

# Coastal Features

Information about the Rhode Island Coastal Resources Management Program

Fall 1999

Volume 8, Number 1

## A Coastal Habitat Restoration Success Story: The Galilee Salt Marsh Returns

■ John H. Chafee Coastal Stewardship Award Announced at Ceremony Honoring the Galilee Salt Marsh Restoration Team

The landscape surrounding the Galilee Escape Road as it slopes toward Point Judith isn't what it used to be just a few years ago. Now, a silvery sheet of salt water slowly advances on newly restored salt marsh twice each day as the high tide spreads across broad swaths of intertidal mudflats.

Tufts of cordgrass, *Spartina alterniflora*, and other salt marsh plants burst from the water and expand landward, their distribution marking the reach of the salt water that inundates this re-born coastline each day. Shore birds are scattered everywhere and feed on the teeming invertebrates - worms and other creatures - that populate the mudflats.

But this dynamic scene where land once again meets sea is missing something. The vast stands of the common reed, *Phragmites*



**Coastal Resources Management Council Honored:** CRMC Supervising Biologist Dave Reis (center) accepts the National Coastal America Award from Coastal America Chairman Dr. Joseph Westphal (right).

### INSIDE THIS ISSUE

☞ Galilee Salt Marsh Restoration Team Honored/John H. Chafee Coastal Stewardship Award Announced

Page 1

☞ Update on the Narragansett Bay National Estuarine Research Reserve

Page 2

☞ CRMC Adopts New Freshwater Wetlands Regulations

Page 6

☞ CRMC Staff Changes

Page 8

*australis*, an indicator of disturbed salt marshes are disappearing as the daily infusion of saltwater is gradually transforming the land back into saltmarsh habitat. This species, which nearly choked off the last remnant of salt marsh habitat at this site, is itself being replaced due to the success of the Galilee Salt Marsh Restoration Project. And just as surely as the presence of *Spartina alterniflora* and other salt marsh grasses signals the renewal of the Galilee Salt Marsh, the absence of *Phragmites australis* heralds its rebirth.

The Galilee Salt Marsh Restoration Project represented a collaboration of government, academia, non-profit organizations, and the private sector. Federal agencies included the Army Corps of Engineers, the Federal Highway Administration, the U.S. Fish and Wildlife Service, and the Environmental Protection Agency. The State of Rhode Island contributed the expertise of the Coastal Resources Management Council, the Department of Environmental Management, the Division of Fish and Wildlife, the Department of Transportation, and the Division of Planning. The Town of Narragansett, the local jurisdiction in which the Galilee Salt Marsh is located, was another governmental partner. Non-governmental partners included Save The Bay,

Rhode Island Ducks Unlimited, Applied Biosystems, and the University of Rhode Island. The combined resources of these partners provided the regulatory, engineering, biological, and financial resources needed for the project's success.

The salt marsh was lost over time partly because fill material from dredging projects to improve navigation was deposited on it. A larger part of its demise was the construction of the Galilee Escape Road. Built in response to the need of people to quickly flee coastal flooding from hurricanes, the Escape Road sliced through the middle of the salt marsh, and effectively cut it off from the daily tidal exchange that is the life-blood of coastal salt marshes.

The key to restoring the salt marsh was restoring tidal flow. The work to accomplish this task began in 1997. Twin 6 x 10 foot box culverts, each one 200 feet long with self-regulating tide gates, were installed at two locations beneath the Escape Road. A series of natural channels were re-excavated to connect incoming tidal waters with the culverts. It worked. This system dramatically improved tidal flooding to both sites, and within one year the restoration of the Galilee Salt Marsh was well underway. Where fewer than 20 acres of salt marsh had previously existed, tidal waters were now bringing new life and restoring native salt marsh habitat at this 130 acre site.

