



**BioInventory of  
Exeter River Floodplain Wetlands  
in the Towns of  
Danville, Fremont & Sandown**

January 2011

# Project Components



- Preliminary Floodplain Wetland Mapping
- Field Research & Documentation
- Habitat Assessment
- Digital Map Preparation
- Report
- Presentation to Towns

# Exeter River



## Exeter River

Watershed Area – 67,700 acres (fresh water portion)

River Length – 33 miles

Drainage Basin – 126 square miles

Forested Land – 67%

Developed Land – 16%

Farmland – 6%

Water and Barren Land – 6%

Wetlands – 3%

# Study Area



## **Study Area**

Overall reach of Exeter River approximately 15 miles

Sandown – 5 miles

Danville – 1 mile + tributaries

Fremont – south reach 2 miles

- north reach 7 miles

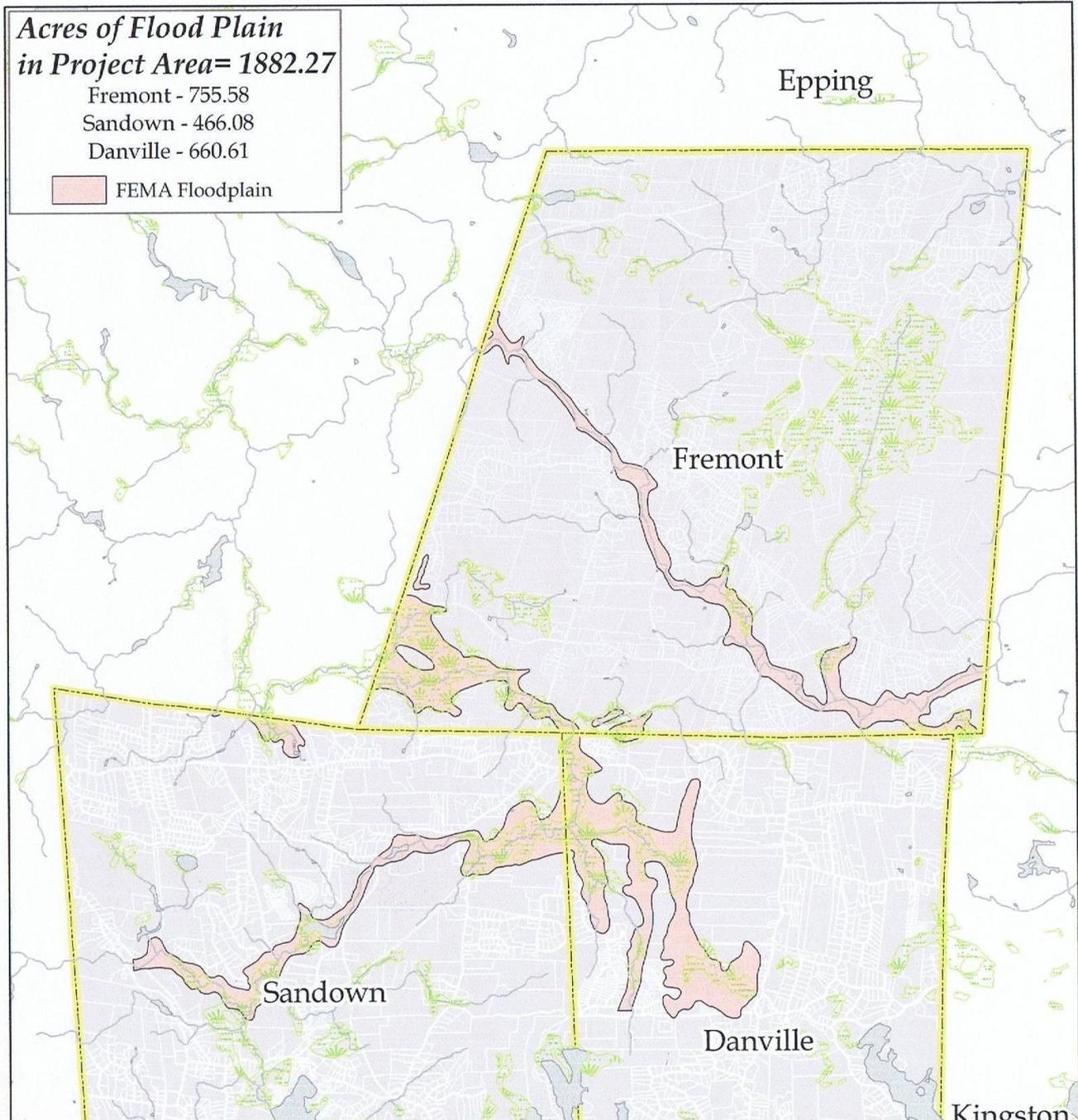
**Acres of Flood Plain  
in Project Area= 1882.27**

