Vegetation Mapping & Change Detection

Suisun Marsh, California

1999 - 2003

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Vegetation of Suisun Marsh as of June 1999

Each Polygon has Multiple Attributes

- Vegetation association/ mapping unit
- WHR habitat type
- Holland vegetation type
- Height class
- Density class
- Disturbance category
- Disturbance intensity

Change Detection Process

- Adjust 1999 line work to match 2003 aerial photography (rubbersheeting)
- Print 1999 line work on mylar sheets, including polygon number & vegetation type
- Overlay mylar on 2003 aerial diapositives using a light table and magnification
- Identify and record change as defined in protocol
- Input change data into project GIS & database

Change Detection Rules

- Size
- Vegetation
- Management

Polygon Acreage	Significant Change
0.5-1 acre	20% or more
1-5 acres	10% or more
> 5 acres	5% or more

Change Detection Rules

- Size
- Vegetation
- Management

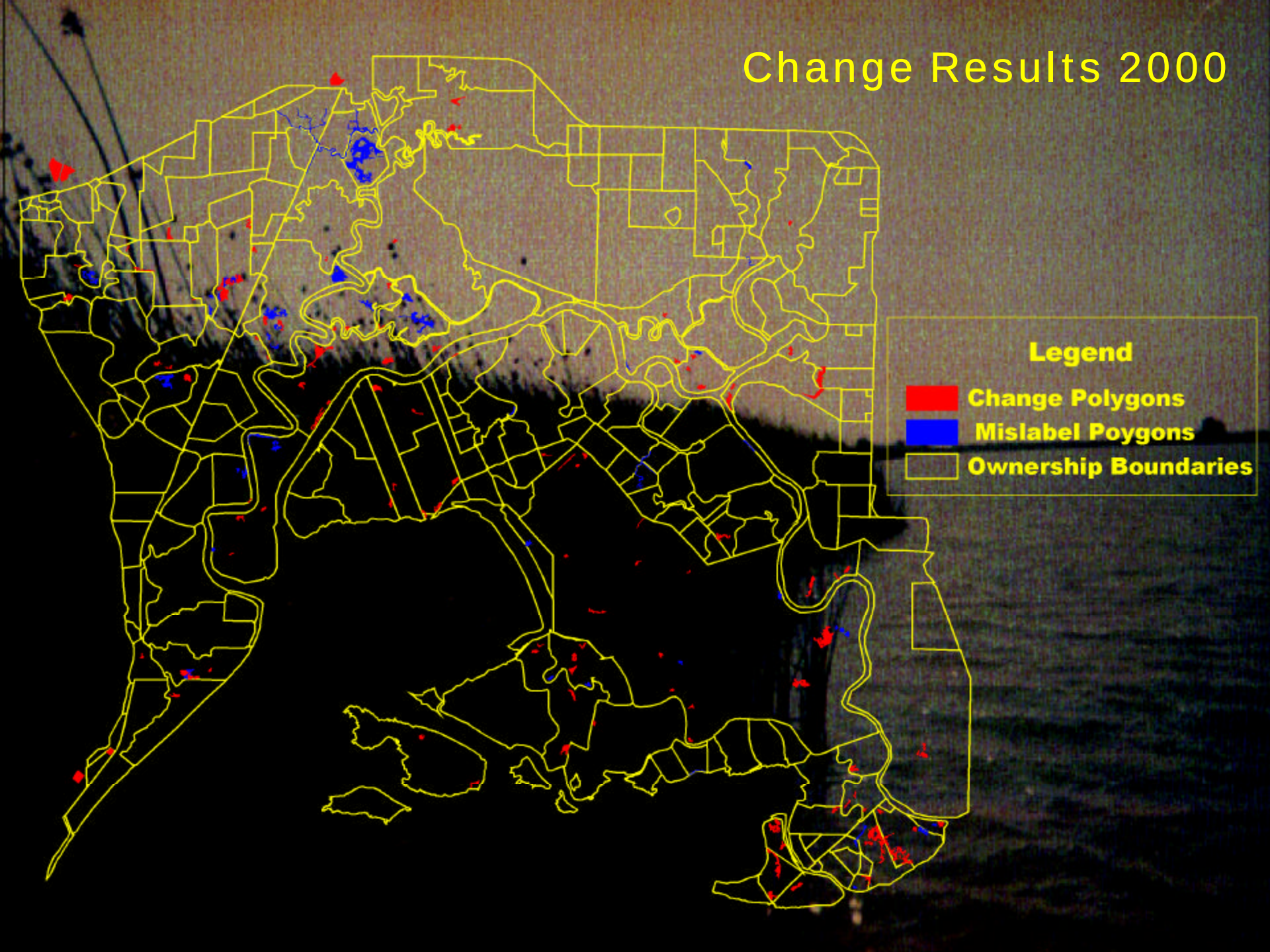
Type Conversion	Assessed
Perennial to perennial	Yes
Annual to perennial	Yes
Annual or perennial to non-vegetated area	Yes
Annual to annual	No