The Galilee Salt Marsh Restoration Project was recognized at a ceremony hosted by Coastal America at the University of Rhode Island's Coastal Institute on November 8. Coastal America is a partnership of federal agencies and offices that works with "state and local governments, the private sector, public interest groups, and community organizations to restore and protect the coastal environment." Coastal America Chairman, Dr. Joseph Westphal presented each of the Galilee Salt Marsh Restoration partners with the National Coastal America Award. The partners were also presented with a copy of a congratulatory letter from Vice President Al Gore.

Despite its celebratory tenor, the ceremony was marked with sadness by the absence of Senator John Chafee, Rhode Island's champion of environmental protection, who had passed away in October. Senator Chafee had been scheduled to host the ceremony. In honor of Senator Chafee, Dr. Westphal announced the creation of the John H. Chafee Coastal Stewardship Award, and presented it to the Senator's son, Lincoln, who was recently appointed by Governor Almond to complete his father's final term in office.

## An Update on the Narragansett Bay National Estuarine Research Reserve

Like sentinels fixed at the heart of Narragansett Bay, Prudence, Patience, and Hope Islands play a vital role in an ambitious effort to oversee and safeguard the ecological health of the nation's estuaries. Significant portions of these islands and their adjoining waters are dedicated to this task under the auspices of the Narragansett Bay National Estuarine Research Reserve (Narragansett Bay NERR). The Narragansett Bay NERR is Rhode Island's link to the National Estuarine Research Reserve System (Reserve System), a nationwide network of protected coastal areas co-managed by the National Oceanic and Atmospheric Administration (NOAA) and the coastal states in whose waters they occur.

As its name implies, the Narragansett Bay NERR is reserved – set aside and protected to preserve its ecological character – in order to serve as a stable field laboratory for scientific research and monitoring of its diverse ecosystems, habitats, and organisms.

In this capacity, the Narragansett Bay NERR provides a forum for the continuous production and dissemination of a scientific database on the ecological health of its estuarine and other coastal resources. Further, it serves as a conduit for pertinent information on contemporary coastal resource management problems. In this role as a virtual clearinghouse of data relevant to coastal resource protection issues, the Reserve System augments local and national efforts to manage, protect, and improve the nation's estuaries.

The Narragansett Bay NERR has made significant contributions to the Reserve System through the dozens of research and monitoring projects it has facilitated since its inception in 1980. The resulting rich and diverse database produced by this wide-ranging collection of research reflects the varied habitats available to researchers at the Narragansett Bay NERR. And the continuous production of data from numerous on-going projects achieves a primary goal of the Reserve System: to facilitate long-term scientific research and monitoring, which measure the environmental health of the nation's estuaries and other coastal resources.

This issue of Coastal Features describes the Reserve System, the Narragansett Bay NERR, and outlines the research and monitoring projects currently underway at this Reserve. Two of these projects receive special emphasis. Both receive financial support via Fellowships awarded by the National Oceanic

### Coastal Features

*Coastal Features* is a publication of the Rhode Island Coastal Resources Management Council. Its preparation was financed in part by a grant from the National Oceanic and Atmospheric Administration pursuant to the Coastal Zone Management Act, as amended. This issue of *Coastal Features* was edited by Kevin R. Cote. To comment on any article or to make address changes, write the CRMC at the Oliver Stedman Government Center, 4808 Tower Hill Road, Wakefield, RI 02879 or contact us on-line at [ricrmc@ricconnect.com](mailto:ricrmc@ricconnect.com).

and Atmospheric Administration (NOAA) through its Sanctuaries and Reserves Division (SRD). While coastal states are responsible for the daily management of their Research Reserves, NOAA manages the Reserve System at the national level, and awards competitive SRD Fellowships for research on a wide range of issues that address the ecological health of coastal and estuarine resources.

### The National Estuarine Research Reserve System

The Reserve System was established by Congress under the 1976 amendments to the Coastal Zone Management Act of 1972 (16 U.S.C. § 1461) (CZMA). According to this Act, "...the purpose of the estuarine sanctuary program is to create natural field laboratories in which to gather data and accomplish studies of the natural and human processes occurring within the estuaries of the coastal zone. This shall be accomplished by the establishment of a series of estuarine sanctuaries which will be designated so that at least one representative of each type of estuarine ecosystem will endure into the future for scientific and educational purposes...especially to provide some of the management information essential to the coastal management decision-making process." Further, the Reserve System's mission "to conduct and facilitate scientific research and monitoring to address significant coastal management issues," supports the CZMA goal to promote comprehensive management of the nation's coastal resources.