Fremont - 755.58

Sandown - 466.08

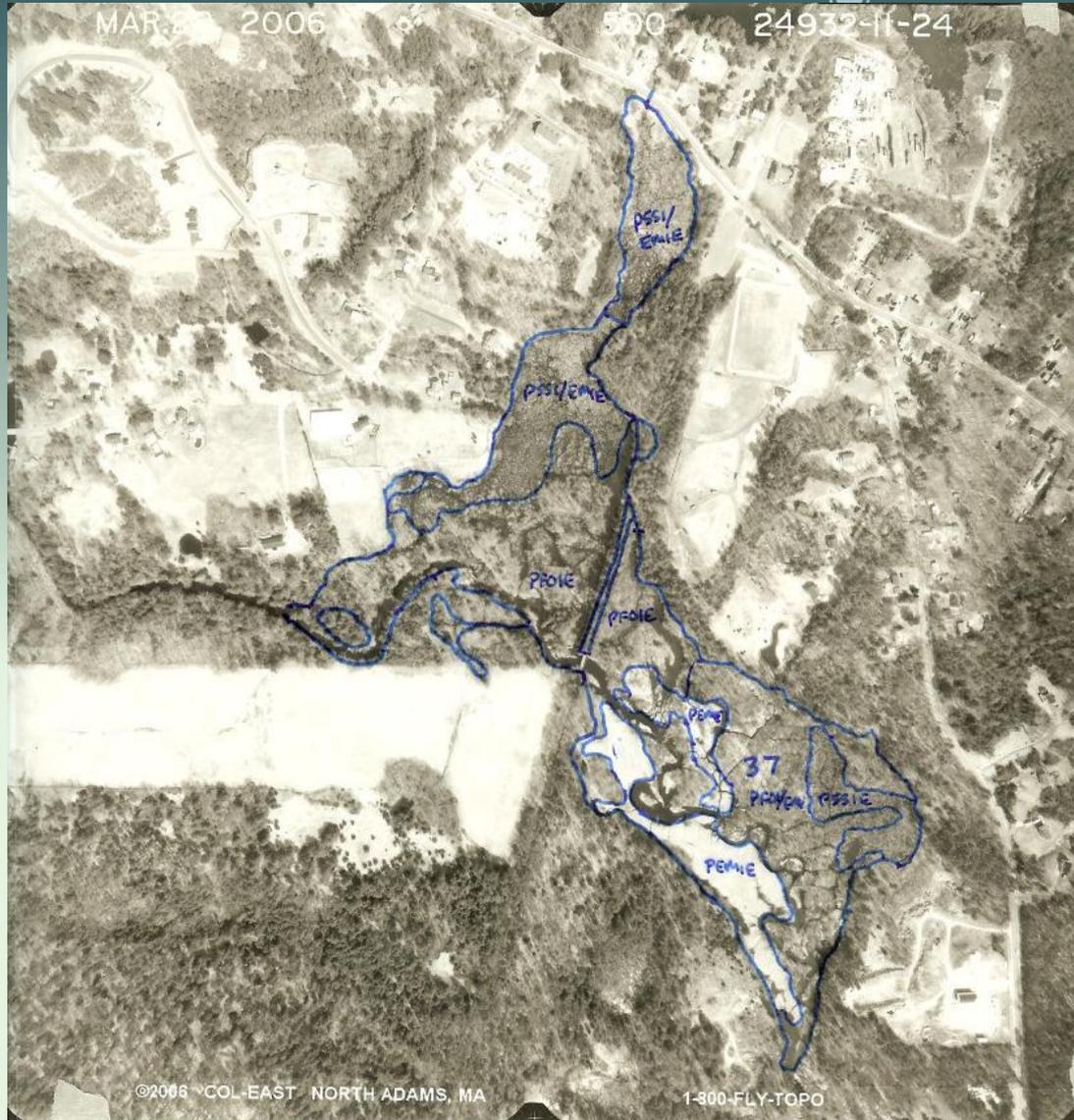
Danville - 660.61

 FEMA Floodplain

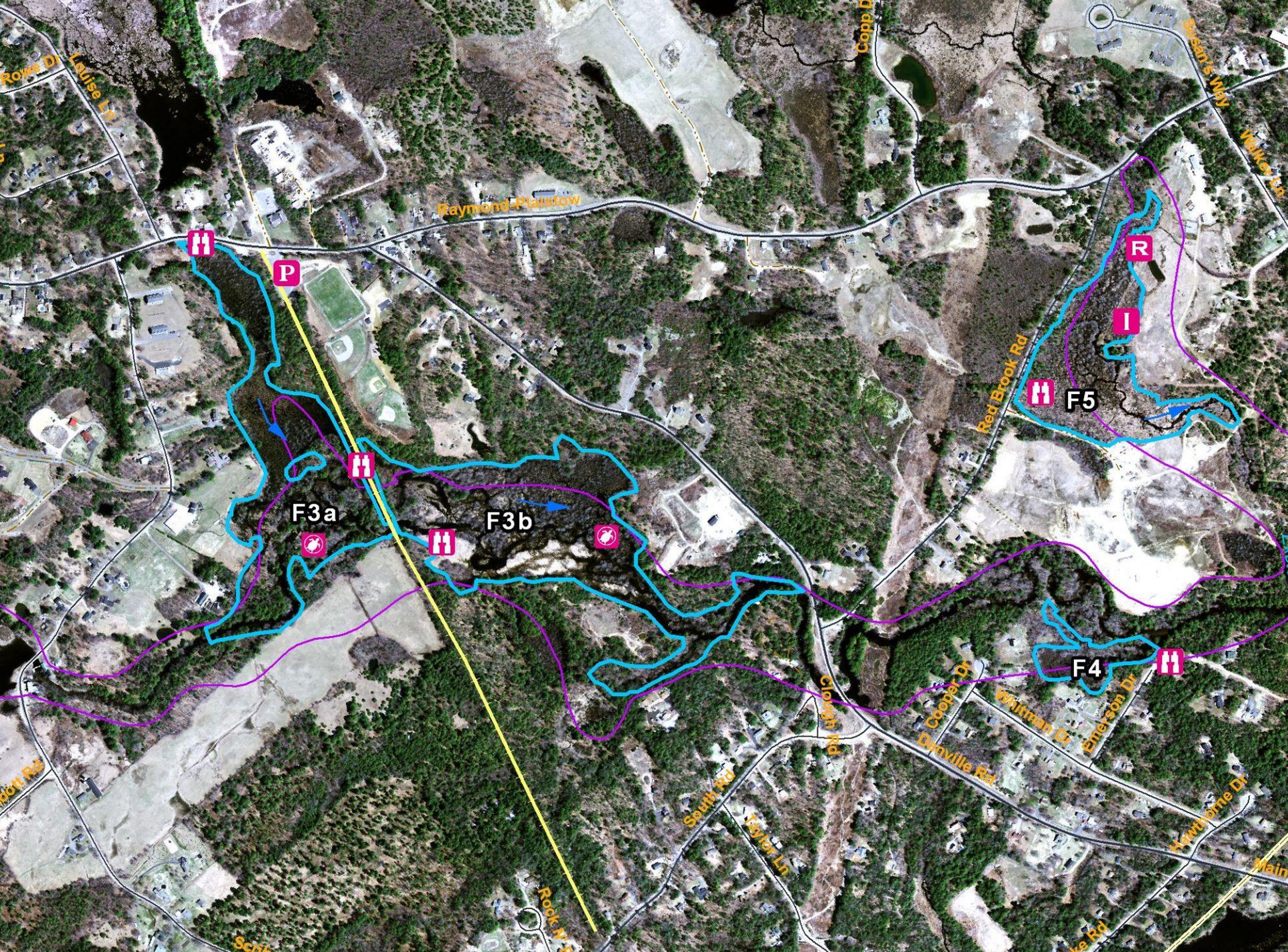




# B + W Stereo Aerial Photo Examples







Rowe Dr  
Laurie Ln

Copp Dr

Susan's Way  
Walker Ln

Raymond-Plainslow

H

P

R

I

H

F5

F3a

H

F3b

H

H

Red Brook Rd

F4

H

Bot Rd

Church Rd

Cooper Dr  
Cynville Rd

Whitman Dr  
Emerson Dr

Hawthorne Dr

Main

Sch

Rock N

South Rd

Tejler Ln

La Rd

# EXETER RIVER FLOODPLAIN WETLANDS

## Tiles 1 & 2



Floodplain Wetland



Data Collection Points



Parking



Potential Restoration Site



Invasive Species



Rare Plant Community



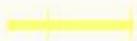
Potential Rare Wildlife Species Habitat



Direction of Flow



Floodplain Study Area



Rail Trail



Town Boundary

### Data Sources:

Wetlands delineated by West Environmental, Inc. based on 2008 1'-resolution aerial photography from the USGS and on field observation. Features of interest (rare plants, invasive species, etc.) mapped by West Environmental, Inc. based on field observation and inference. Please see the accompanying report for more information.

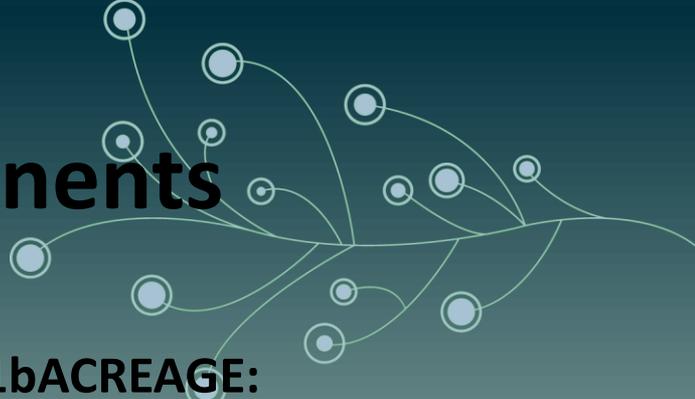
The following data sources were mapped at 1:24,000 and distributed by NH GRANIT: Roads, from NHDOT and Town Boundaries, from USGS. Floodplain Study Area based on the 100-year floodplain (Zone A) as mapped on the DFIRM (Digital Flood Insurance Rate Map) developed by FEMA and distributed by NH GRANIT. Background imagery is 2008 1'-resolution aerial photographs from USGS, provided by the Rockingham Planning Commission.

**WEST**   
**ENVIRONMENTAL** INC.

Map  
by:  
 Neatline Associates  
Deerfield, NH  
[www.nhgis.com](http://www.nhgis.com)

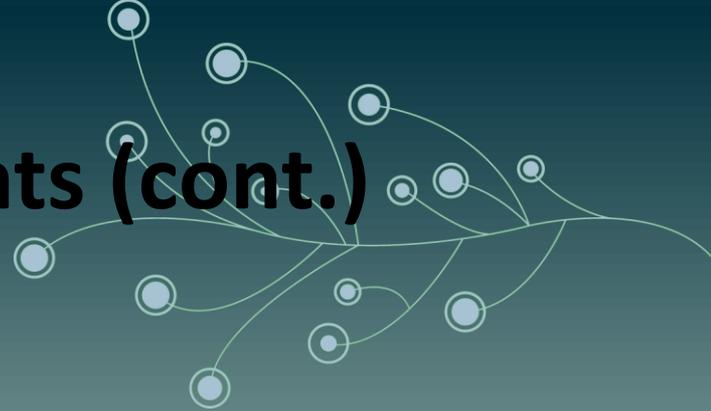


# Data Form Components



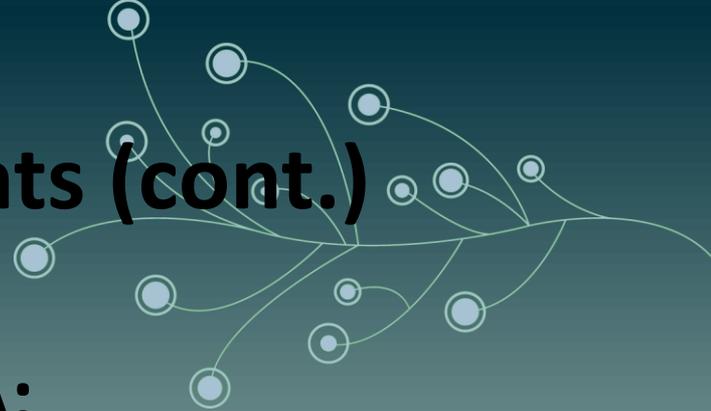
- **WETLAND ID: D1 CLASSIFICATION: PSS1/EM1bACREAGE:**
- **WETLAND TYPE:**
- WOODED SWAMP - Deciduous Evergreen Scrub-Shrub
- MARSH Freshwater Shallow Freshwater Deep
- WET MEADOW Ditched Grazed
- RIVER |Order:
- STREAM Perennial Intermittent
- POND Name:
- VERNAL POOL Documented Potential
- HUMAN MADE or OTHER
- BEAVER FLOWAGE Active AbandonedDam Present Yes No

