

TEXAS

PARKS &

WILDLIFE

Water Spinach

- **Morning Glory Family**
- **Native to India and Southeast Asia**



Important Food in the Asian Community



Commercial Culture

- **Dates from 300 AD in China**
- **Diet staple**
 - **High protein content**
 - **Used as animal feed**
- **Medicinal properties**
- **Widely cultivated in many countries**



Risk Assessment



2003 Houston Area Survey

- **Focused on Rosharon area and downtown Houston**
- **Hurricane damage destroyed many greenhouses in area**
- **No water spinach was found near impacted greenhouses**
- **No water spinach was found in ditches or bayous in the area**

Mean Daily Temperature Must Exceed 77° F (Edie and Ho 1969, Patnaik 1976)



Risk Assessment Findings

- **Water spinach has been cultivated and sold in Texas for approximately 30 years with no evidence that it has been able to establish itself in the wild.**
- **Texas climate is a poor match when compared to the climate in areas where water spinach is native.**
- **Temperature data indicate it would be difficult for water spinach to survive year round outside of greenhouses in Texas.**
- **Water spinach has not exhibited a propensity for rapid spread in either Florida or California.**
- **Water spinach is controllable with herbicide.**

Current Status in Texas

- Evaluated 10 years of vegetation surveys
- Informal visits to markets and restaurants
- Directed vegetation surveys in Dallas-Ft. Worth, Austin, San Antonio and Houston
- Follow-up surveys with other states