The Reserve System currently consists of 25 Reserves that encompass over one million acres of land and water throughout the United States and Puerto Rico. The greatest concentration of Research Reserves, fourteen in all, occurs on the Atlantic coast, five are scattered along the Pacific coast from Alaska to the U.S. - Mexico border, 4 are located on the Gulf Coast, and one each is found in the Great Lakes region and in Puerto Rico. This far-flung network represents at least 35 distinct coastal habitats including terrestrial, marine, brackish, and freshwater types.

From an administrative perspective, the Reserve System is a collaborative effort between the federal government and the coastal states. This partnership is intended to benefit both state and federal interests. NOAA establishes standards for designating and operating each Research Reserve, supports their operation, undertakes research projects that benefit the entire Reserve System, and applies information produced at individual Reserves to national coastal zone management planning.

From an environmental perspective, Research Reserves consist of the physical, chemical, and biological characteristics that identify them as unique coastal ecosystems. In addition to being selected as "representative types of estuarine ecosystems," Research Reserves are also chosen on the basis of their ability to represent a large biogeographic region. As such, scientific information produced at a single Research Reserve may provide the basis for coastal resource management decision-making on numerous issues throughout a large area of the coastal zone.

This idea is formalized through the National Estuarine Research Reserve System-Wide Monitoring Program (Monitoring Program). A central goal of the Monitoring Program is "to identify and track short-term variability and long-term changes in the integrity and biodiversity of representative estuarine ecosystems and watersheds for the purpose of contributing to effectual national, regional, and site specific coastal zone management."

In order to produce consistent information on a system-wide basis, the Monitoring Program guides research and monitoring programs throughout the entire Reserve System. The current focus of the Monitoring Program is being implemented in three distinct stages:

- Stage One - Water Quality and Storm Impacts
- Stage Two - Biological Communities and Habitats
- Stage Three - Watershed Land-Use Change

#### Reserves Currently in the National Estuarine Research Reserve System

Ace Basin, South Carolina	Hudson River, New York	Rookery Bay, Florida
Apalachicola Bay, Florida	Jacques Cousteau/Mullica River, N.J.	Sapelo Island, Georgia
Chesapeake Bay, Maryland	Jobos Bay, Puerto Rico	South Slough, Oregon
Chesapeake Bay, Virginia	Kachemak Bay, Alaska	Tijuana River, California
Delaware	Narragansett Bay, Rhode Island	Waquoit Bay, Massachusetts
Elkhorn Slough, California	North Carolina	Weeks Bay, Alabama
Grand Bay, Mississippi	North Inlet-Winyah Bay, N.C.	Wells, Maine
Great Bay, New Hampshire	Old Woman Creek, Ohio	
Guana Tolomato Matanzas, Florida	Padilla Bay, Washington	

## The Narragansett Bay National Estuarine Research Reserve

The Narragansett Bay NERR was designated as a part of the Reserve System in October, 1980. It was also the first to represent the Virginian Biogeographic region, which extends over 1,000 miles along the Atlantic coast, from Cape Hatteras to Cape Cod. The Reserve is located at the approximate center of Narragansett Bay and contains 2,353 acres of upland property on Prudence, Patience, and Hope Islands. All of Patience and Hope Islands are included in the Narragansett Bay NERR, and Prudence Island contributes 2,055 acres to the Reserve. Approximately 2,000 acres of bay waters contiguous to these islands are also a part of the Reserve. These waters extend from the Reserve's coastal property to a depth of 18 feet in Narragansett Bay.