# Data Form Components (cont.)



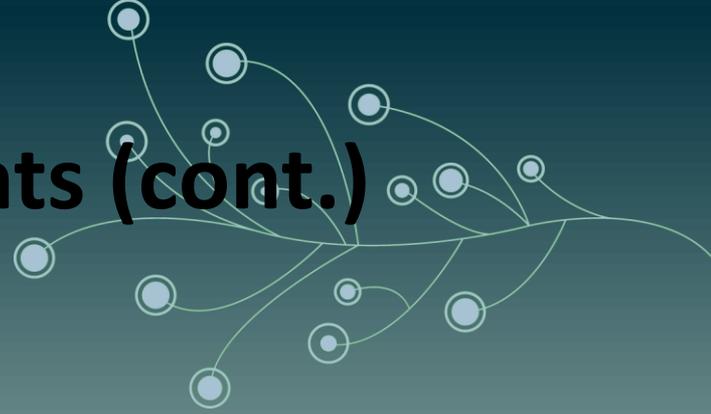
- **WETLAND PLANT COMMUNITY DATA**
- **TREE LAYER** Red maple | Dead trees
- **SHRUB LAYER** Buttonbush, Winterberry, Leatherleaf
- **HERBACEOUS LAYER** Water willow, Broadleaf Cattail, Tussock sedge, Beggars tick, Blue joint grass, Eastern burreed and Royal fern - deep marsh habitat
- Rare Plant Community?    Yes    No
- Describe:

# Data Form Components (cont.)



- **WETLAND HYDROLOGY DATA:**
- Open water in Exeter Rver channel to 4-6' deep
- Remaining wetland 2-3' deep
- Large deep water area
- New culvert at Sandown Road
- Beaver influenced

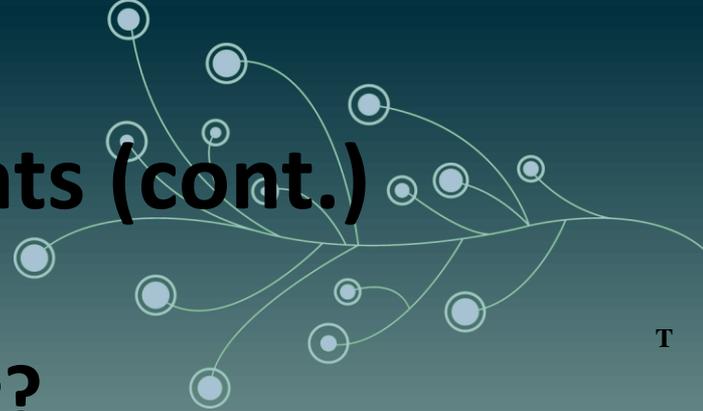
# Data Form Components (cont.)



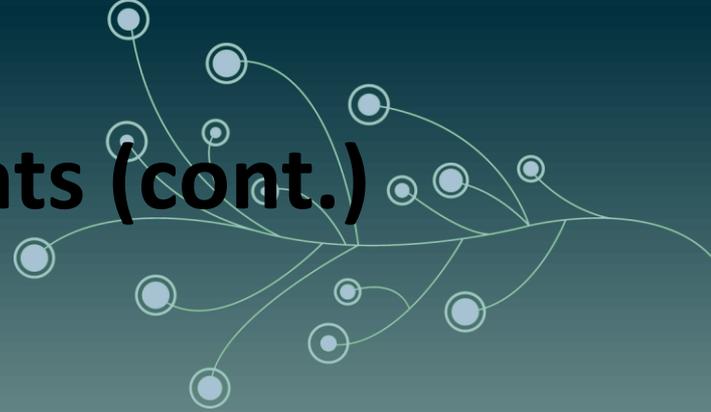
- **Diversity**
- Aquatic Insect Habitat?
- Amphibian Habitat?
- Fisheries Habitat?
- Cavity Trees?
- Food Sources?
- Cover?
- Prox. to Beaver/Mink/Otter?

# Data Form Components (cont.)

- **WAP Highest Ranked Habitat?**
- **State                      Region**
- **Existing Critical Habitat**
- **Critical Habitat Features**
- **Type: Blanding's & spotted turtle**
- **Specific Habitat Features: Soft muddy bottom, aquatic vegetation, loafing logs**

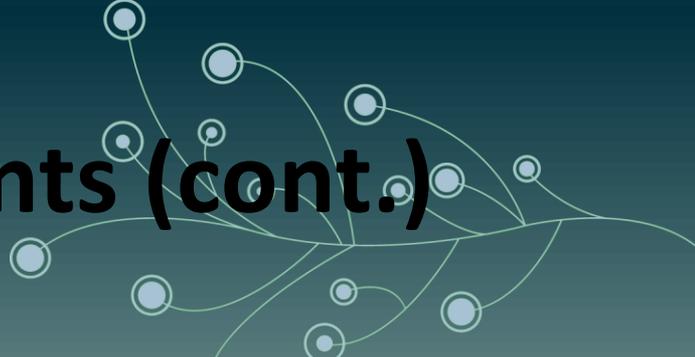


# Data Form Components (cont.)



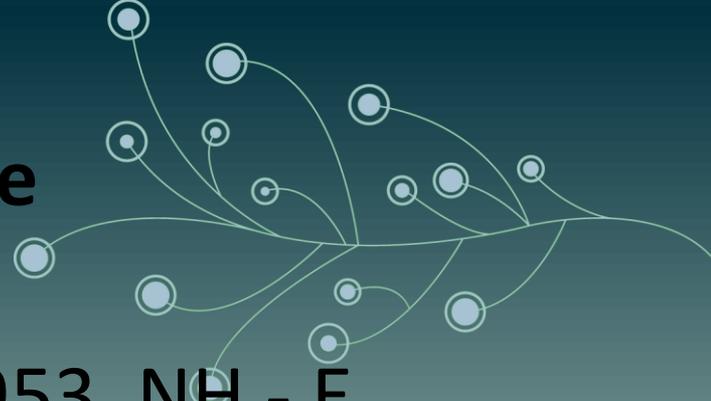
- **Recreational Use**
- Parking Available?
- Watercraft Access?
- Fishing Available?
- Hunting Permitted?
- Walking/Biking Trails?
- ATV/4 Wheel?

# Data Form Components (cont.)



- **Restoration Stabilization Potential**
- Describe:
- **H2O Quality Degradation**
- Describe
- **Invasive species**
- List:

# Natural Heritage Data Response



Brook Floater – last reported 1953 NH - E

## Wildlife Species

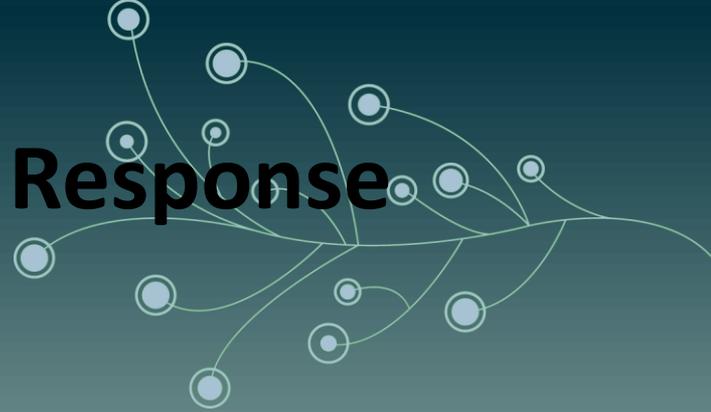
Blanding's Turtle – last reported 2008 NH - E

Spotted Turtle – last reported 2008 NH - T

Vesper Sparrow – last reported 2001 NH - SC

Great Blue Heron Rookery

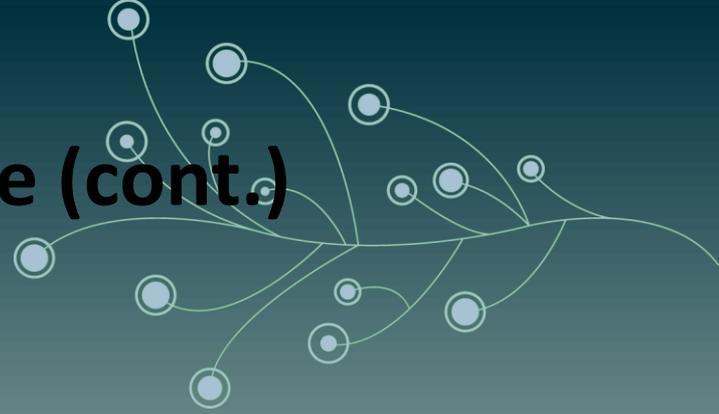
# Natural Heritage Data Response



## Fish:

- Redfin Pickerel – last reported 1984 NH-SC
- Banded Sunfish – last reported 2005 NH-SC
- Swamp Darter – last reported 1984 NH-SC
- Bridled Shiner – last reported 2006 NH-T

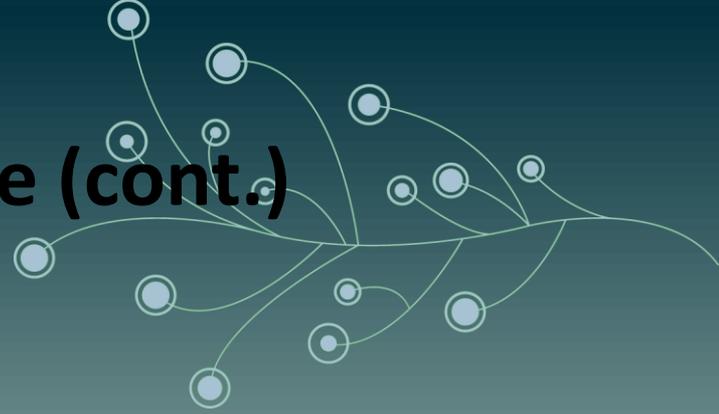
# Natural Heritage Data Response (cont.)