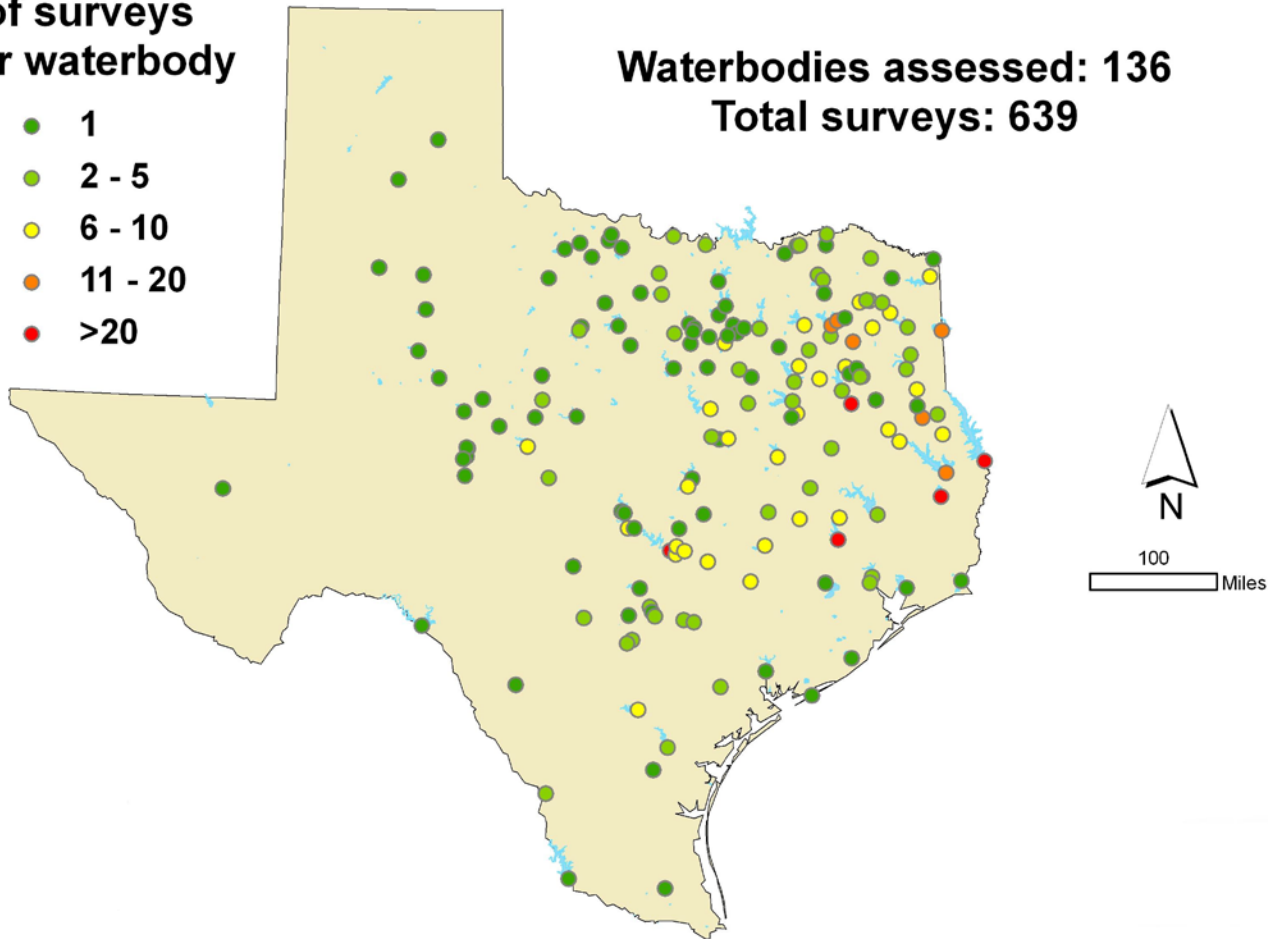
Routine Surveys

Inland Fisheries Vegetation Surveys 1999-2009

of surveys
per waterbody

- 1
- 2 - 5
- 6 - 10
- 11 - 20
- >20

Waterbodies assessed: 136
Total surveys: 639



Market/Restaurant Surveys

Summary of water spinach purchases and wholesale prices in markets and restaurants.*