Change Detection Rules

- Size
- Vegetation
- Management

Management Style Change	Assessed
From active to passive	Yes
From one type of active to another	No

Change Results 2000



Summary of Major Changes 1999-2000

- Change detected on 515 acres (0.74% of study area)
- Intertidal wetlands accounted for 12 of these acres
- 65 acres of *Salicornia virginica* lost; 70% converted to *Scirpus maritimus*
- *Lepidium latifolium* (perennial pepperweed) increased by 18 acres exclusively in managed wetlands
- *Phragmites australis* (common reed) increased by 20 acres
- Human activity greatest cause for change (construction)

2003 Field Data Collection

- Driven by classification improvement
- 100 samples collected

Table 2: An example of the cluster analysis showing the arrangement and relationship of plots in the clustering diagram and their preliminary and final names. Each differently colored group indicates clusters of plots that have been grouped together as associations or alliances.

sui plot name	final class		Diagram (splits closest to the left are ecologically more closely related than splits to the right)
Sui041	J. balticus/Lepidium	134	-----| | |
Sui060	Lepidium/Distichlis	323	|--| |----------| | |-|
Sui137	Lepidium/Distichlis	323	| |-| | | |
Sui099	Lepidium/Distichlis	323	---| |------| | |
Sui146	J. balticus/Conium	133	|| | | |
Sui177	J. balticus/Conium	133	||----------| | |
Sui194	Juncus balticus	132	-| | |-|
Sui028	Distichlis/Lotus	147	|----------| | |
Sui081	Distichlis/Lotus	147	| | |
Sui126	Lotus corniculatus	344	| | |
Sui127	Lotus corniculatus	344	| | |
Sui013	Centaurea (generic)	413	|----| | |
Sui030	Centaurea (generic)	413	| |----------| |--|
Sui198	Centaurea (generic)	413	| | | |
Sui155	Centaurea (generic)	413	-----| | |
Sui025	Lolium (generic)	218	|--| | |
Sui122	Lolium (generic)	218	| || | |
Sui093	Lolium (generic)	218	---||--| | |
Sui147	Lolium (generic)	218	----| |----------| |-|
Sui120	Lolium/Lepidium	220	--|----| | |
Sui125	Lolium (generic)	218	|-| | |
Sui148	Lolium (generic)	218	| | |
Sui017	Leymus (generic)	215	| | |---|
Sui062	Leymus (generic)	215	| | |
Sui128	Leymus (generic)	215	|----------| | |
Sui065	Leymus (generic)	215	| | |
Sui131	Cotula coronopifolia	342	|----------| | |
Sui132	Cotula coronopifolia	342	| |----------| |----|
Sui173	Cotula coronopifolia	342	| | | |
Sui150	Xanthium/Polypogon	332	----------| | |
Sui050	Sesuvium verrucosum	357	| | |
Sui130	Sesuvium verrucosum	357	|-----| | |
Sui172	Sesuvium verrucosum	357	| | | |
Sui179	Sesuvium verrucosum	357	| |----------| |
Sui105	Sesuvium/Distichlis	358	|| | |
Sui129	Sesuvium verrucosum	357	||----| |
Sui166	Sesuvium/Cotula	362	|| |
Sui187	Sesuvium/Lolium	359	-| |