According to the Reserve's Management Plan, "these islands contain diverse aquatic and terrestrial habitats and support numerous species." The table below illustrates the rich diversity of ecosystems and habitats at the Narragansett Bay NERR that are available for researchers.

### Representative Ecosystems of the Narragansett Bay NERR

Classification	Ecosystem/Habitat Type	Distribution
Group IA3	Shorelands Maritime Forest (Woodland) Temperate Deciduous Forest Biome	Patience Island North Prudence Unit
Group IB1	Shorelands Coastal Cliffs	South Prudence Unit Hope Island
Group IE	Transition Areas Coastal Marshes	Little Unit (Prudence Island)
Group IIA	Intertidal Beaches	North Prudence Unit
Group IID	Intertidal Mud and Sand Flats	North Prudence Unit
Group IIE	Intertidal Algal Beds Northern Latitude Rocky Shores	South Prudence Unit Little Unit (Prudence Island)
Group IIF1	Shorelands Maritime Forest (Woodland) Temperate Deciduous Forest Biome	Prudence Island Heritage Unit
Group IIIB	Submerged Bottoms Subtidal Soft Bottoms	North Prudence Unit
Group IIIC	Submerged Bottoms Subtidal Plants	South Prudence Unit

Following the Reserve System model of a federal-state partnership, the Narragansett Bay NERR is jointly administered by NOAA/SRD and the Rhode Island Department of Environmental Management (DEM). In concert with these two government agencies, the Audubon Society of Rhode Island, and the Prudence Conservancy, a non-profit land trust dedicated to maintaining Prudence Island in its natural condition, form a "Partnership for Protection" to ensure the continued viability and success of the Narragansett Bay NERR.

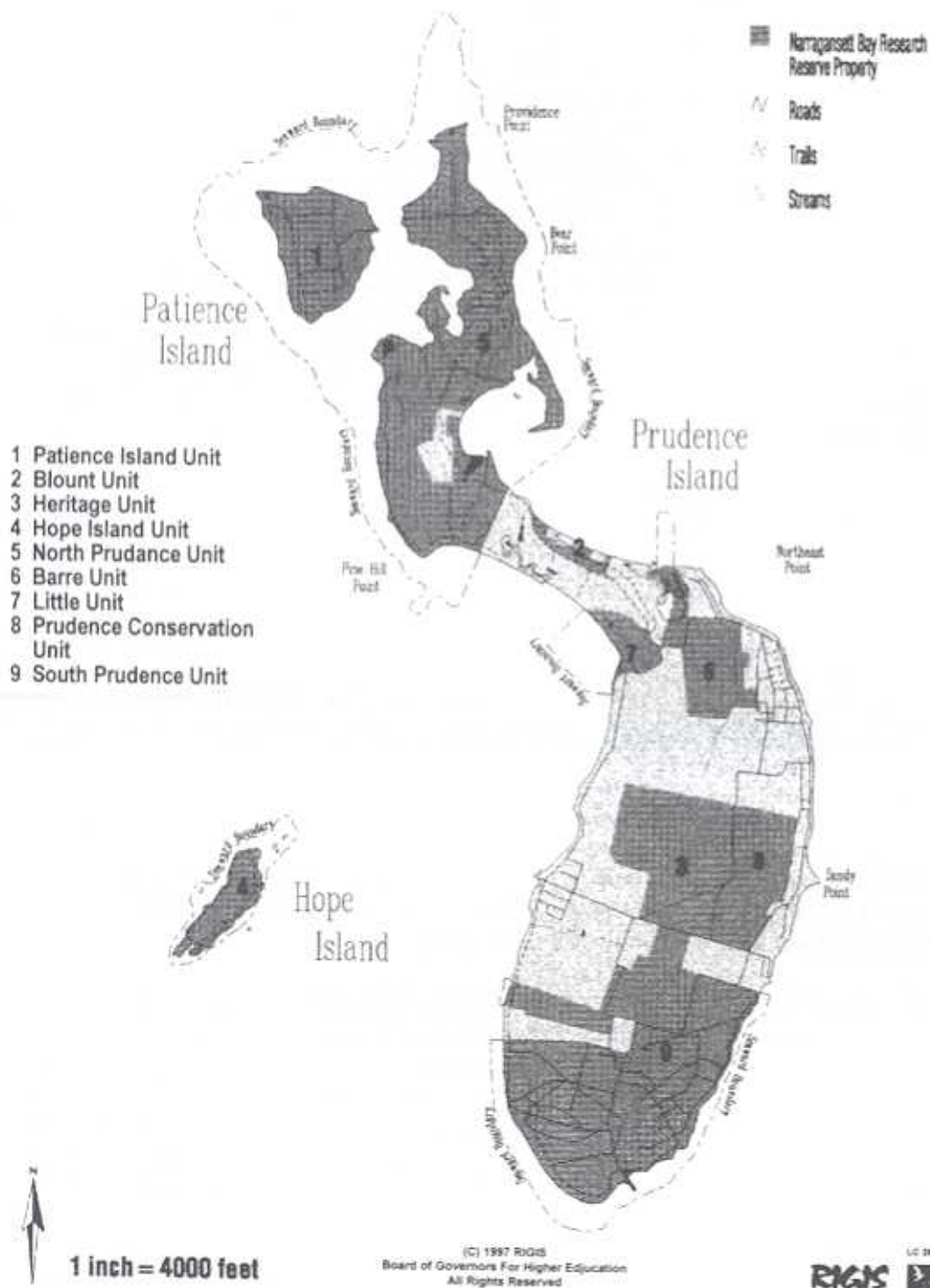
While NOAA/SRD and DEM share administrative responsibilities and manage the Narragansett Bay NERR research and monitoring programs, the Audubon Society and the Prudence Conservancy greatly enhance the Reserve's value by offering education programs and recreational opportunities to the general public. Although all three islands within the Narragansett Bay NERR are available to researchers and the public, all support facilities for research and public education activities are currently located on Prudence Island. In order to encourage research at the Narragansett Bay NERR, and provide support for visiting researchers, a 2,500 foot square field station has been constructed at South Prudence. The field station houses a fully equipped research laboratory and overnight accommodations for up to eight scientists. Logistical support is also available, including GIS data and mapping products and long-term research and monitoring data-sets.