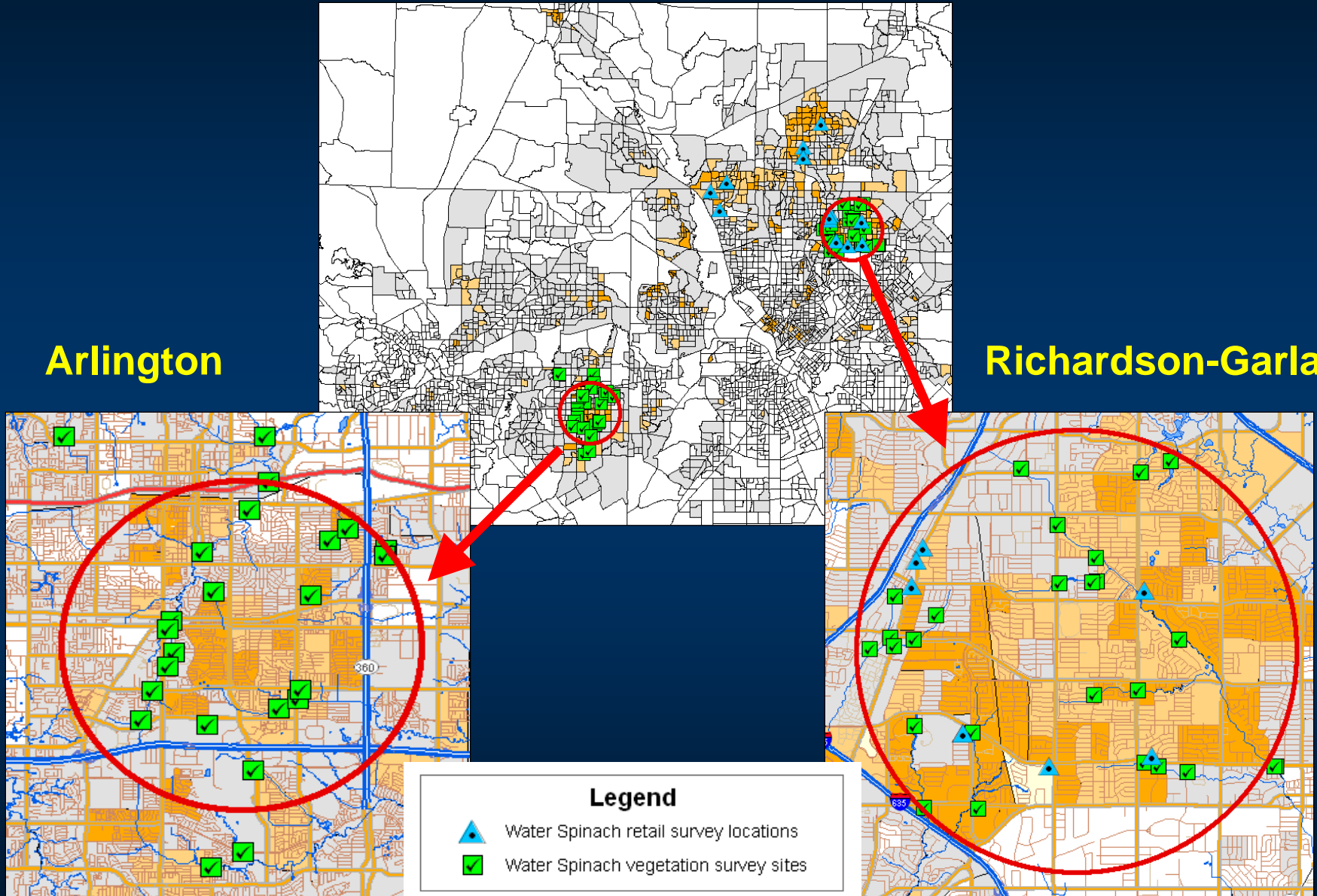
City	Monthly amount purchased (lbs)	Wholesale cost/lb
Austin	0 – 1,500	\$0.80 - \$1.80
Dallas-Ft Worth	100 – 18,000	\$0.80 - \$1.80
Houston	5 – 4,000	\$0.60 - \$2.00
San Antonio	1 – 1,000	\$0.50 - \$1.00