## Natural Communities:

- Sweet pepperbush wooded fen – last reported 2009 NH-S2
- Poor level fen/bog system – last reported 2009 NH-S3

## Natural Heritage Data Response (cont.)



### Plant Species:

- Climbing Hempweed – last reported 1940
- Featherfoil – last reported 1940
- Piled-up Sedge – N/A

# EXETER RIVER FLOODPLAIN WETLANDS Ranked Wildlife Habitat

## Wildlife Habitat Tier

- Highest Ranked Habitat in NH
- Highest Ranked Habitat in Biological Region
- Supporting Landscapes

Floodplain Study Area

Floodplain Wetland

Town Boundary

Waterbody

River

Major Road

Rail Trail

Data Source:

Wetlands delineated by WEST Environmental, Inc. based on 2000 1:25,000 scale digital data from the USGS and field observations. Wildlife habitat tiers are from the 2010 NH Fish, Game and Wildlife Action Plan.

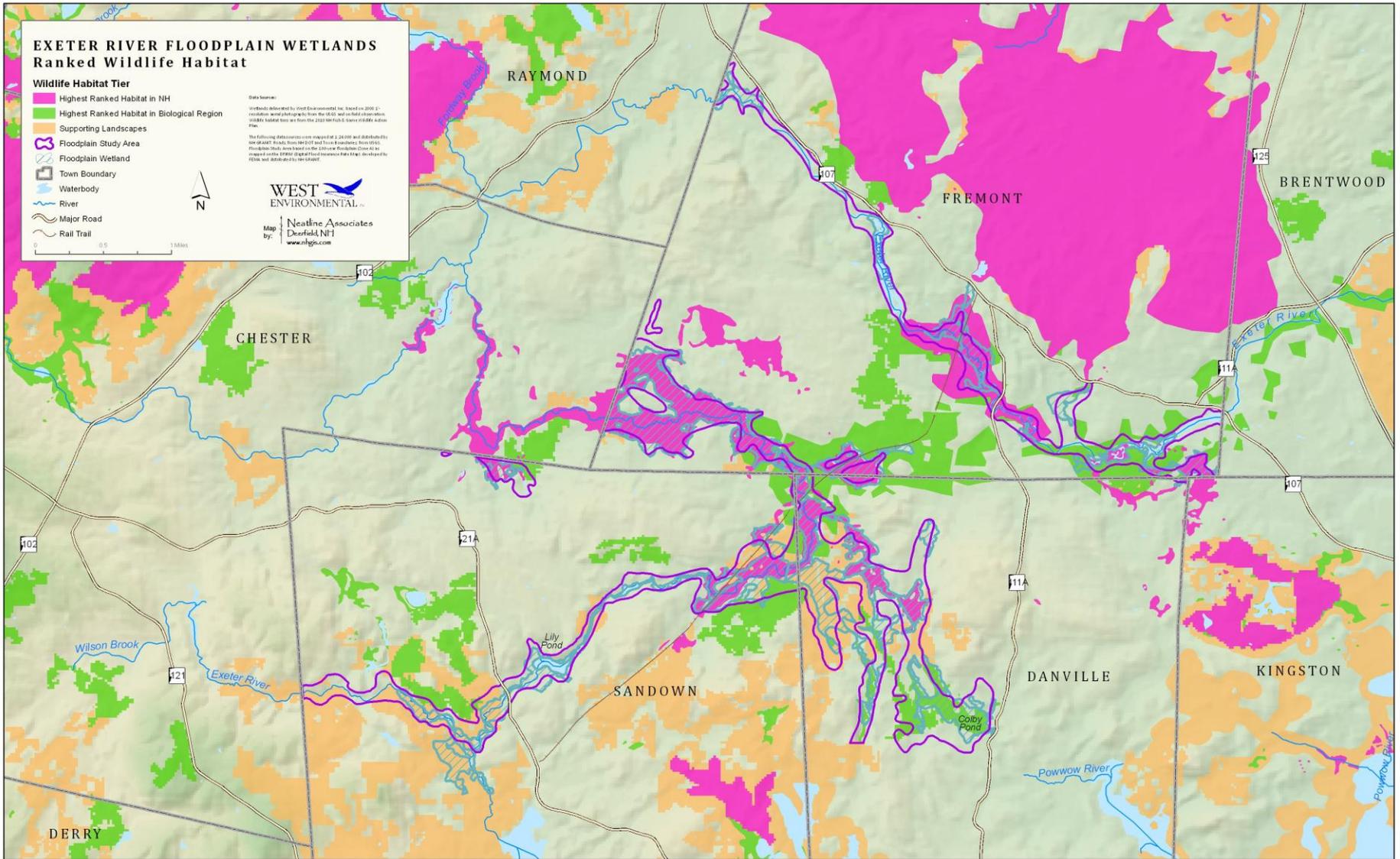
The following delineations were completed on 1/28/2010 and distributed by WEST Environmental, Inc. based on 2000 1:25,000 scale digital data from the USGS and field observations. Floodplain Study Area based on the 100-year Floodplain Zone as measured on the 2000 Digital Flood Insurance Rate Map developed by FEMA and distributed by WEST.

**WEST ENVIRONMENTAL**

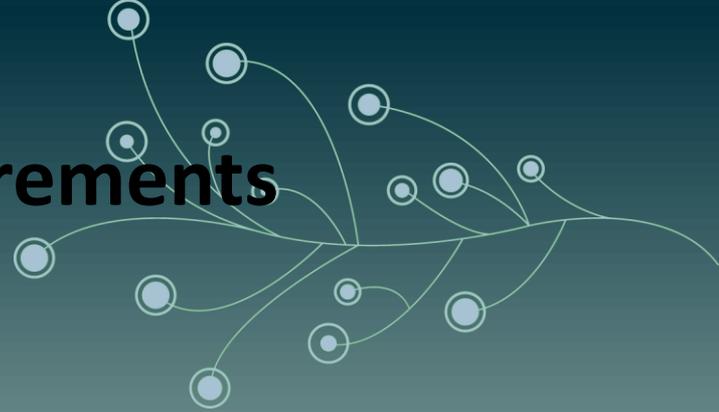
Map by: **Neatline Associates**  
Deerfield, NH  
[www.nhgis.com](http://www.nhgis.com)



0 0.5 1 MILE



# Blandings Turtle Habitat Requirements



- Slow moving rivers with beaver ponds
- Aquatic vegetation
- Soft muddy bottoms
- Loafing logs



Blandings Turtles with Painted Turtles



Wetland F-8a Blandings turtle habitat



Potential turtle nesting habitat adjacent Wetland S-1c

# Spotted Turtle Habitat Requirements



- Unpolluted shallow water
- Marshes
- Vernal pools
- Forested wetlands





Wetland F-9 Spotted turtle habitat



Potential turtle nesting area near Wetland D-9c.