### NOAA Funded Research: Sanctuaries and Reserves Division Fellowships at the Narragansett Bay NERR

There are two current SRD Fellowships that are funding ongoing research projects at the Narragansett Bay NERR. John Bruno is a Brown University student nearing the completion of his research on coastal plant communities of cobble beaches. Debra DiQuinzio recently received her M.S. degree in Natural Resources Sciences from the University

of Rhode Island, and has completed her study of avian community dynamics. Extensions of her research are currently under the direction of Dr. Peter Paton, at URI's Department of Natural Resources Sciences.

## Parcels in the Narragansett Bay National Estuarine Research Reserve



John Bruno is a fifth year Ph.D. candidate in the Department of Ecology and Evolutionary Biology at Brown University. He is also a third year SRD Fellow. According to Mr. Bruno, the undisturbed cobble beach habitats available in the Narragansett Bay NERR at Prudence Island provides the stable environment necessary to conduct his research on plant communities. Mr. Bruno is examining the effect of cordgrass *Spartina alterniflora* on the establishment of cobble beach plant communities at Prudence Island in the Narragansett Bay NERR and at Brown University's Haffenreffer Reserve in Bristol, RI. His research tests the hypothesis that "*Spartina alterniflora* facilitates the establishment and persistence of New England cobble beach plant communities by modifying the shoreline environment." His results show that *Spartina alterniflora* beds facilitate habitat modification on cobble beaches. According to Bruno, "Beds of *Spartina* can reduce mean water velocity by 50%, maximum velocity by nearly an order of magnitude, and can substantially stabilize the cobble substrate." What

