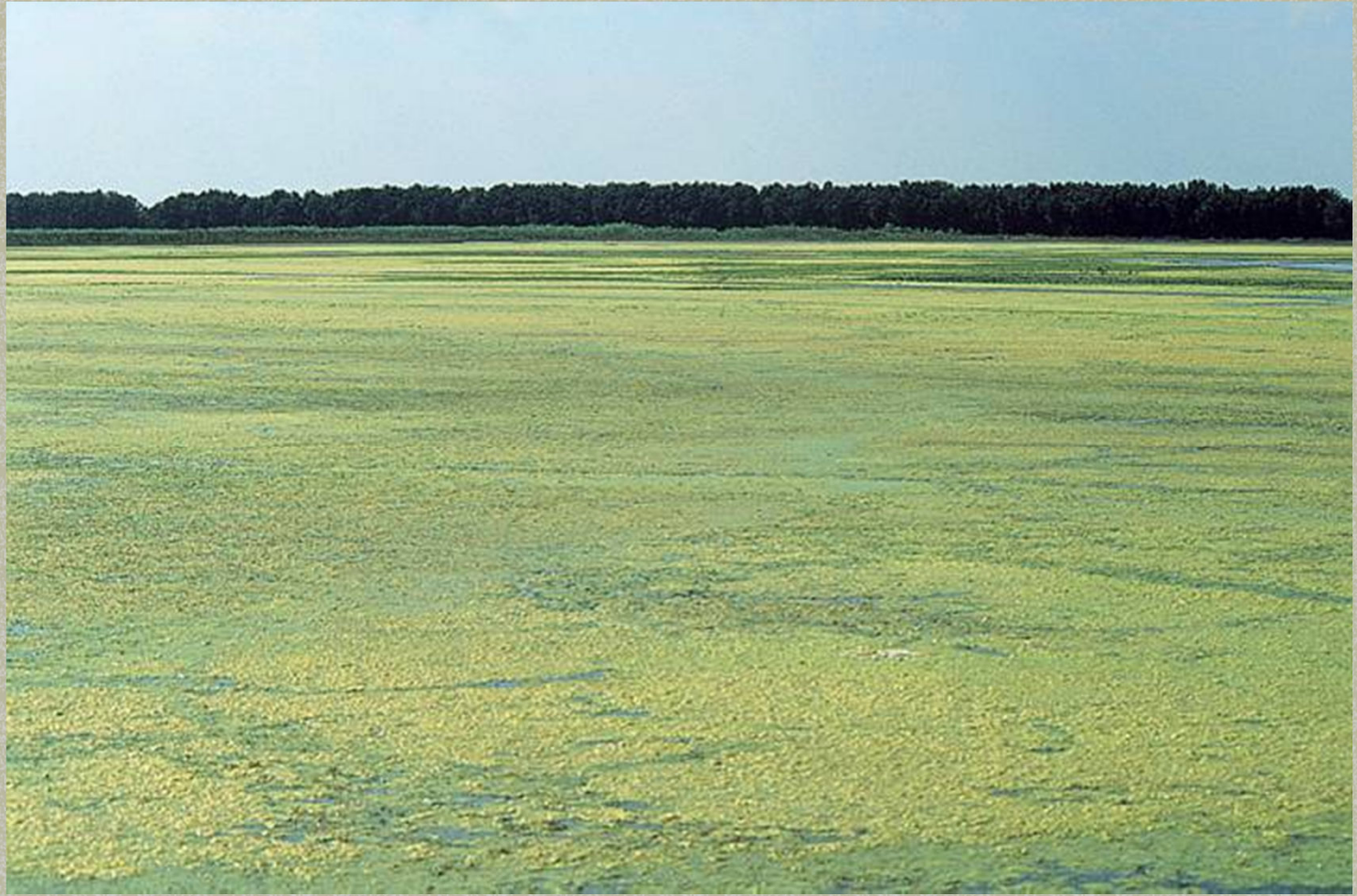


Hydrilla in Florida



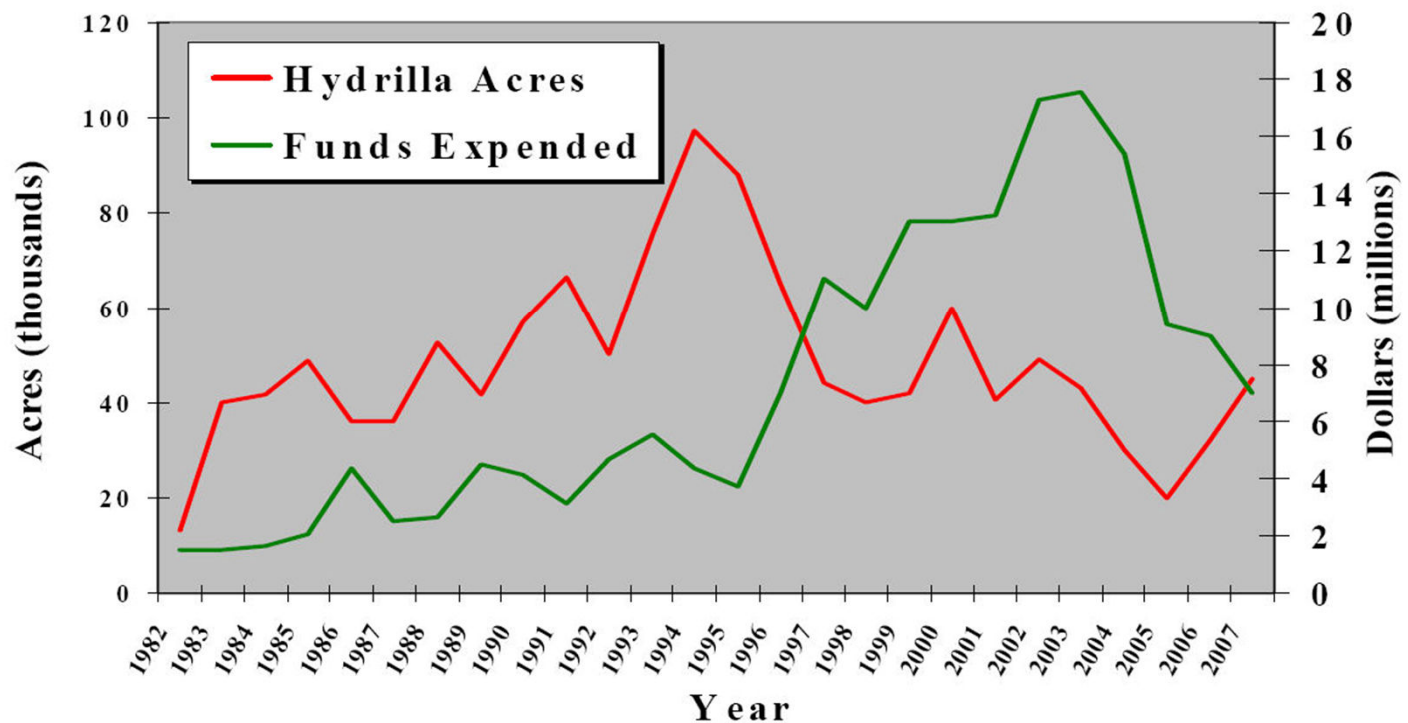


Hydrilla in Florida




Direct costs of treatment (note: fluridone resistance arises about 2003, so treatments drop)

Figure 1: Invasive Plant Growth vs. Funding





Potential Impacts in California



Why CDFA
especially
doesn't want
hydrilla:
thousands of
miles of
irrigation canals
up to 85% loss
of flow



Imperial County



Water storage loss! reservoir in Imperial





Imperial Co. before carp, ca 1980

only copper herbicides, mechanical removal





In 10 yrs, infestation increased
from 300 to 600 mi of canals





Hydrilla in Clear Lake when first discovered 1994 (Big Valley)





Importance to Clear Lake

- Would ruin boating, fishing
- Would ruin tourism: A loss of \$20 million per year to local economy



Hydrilla does well
throughout California



Imperial County canals





San Diego ornamental lake





Tulare Co.: 20-ft deep fish pond





Tulare Co.





Chowchilla River, Mariposa Co





Yuba Co. Sierra foothills





Redding by Sacramento R.





Redding golf course





From the Mexican
border to Shasta Lake,
hydrilla does just fine in
California



Current Status: Very Promising

- 2010: 12 active infestation sites
- One eradicated 2010
- Only 3 sites produced any plants in last 3-6 years:
 - Clear Lake, Yuba Co., Imperial Irr. Dist.



Clear Lake

- Coming back under control after plants returned in 2007. Treatments had ended in 2006; reinstated 2007.

Year	# Plants Found
2000	67
2001	41
2002	12
2003	1
2004-06	0
2007	72
2008	196
2009	76
2010	12



Yuba Co, Oregon House

- Most of source area in irrigation canal lined with concrete 2008-2011.
- Heaviest infested pond lined 2010
- Only ~20 plants in 2010



Imperial Irrigation District

- Over 600 miles of canals and drains infested by mid 80's
- Sterile triploid grass carp stocking starts ~1986.
- Since ~2005, all of system clean except for 2-3 miles of isolated drains leading to Salton Sea.



Summary

- Hydrilla will thrive in California and cause large problems for water transport
- Once hydrilla gets to the Delta it will be nearly impossible to stop
- We have a chance to stop it now