# Wood Turtle Habitat Requirements



- Slow moving meandering streams
- Sandy bottoms
- Overhanging wooded banks





Wetland F-3 Wood Turtle Habitat



Wetland S-9a Great Blue Heron Rookery in Colby Pond



Vesper Sparrow Habitat

# Natural Plant Communities



- Oxbow buttonbush swamp S3
- Deep emergent marsh – aquatic bed S4
- Vernal floodplain pool S2
- Leatherleaf-sheep laurel dwarf shrub bog S3
- Red maple floodplain forest S4
- Sweet pepperbush wooded fen S2



Wetland S-2 **Oxbow Buttonbush Swamp** taken from Rail Trail



Wetland D-1 **Buttonbush Swamp** taken from Sandown Road.  
Potential Pied -billed Grebe habitat



**Wetland F-3 deep emergent marsh-aquatic bed Community**



Wetland F-3 **Floodplain Marsh** with potential Sedge Wren habitat



**Wetland F-8b Deep emergent marsh - aquatic bed plant Community**



Wetland F-1 **Vernal Floodplain Pool** Community



Wetland F-8a - a **Leatherleaf/sheep laurel dwarf shrub bog** in Fremont and Danville



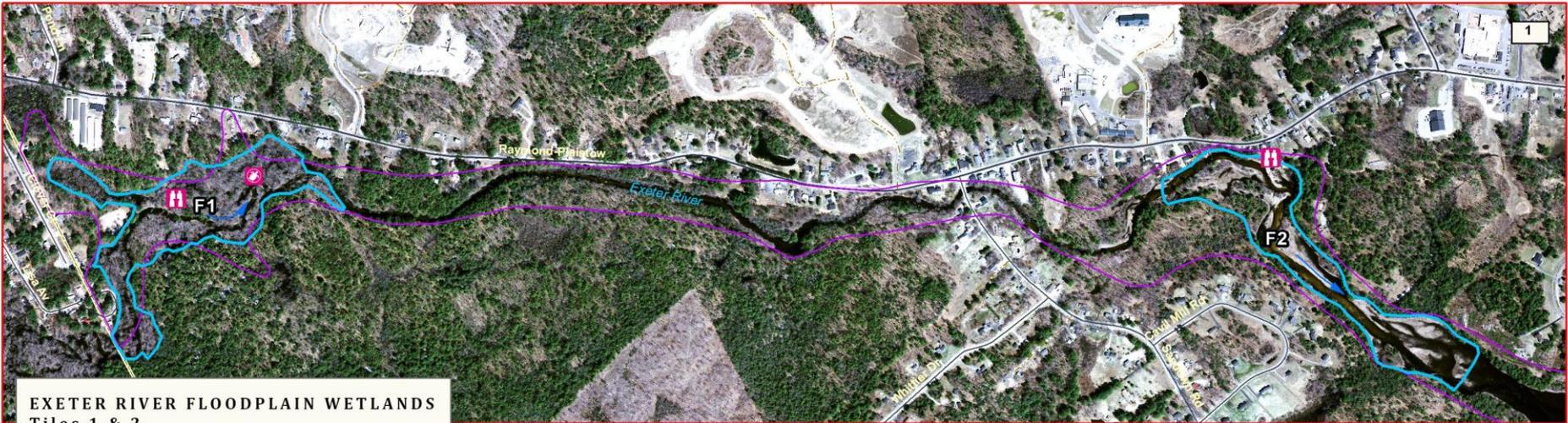
**Wetland F-10a Red Maple Floodplain Swamp**



**Wetland S-3 Red Maple forested floodplain**



Wetland D-6a **Sweet pepperbush wooded fen**



## EXETER RIVER FLOODPLAIN WETLANDS Tiles 1 & 2

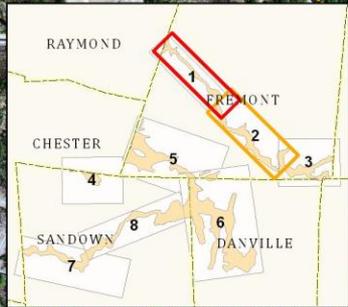
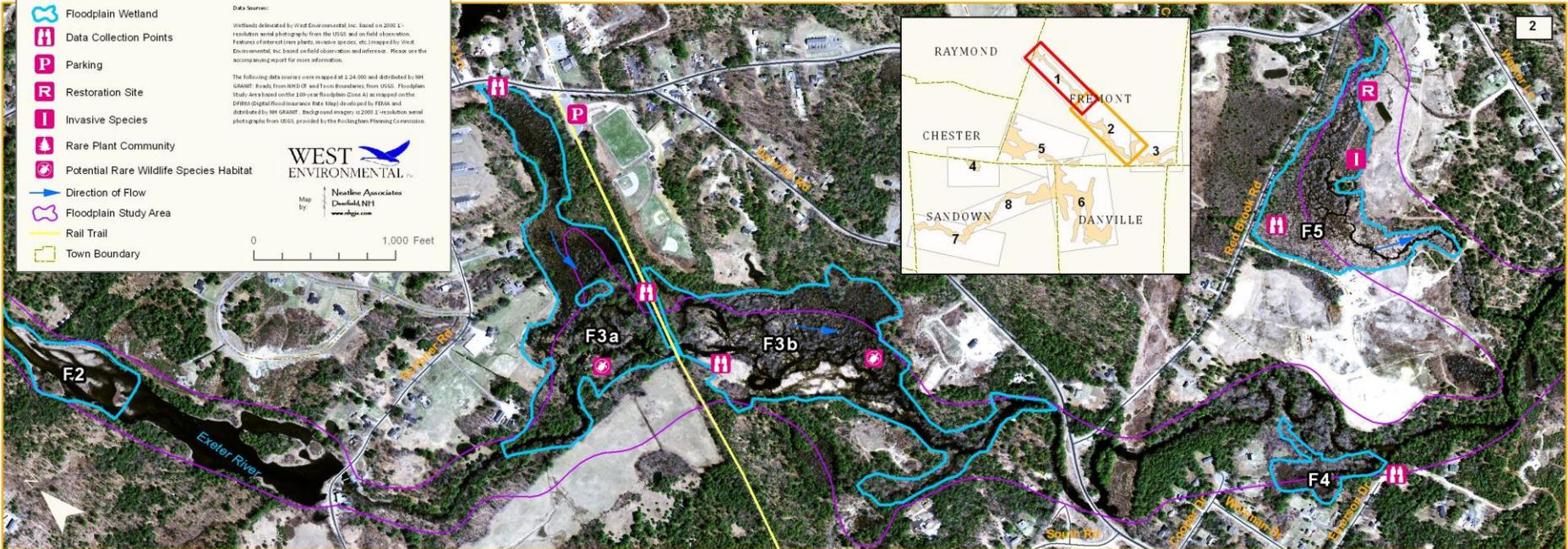
- Floodplain Wetland
- Data Collection Points
- Parking
- Restoration Site
- Invasive Species
- Rare Plant Community
- Potential Rare Wildlife Species Habitat
- Direction of Flow
- Floodplain Study Area
- Rail Trail
- Town Boundary

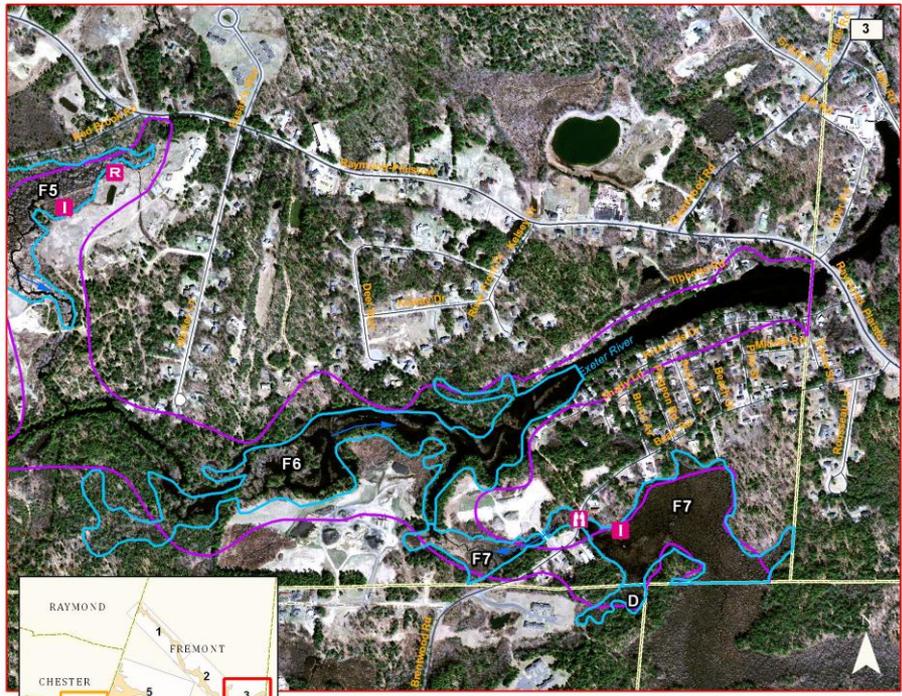
Data Sources:  
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The following data sources were mapped at 1:24,000 and distributed by NH GRANIT. Roads from NH-D-DE and from boundaries from USGS. Floodplain Study Area is based on the 100-year Floodplain (Zone A) as mapped on the Digital Floodplain Inventory Data Map developed by USGS and distributed by NH GRANIT. Background imagery is 2000 1-resolution aerial photography from USGS, provided by the Rockingham Planning Commission.