this means for annual plant species is an increased probability for success; by reducing environmental stress, *Spartina* beds provide stable habitat for seed settlement and germination, seedling emergence and establishment, and adult survival. Bruno conducted a "seed addition experiment" and found that seedlings only emerged behind *Spartina* beds, which suggested that "seedling emergence is the proximate life stage limiting adult distribution." He also conducted an experiment to test the effects of substrate instability, soil quality, and herbivory on seedling emergence between beds. Seeds of *Suaeda linearis* and *Salicornia europaea*, two annual species, were placed behind *Spartina* beds and between beds under conditions with and without substrate stabilization manipulations. The experimental design stabilized

substrate without affecting water velocity, soil characteristics, or access by herbivores. Seedlings of both species emerged only when placed in stabilized substrate. Bruno's results "indicate that *Spartina alterniflora* facilitates the establishment and persistence of cobble beach plant communities by stabilizing the substrate and enabling seedlings to emerge and survive."

Debra DiQuinzio studied the breeding biology of the Saltmarsh Sharp-tailed Sparrow *Ammodramus caudacutus*. This species typically makes its nests in high marsh areas characterized by the saltmeadow grass *Spartina patens*. It occupies this specialized habitat throughout its range from New Jersey to southern Maine, and represents a potentially good indicator species to assess the success of salt marsh restoration efforts. The relatively pristine condition of high salt marsh habitat in the Narragansett Bay NERR on Prudence Island provided an ideal field laboratory for Ms. DiQuinzio's comparative research on the habitat requirements and health of Saltmarsh Sharp-tailed Sparrow populations.

Ms. DiQuinzio surveyed virtually every salt marsh habitat on Prudence Island. Over 150 specimens were captured in mist nets and uniquely marked with color-coded bands. The specimen's local movements were monitored, nests were identified, and habitat characteristics of nesting sites were quantified. Thirty-five nests were identified in areas characterized by *Spartina patens* (65% cover) and *Spartina alterniflora* (15% cover).

Comparative studies were conducted at seven mainland salt marshes that ranged from Sachest Point to Quonochontaug. None of the specimens from Prudence Island were observed at these locations. It is noteworthy that these sites were marked by the presence of the common reed *Phragmites australis*, which is an indicator of disturbed salt marshes. This plant species was absent at every nesting site colonized by Saltmarsh Sharp-tailed Sparrows on Prudence Island. Ms. DiQuinzio also noted that nesting ecology differed between mainland sites and Prudence Island. Predators were responsible for most nest failures at mainland sites, while flooding from high tides were the cause of most nest failures on Prudence Island.

Ms. DiQuinzio's research represents an example of the value of the National Estuarine Research Reserve System as a tool for producing information pertinent to significant coastal resource management issues. Her research provided original baseline data on Saltmarsh Sharp-tailed Sparrow that fulfilled its potential as a useful tool for measuring the success of salt marsh restoration. Her work has helped to prompt further study of avian communities at the Narragansett Bay NERR. The SRD Fellowship that funded her research continues to support research on other aspects of avian communities on Prudence Island. Dr. Peter Paton is currently directing research at the Narragansett Bay NERR to assess the significance of islands in Narragansett Bay to migrating songbirds.

## **The CRMC Adopts New Regulations: Freshwater Wetlands in the Vicinity of the Coast**

### **Background**

For many years, freshwater wetlands near Rhode Island's coast have been under the regulatory jurisdiction of both the Department of Environmental Management (DEM) and the Coastal Resources Management Council (CRMC). Due to the recent enactment of a state law intended to eliminate duplicative permitting, CRMC and DEM have jointly established a line that clearly delineates separate areas of freshwater wetlands regulatory jurisdiction. Pursuant to recently promulgated regulations, the jurisdictional line took effect on August 18, 1999.