* Surveys indicate the retail price was about twice the wholesale cost.

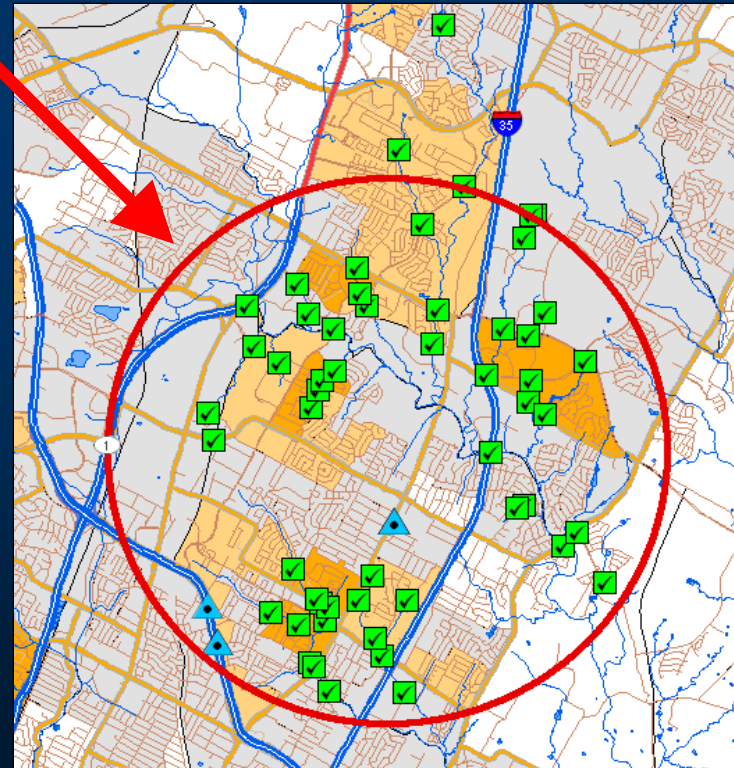
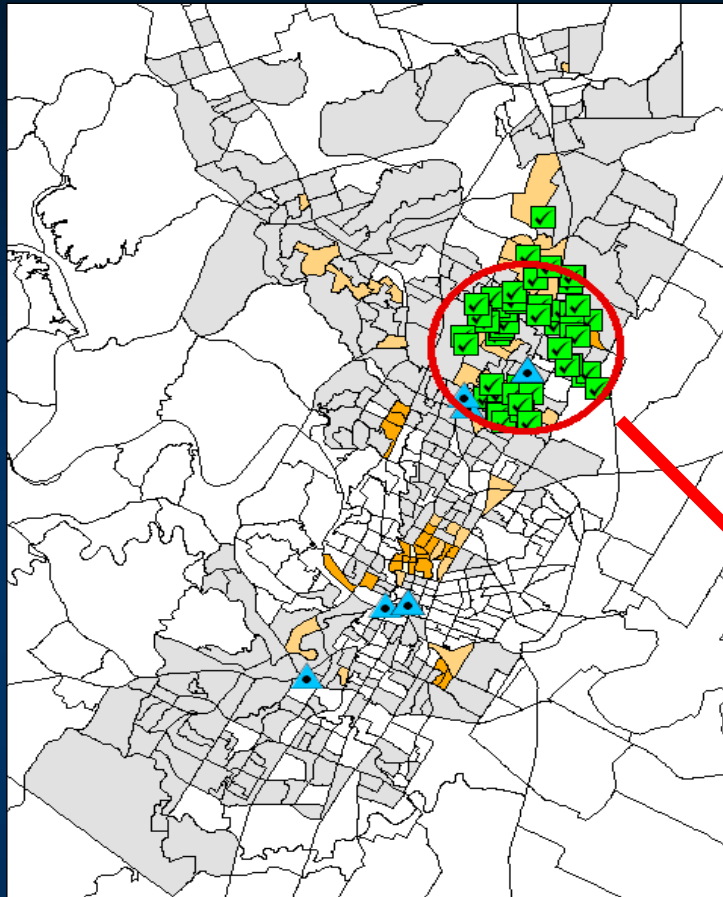
Dallas –Ft Worth

Arlington



Richardson-Garland



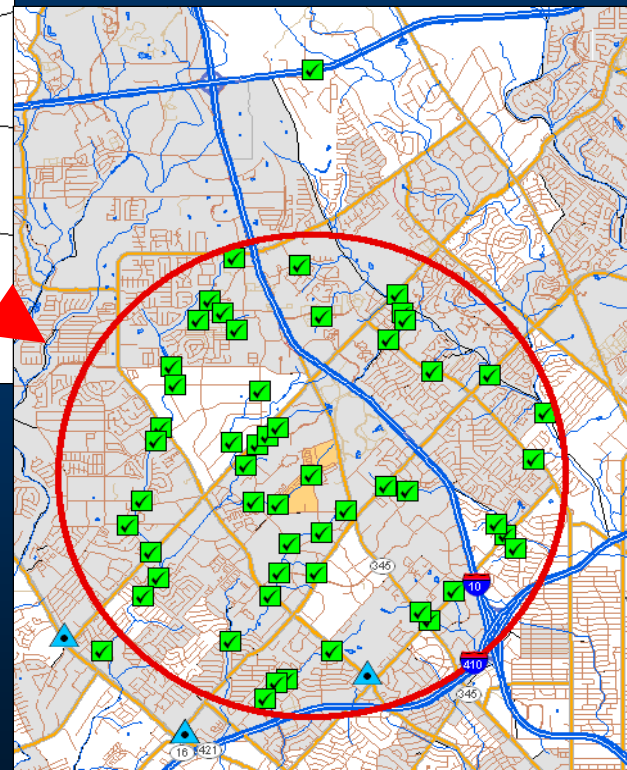
Austin





Legend

-  Water Spinach retail survey locations
-  Water Spinach vegetation survey sites