**WEST ENVIRONMENTAL, INC.**  
Map by  
Nestline Associates  
Doverfield, NH  
www.westenv.com

0 1,000 Feet





**EXETER RIVER FLOODPLAIN WETLANDS**  
**Tiles 3 & 4**

**Legend:**

- Floodplain Wetland
- Data Collection Points
- Parking
- Restoration Site
- Invasive Species
- Rare Plant Community
- Potential Rare Wildlife Species Habitat
- Direction of Flow
- Floodplain Study Area
- Town Boundary

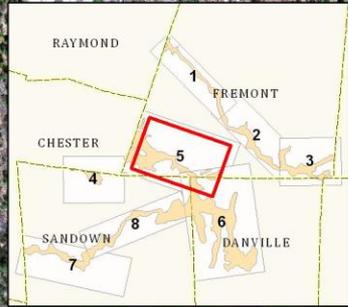
**Data Sources:**  
 Wetland delineation by WEST Environmental, Inc. (October 2002); resolution aerial photography from the State and on field observation. Field data collection dates: 10/20/02, 10/21/02, 10/22/02, 10/23/02, 10/24/02, 10/25/02, 10/26/02, 10/27/02, 10/28/02, 10/29/02, 10/30/02, 10/31/02, 11/01/02, 11/02/02, 11/03/02, 11/04/02, 11/05/02, 11/06/02, 11/07/02, 11/08/02, 11/09/02, 11/10/02, 11/11/02, 11/12/02, 11/13/02, 11/14/02, 11/15/02, 11/16/02, 11/17/02, 11/18/02, 11/19/02, 11/20/02, 11/21/02, 11/22/02, 11/23/02, 11/24/02, 11/25/02, 11/26/02, 11/27/02, 11/28/02, 11/29/02, 11/30/02, 12/01/02, 12/02/02, 12/03/02, 12/04/02, 12/05/02, 12/06/02, 12/07/02, 12/08/02, 12/09/02, 12/10/02, 12/11/02, 12/12/02, 12/13/02, 12/14/02, 12/15/02, 12/16/02, 12/17/02, 12/18/02, 12/19/02, 12/20/02, 12/21/02, 12/22/02, 12/23/02, 12/24/02, 12/25/02, 12/26/02, 12/27/02, 12/28/02, 12/29/02, 12/30/02, 12/31/02.

**Map Scale:**  
 0 1,000 Feet

**WEST ENVIRONMENTAL**  
 A Member Association  
 100 North Main Street  
 Danville, VT 05751  
 www.westenv.com



5



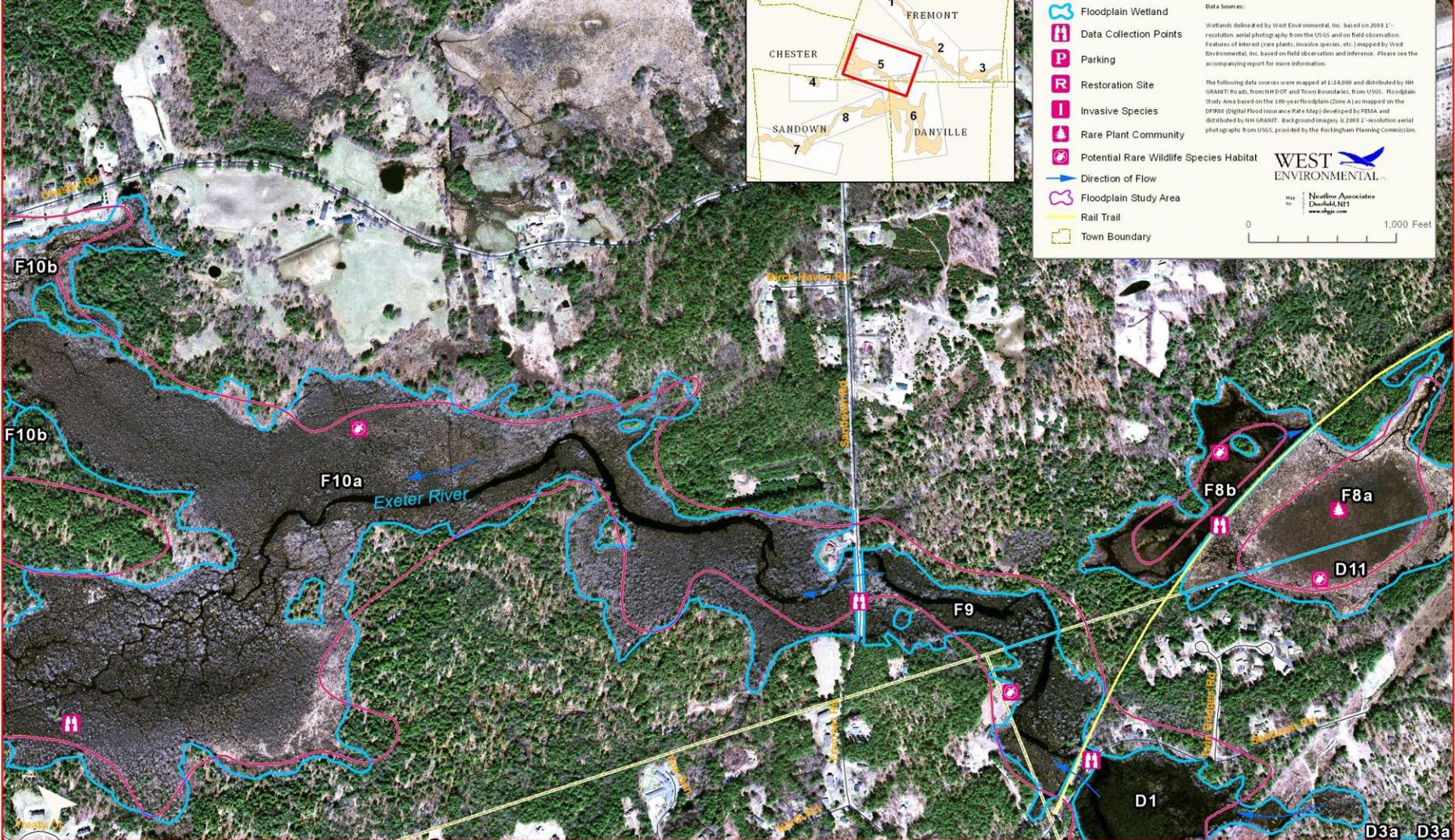
### EXETER RIVER FLOODPLAIN WETLANDS Tile 5