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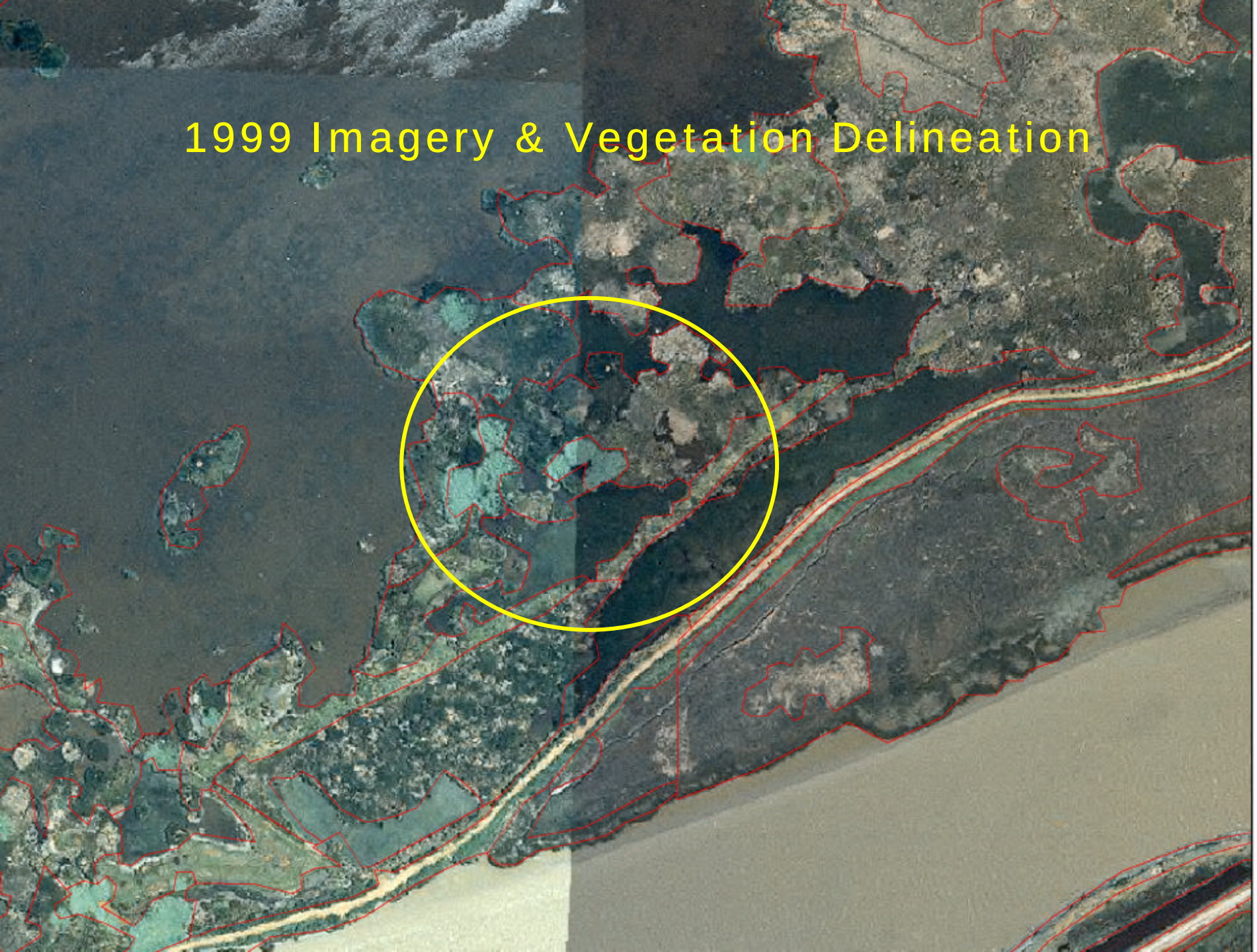
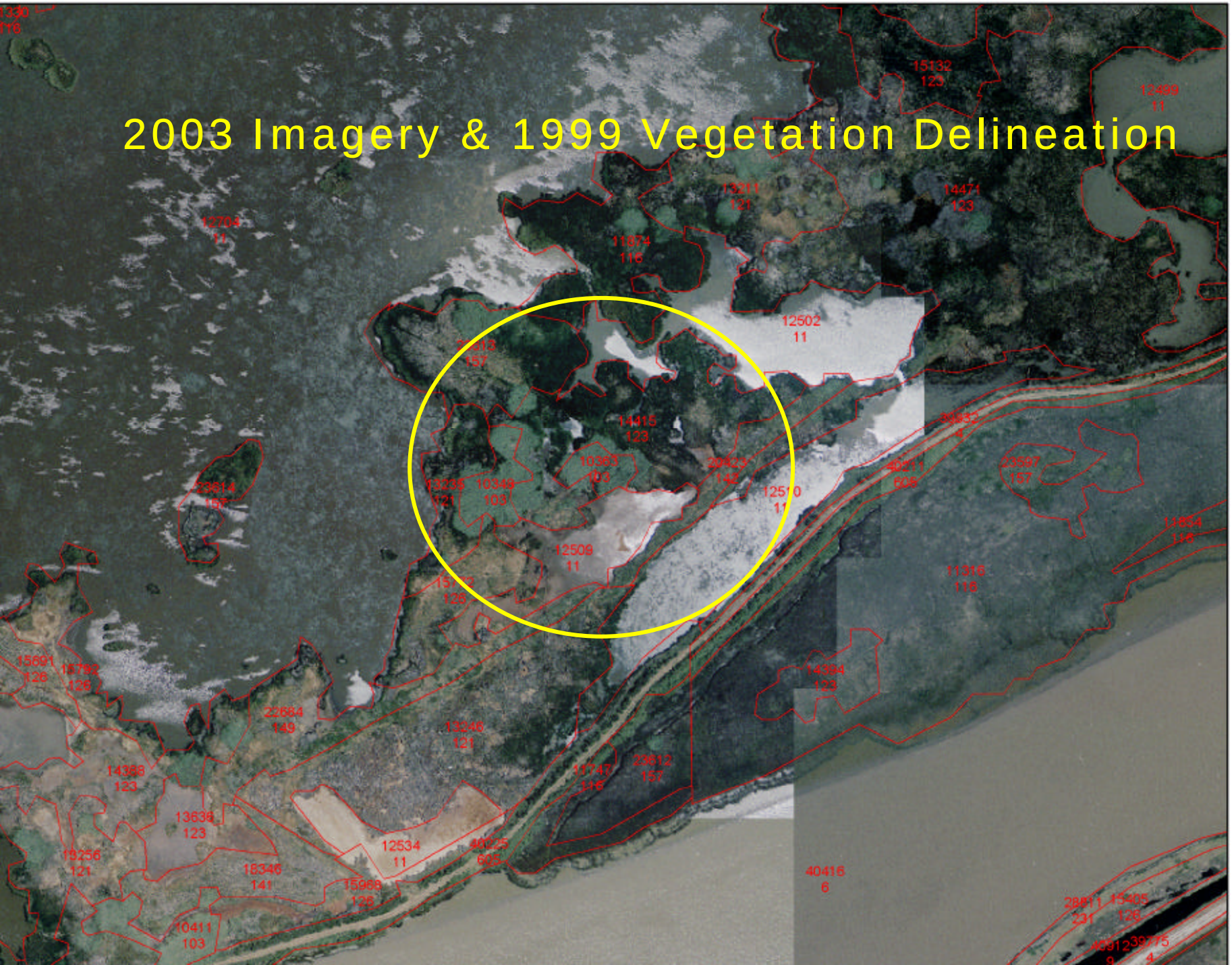