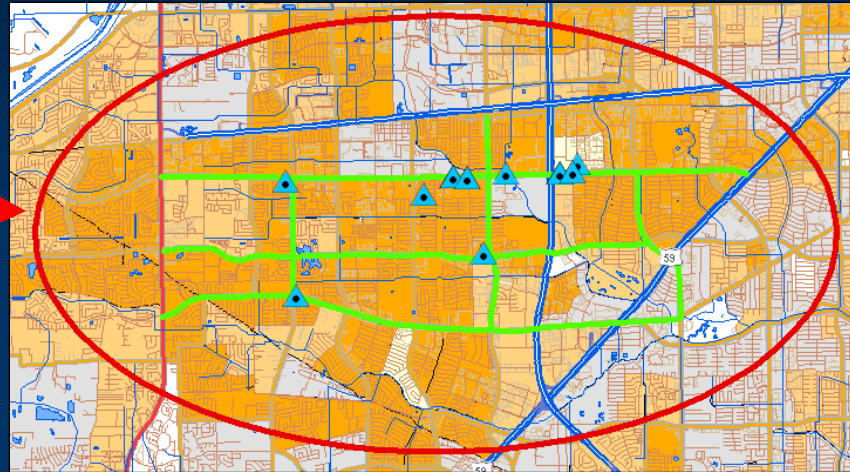
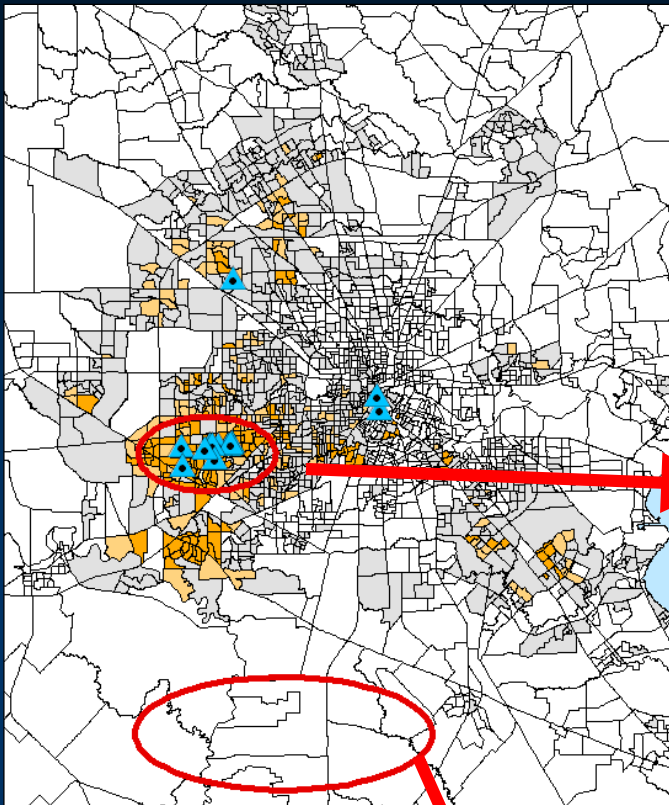
San Antonio