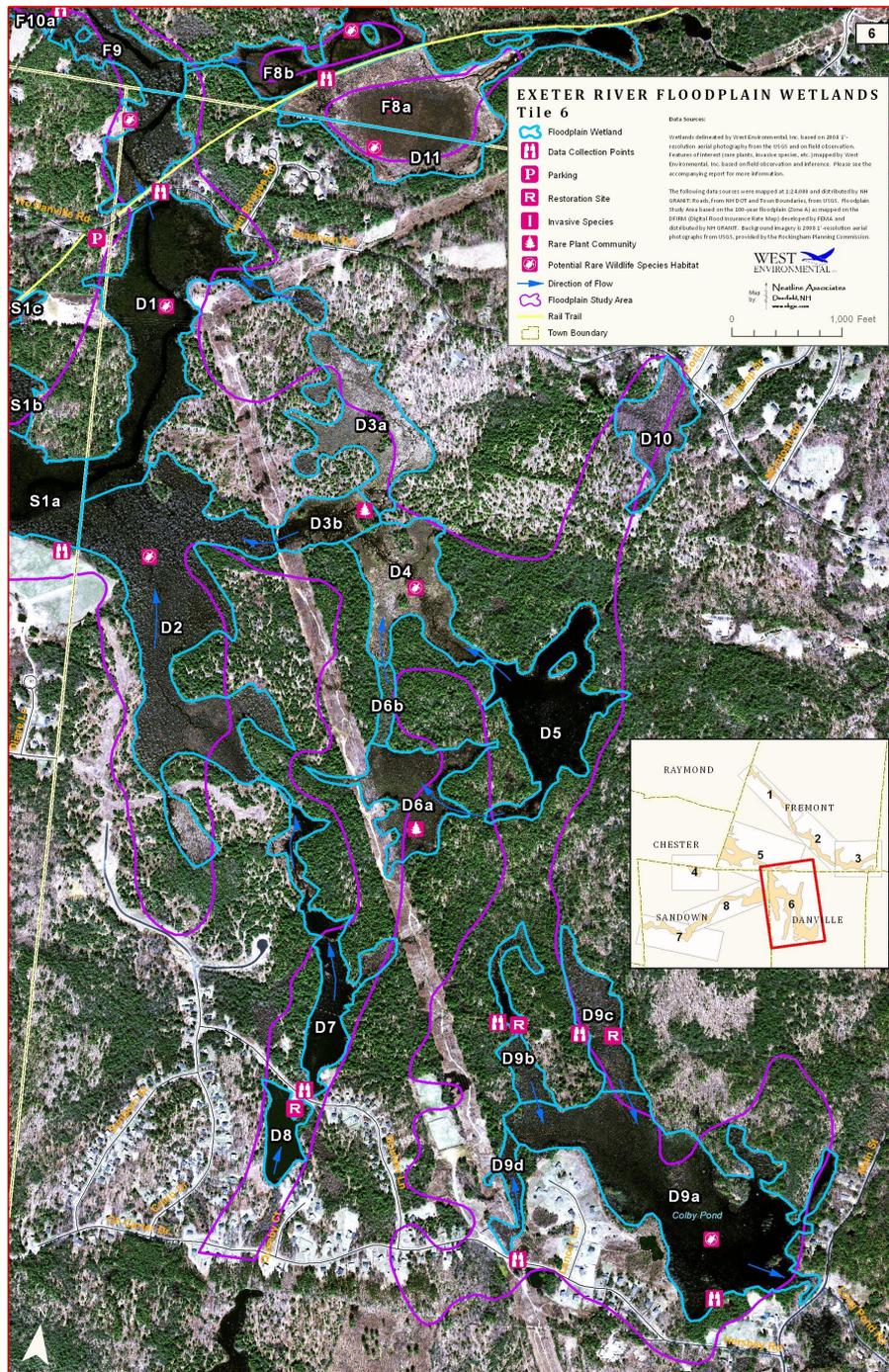
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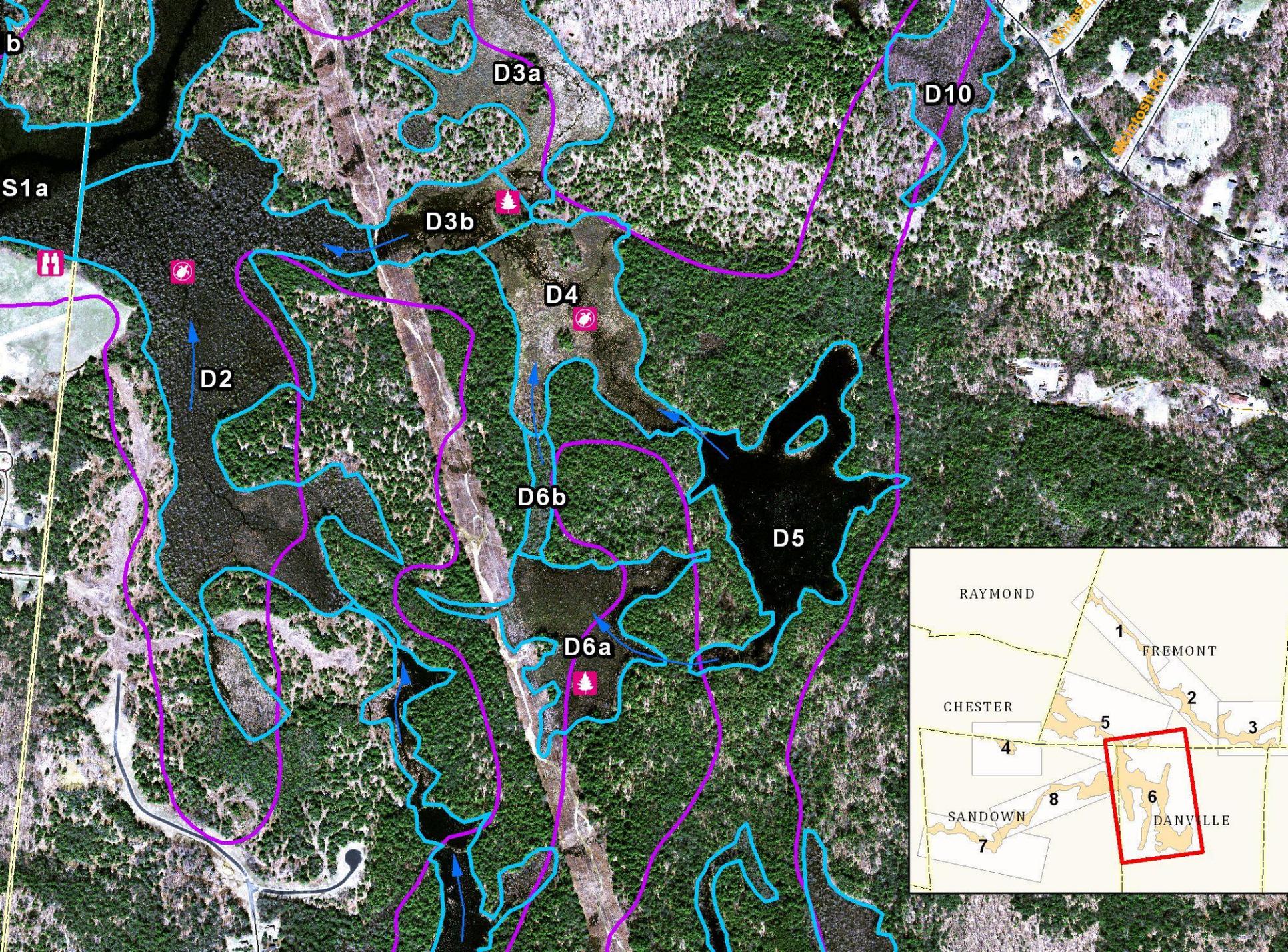
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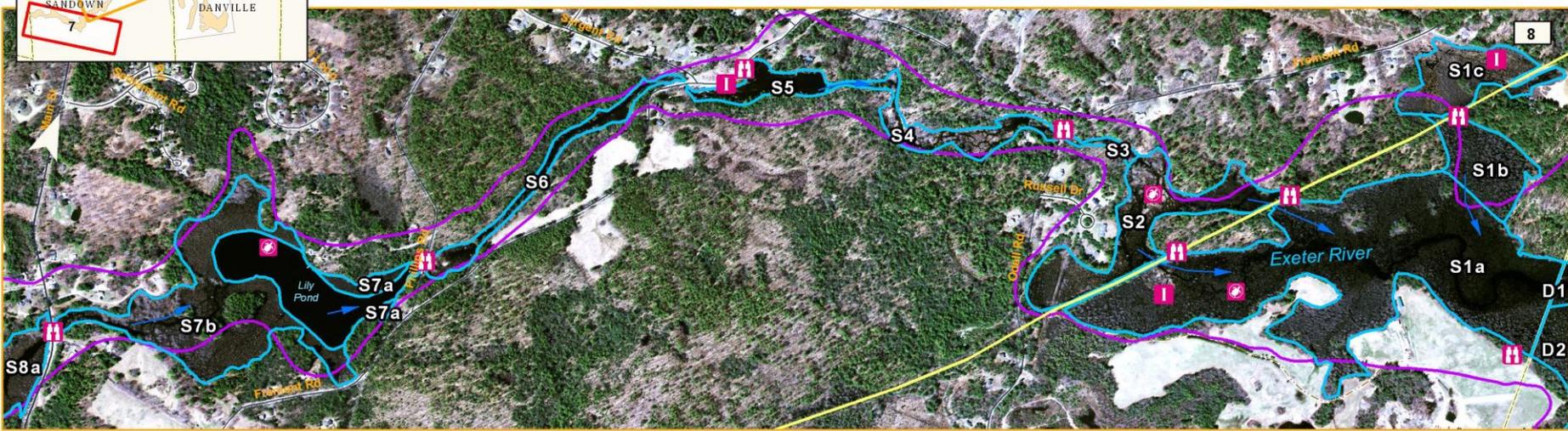
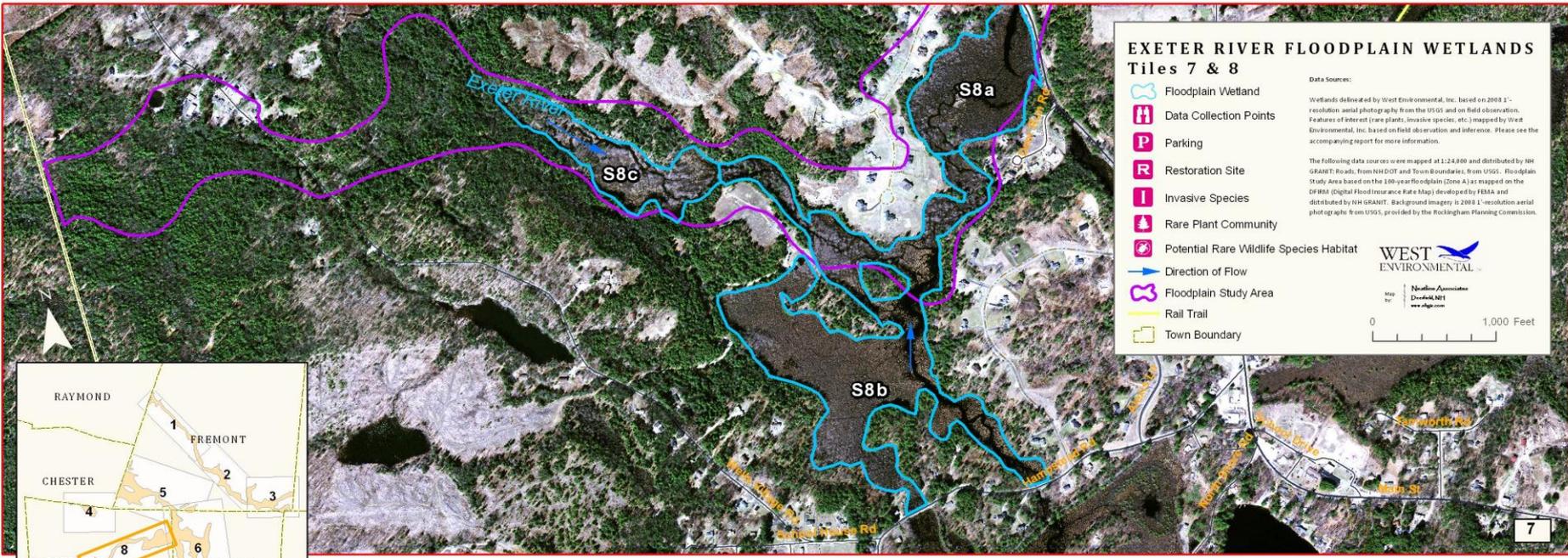
**WEST ENVIRONMENTAL, INC.**  
Map by: Nestline Associates  
Dorchester, NH  
www.nestline.com