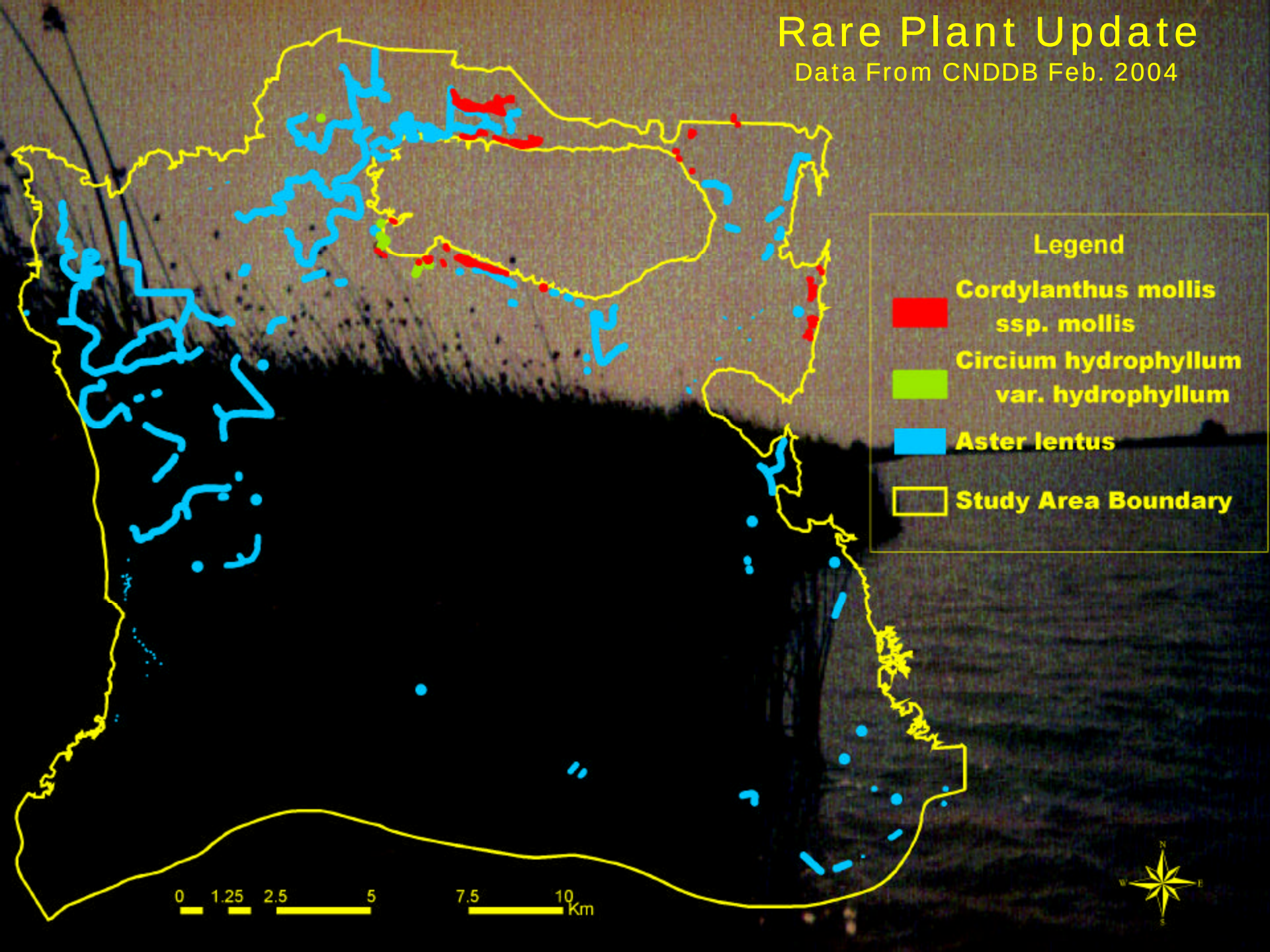