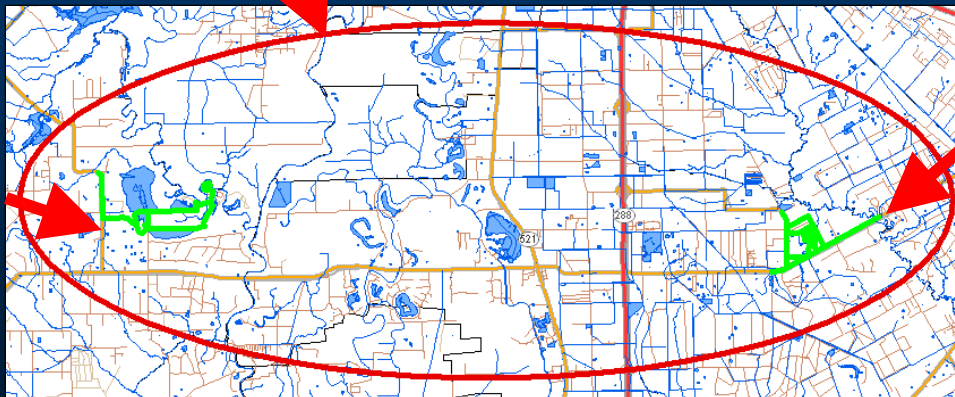
Legend

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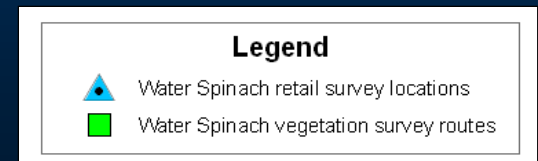
Houston