0 1,000 Feet









### EXETER RIVER FLOODPLAIN WETLANDS Tiles 7 & 8

**Data Sources:**

Wetlands delineated by West Environmental, Inc. based on 2005 1'-resolution aerial photography from the USGS and on field observation. Features of interest (rare plants, invasive species, etc.) mapped by West Environmental, Inc. based on field observation and inference. Please see the accompanying report for more information.

The following data sources were mapped at 1:24,000 and distributed by NH GRANIT: Roads, from NH DOT and Town Boundaries, from USGS. Roadplan Study Area based on the 100-year floodplain (Zone A) as mapped on the FEMA Digital Flood Insurance Rate Map developed by FEMA and distributed by NH GRANIT. Background imagery is 2008 1'-resolution aerial photography from USGS, provided by the Rockingham Planning Commission.

**WEST ENVIRONMENTAL**

Map by: **WEST ENVIRONMENTAL**  
 Nathan Associates  
 Dover, NH  
 www.westenv.com

0 1,000 Feet

Danville Wetlands	Acres
D1	56.0
D2	64.6
D3a	21.1
D3b	8.0
<i>Total D3</i>	<i>29.1</i>
D4	19.8
D5	24.0
D6a	17.0
D6b	2.4
<i>Total D6</i>	<i>19.4</i>
D7	17.1
D8	5.7
D9a	60.6
D9b	7.3
D9c	10.6
D9d	3.7
<i>Total D9</i>	<i>82.2</i>
D10	10.7
D11	11.92
<b>Total</b>	<b>340.34</b>



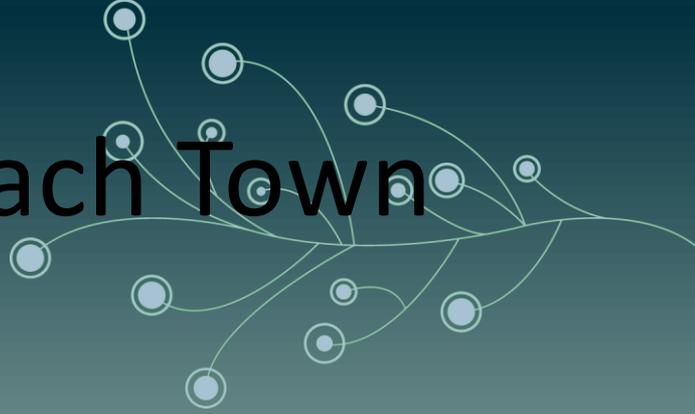
<b>Sandown Wetlands</b>	<b>Acres</b>
S1a	72.51
S1b	9.23
S1c	10.36
<i>Total S1</i>	<i>92.10</i>
S2	16.90
S3	1.00
S4	6.89
S5	4.57
S6	5.80
S7a	2.21
S7b	28.45
<i>Total S7</i>	<i>30.66</i>
S8a	18.93
S8b	56.85
S8c	14.99
<i>Total S8</i>	<i>90.77</i>
S9	20.96
<b>Total</b>	<b>269.65</b>



<b>Fremont Wetlands</b>	<b>Acres</b>
F1	21.0
F2	19.4
F3a	27.1
F3b	34.5
<i>Total F3</i>	<i>61.6</i>
F4	4.0
F5	18.1
F6	35.1
F7	25.1
F8a	31.5
F8b	17.4
<i>Total F8</i>	<i>49.0</i>
F9	12.6
F10a	223.3
F10b	39.7
<i>Total F10</i>	<i>263.0</i>
<b>Total</b>	<b>509.0</b>



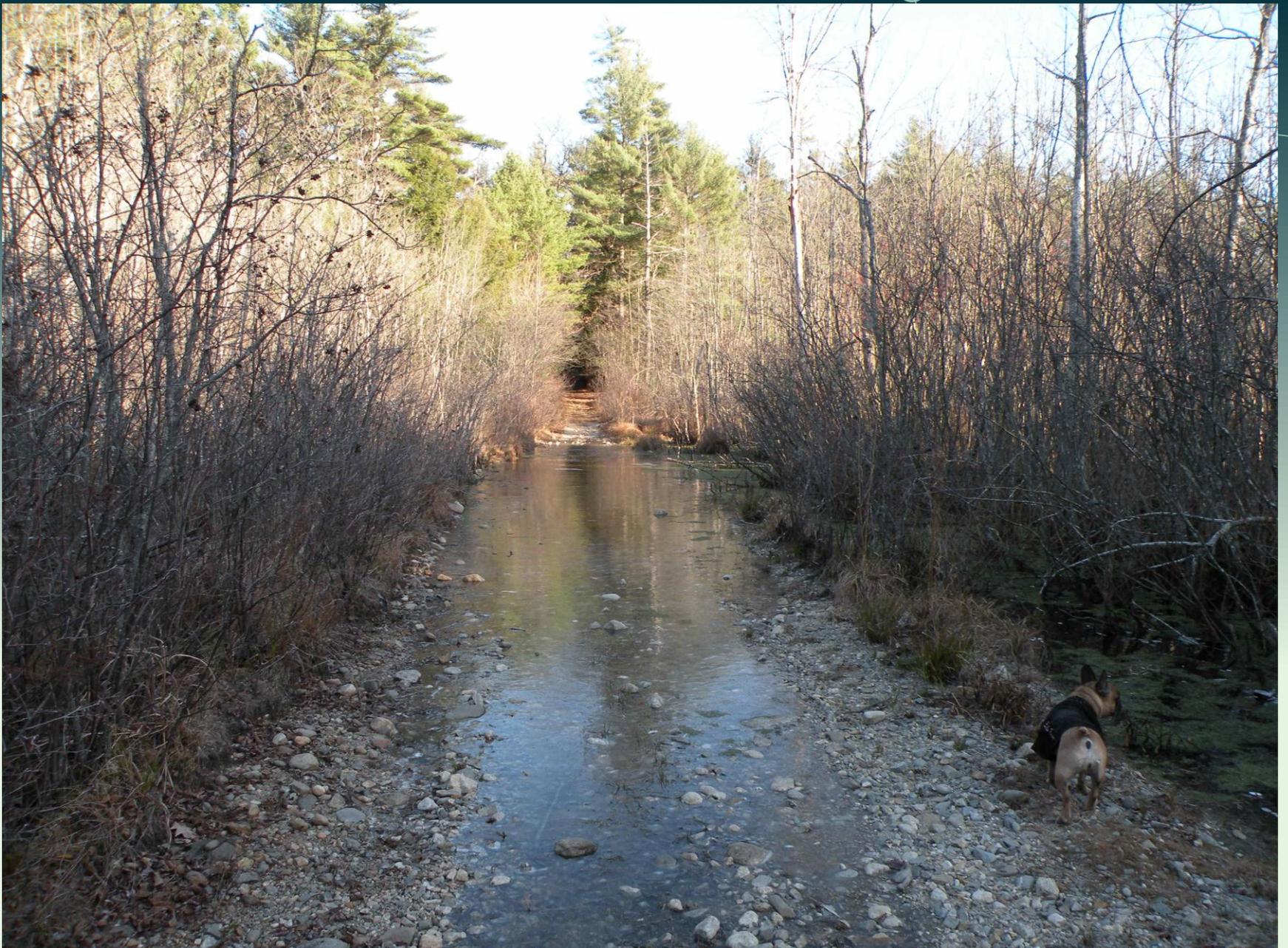
# Total Wetlands in each Town



- Fremont - 509 acres
- Danville – 340 acres
- Sandown – 269 acres
  
- Total 1,118 acres



ATV on Rail Trail



Wetland restoration site in Wetland D-9b



Wetland S-1 from Rail trail showing Invasive Phragmites along river channel



Wetland S-7a Lilly Pond



Wetland D-9b Vernal Pool Habitat



Wetland S-1c large leaf cranberry



Wetland S-1b Black Gum Tree



Wetland S-8a frozen river channel in Sandown