1999 Imagery & Vegetation Delineation

2003 Imagery & 1999 Vegetation Delineation

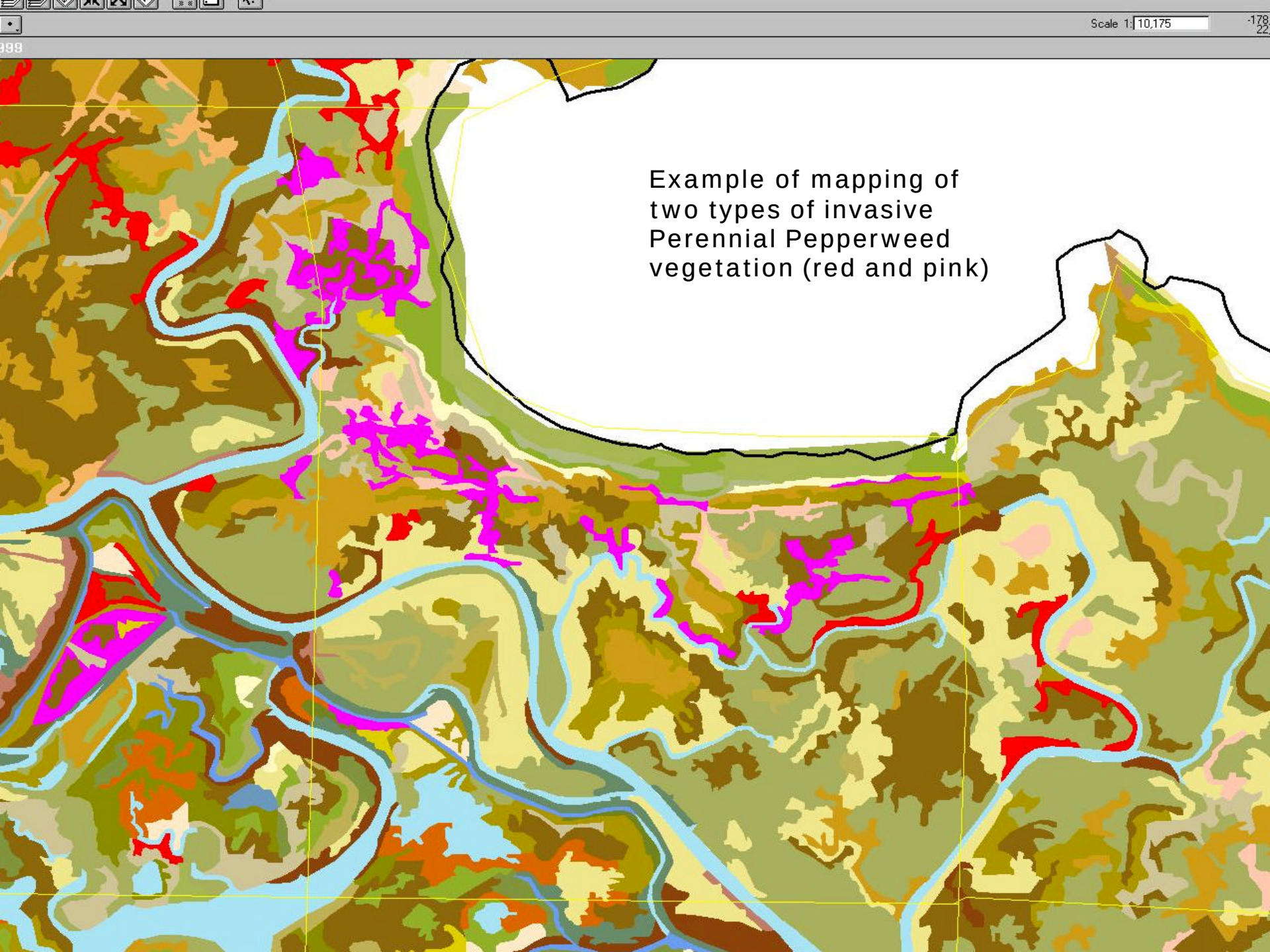


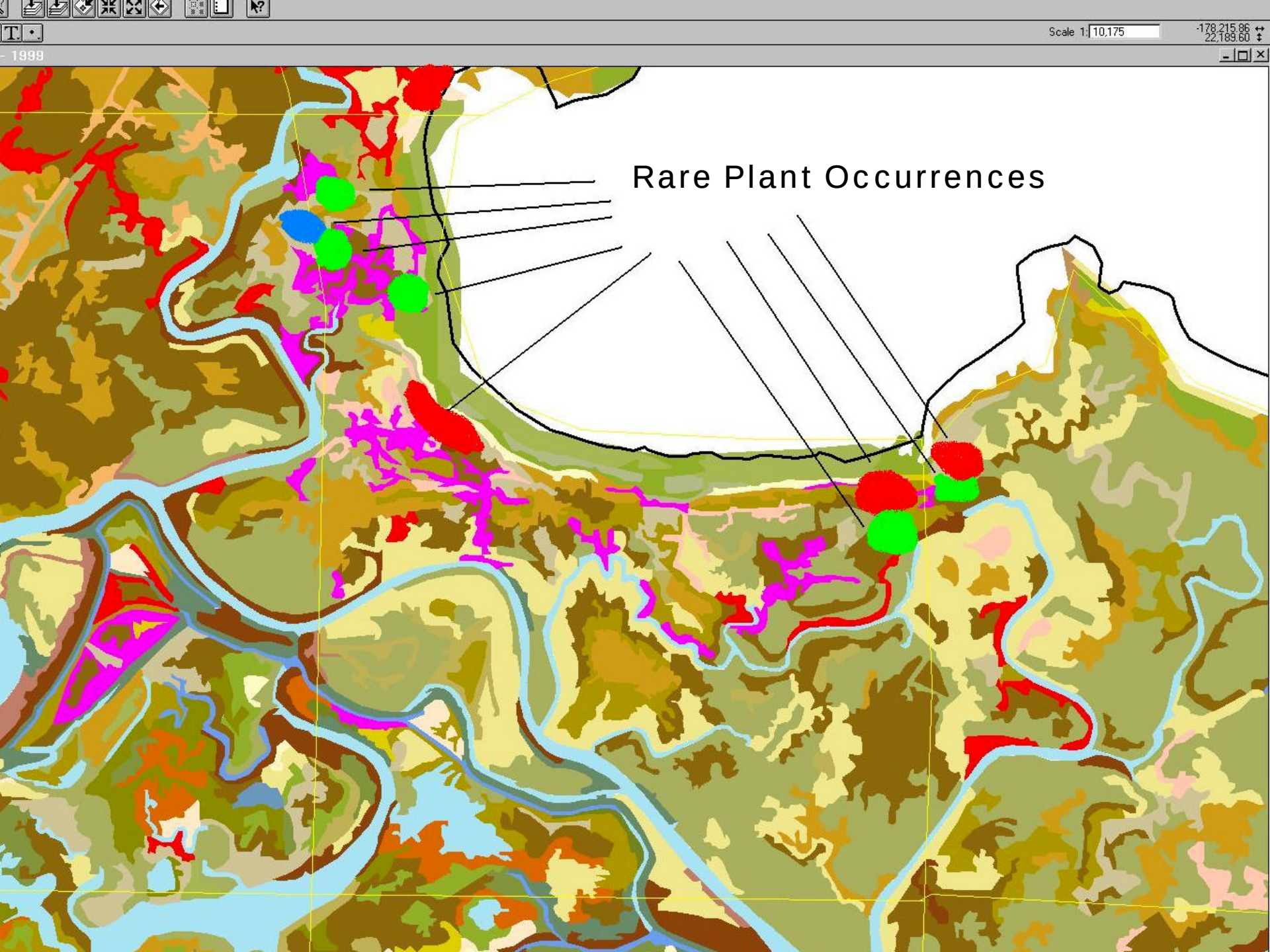
Rare Plant Update

Data From CNDDB Feb. 2004

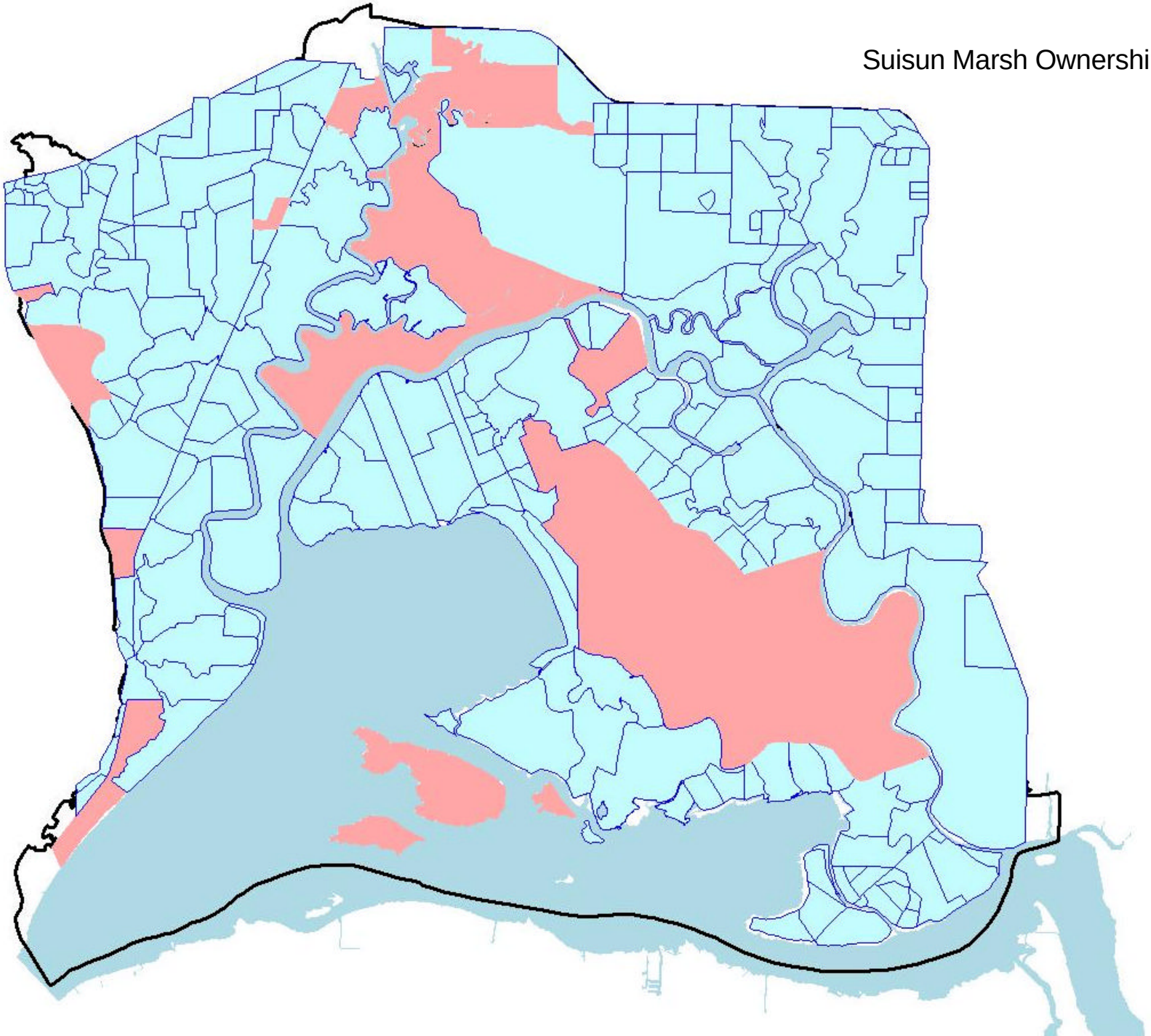


Example of Fine Scale
Vegetation Patterns in
Natural Tidal Marsh, Rush
Ranch


Scale 1: 10,175
Example of mapping of two types of invasive Perennial Pepperweed vegetation (red and pink)


Scale 1: 10,175
-178,215.86
22,189.60
- 1999
Rare Plant Occurrences

Suisun Marsh Ownership



Vegetation Change in a Management Area: Benecia Salt Marsh Harvest Mouse Unit

Vegetation Type		1999 Acres	2000 Acres	Change
346	Salicornia virginica	5.57	5.57	0.00
114	Scirpus americanus (generic)	5.13	5.13	0.00
103	Phragmites australis	3.85	3.85	0.00
413	Centaurea solstitialis (generic)	3.69	3.69	0.00
141	Distichlis spicata	3.18	3.18	0.00
123	Typha species (generic)	2.79	2.79	0.00
006	Slough	2.4	2.4	0.00
347	Salicornia virginica - Annual Grasses	1.64	1.64	0.00
154	Distichlis spicata - Scirpus maritimus	0.85	0.85	0.00
337	Atriplex triangularis - Annual Grasses	0.74	0.74	0.00
702	Salix laevigata - Salix lasiolepis	0.3	0.3	0.00

Future Map Updates

- Move toward event-driven update schedule
- 2000 change detection analysis indicated relative stability – recommended 3-year cycle
- Results and lessons from current effort may lead to further refinements and recommendations

Mapping Process Supports Adaptive Management

- Results from the change detection should motivate management decisions
- “What if” scenarios (invasive species)
- Decision support on balance of management regimes
- Develop models for rare species habitat