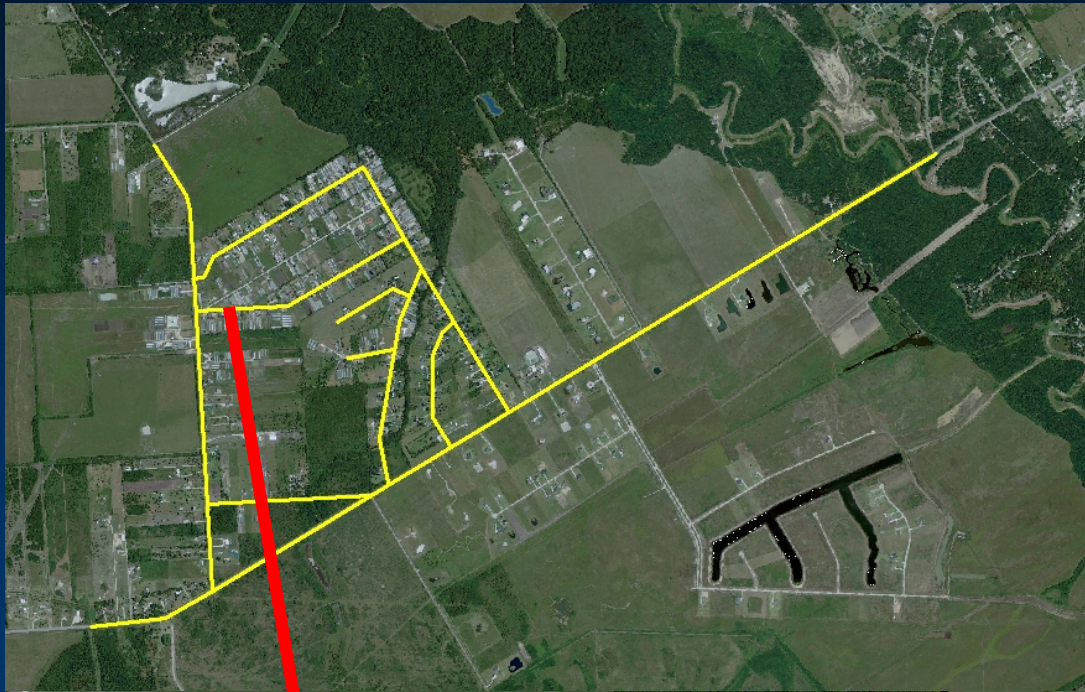
Brazos
Bend SP



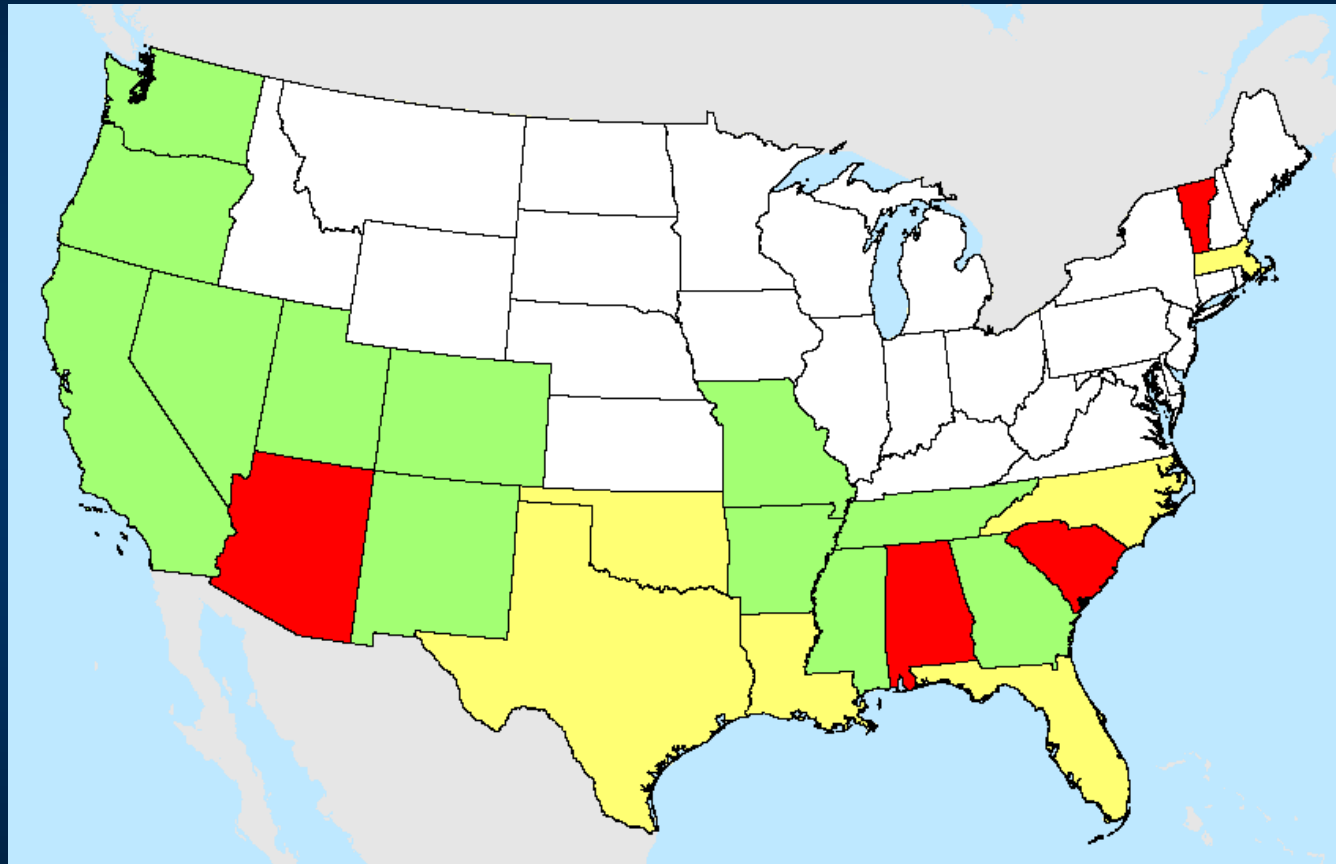
Rosharon



Rosharon Commercial Production



Water Spinach Regulations



Legend



Prohibited



Not Regulated



State Regulated



Not Applicable

Proposed Regulations

- **Water spinach will remain a restricted species in Texas. Due to its relatively low risk, cultivation by permitted growers and unrestricted possession for personal consumption will be allowed.**
- **Commercial cultivation will take place only in TPWD-permitted facilities.**
- **Wholesale and retail outlets will be allowed to possess water spinach and sell it for personal consumption if they retain invoices from permitted growers within Texas and from persons selling water spinach legally from outside Texas.**

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Commercial Culture

- California – agricultural crop
- Florida – permitted species
- Texas – under cultivation >20 years