### **The jurisdictional line**

Biologists from the CRMC and DEM have worked together to establish a line that delineates freshwater wetlands jurisdiction between the two agencies. Generally, the jurisdictional line coincides with state and local roads. In the few instances where roadways were not used, for the most part, the line follows local right-of-ways or property boundaries. As of August 18, all freshwater wetlands that are shoreward of the line, i.e., *in the vicinity of the coast*, fell under the jurisdiction of the CRMC. Those freshwater wetlands that are landward of the line remain under the authority of the DEM. New applications for freshwater wetlands permits for activities proposed shoreward of the line will be submitted to the CRMC. Applications for freshwater wetlands permits landward of the jurisdictional line will be submitted to the DEM Wetlands Program.

### **Farmers**

The only exception to this change to freshwater wetlands regulation pertains to farmers. The jurisdictional line does not apply to farmers pursuing farm-related projects. DEM will continue to be the freshwater wetlands regulatory agency for all farmers, regardless of the location of the farm.

### **Rules and regulations**

The CRMC has promulgated *Rules and Regulations Governing the Protection and Management of Freshwater Wetlands in the Vicinity of the Coast* became effective on August 18, 1999. The Rules are similar to the DEM's wetlands Rules with some definitional and procedural changes to allow for consistency with CRMC's ongoing program and procedures. A separate fact sheet prepared by CRMC describes these differences. DEM's Rules are expected to be updated as well this fall to reflect these latest jurisdictional changes. It is the goal of both agencies to continue to fully

protect the integrity of freshwater wetlands and minimize disruption to ongoing projects.

### **Existing DEM wetlands permits**

Both agencies are committed to working with the regulated community to ease the transition to this new jurisdiction. All determinations, verifications, and permits issued by DEM prior to August 18 will remain valid for the specified time periods. Any *Application for Renewal* of a valid permit that was granted by DEM prior to the effective date of the CRMC Rules and Regulations will be submitted to DEM for processing. Similarly, any *Application for Permit Modification* will be submitted to DEM. If DEM determines that the modification requires a new permit, the applicant would be required to submit a new application to CRMC for review and approval.

### **Ongoing DEM applications and enforcement cases**

All freshwater wetlands applications pending with DEM on August 18, will continue to be reviewed by DEM under the Rules and Regulations in effect at the time the application was submitted. An application is considered pending at DEM once an application number has been assigned. No additional freshwater wetlands permit will be required from the CRMC. Ongoing DEM enforcement actions on properties that are shoreward of the line will also continue to be processed by the DEM.

### **Projects on the line**

The CRMC *Rules and Regulations Governing the Protection and Management of Freshwater Wetlands in the Vicinity of the Coast* specify which agency will handle road and utility projects that fall on the jurisdictional line. On the rare occasion that an application for a project straddles the line, the agencies have agreed to decide on a case-by-case basis whether one agency or both agencies should review the project. When planning for a project that straddles the line, a request should be submitted to the CRMC for the clarification of regulatory jurisdiction. CRMC will be the gatekeeper for these projects, will coordinate with the DEM, and will notify the applicant of the appropriate wetland review agency.

### **Other CRMC regulatory programs**

Those portions of the Coastal Resources Management Program (CRMP) and the Special Area Management Plans (SAMPs) that pertain to freshwater wetlands will remain in effect. In all cases where there is more than one protection standard or provision from the CRMP, the SAMP, and the new *Rules and Regulations Governing the Protection and Management of Freshwater Wetlands in the Vicinity of the Coast*, then the more stringent standard shall apply. There will be certain circumstances where both DEM and CRMC will continue to be involved in the regulation of the same freshwater wetland. This may arise where CRMC's 200-foot contiguous area or the limit of a CRMC Special Area Management Plan extends landward of the new jurisdictional line.

### **Other permits**

The CRMC *Rules and Regulations Governing the Protection and Management of Freshwater Wetlands in the Vicinity of the Coast* pertain to State freshwater wetlands permitting and enforcement only. These Rules do not eliminate the need to obtain other local, state, federal, or other permits. When applicable to freshwater wetlands in the vicinity of the coast, the U.S. Army Corps of Engineers Programmatic General Permit will be administered by CRMC. The DEM will continue to administer the *Rules and Regulations Establishing Minimum Standards Relating to Location, Design, Construction and Maintenance of Individual Sewage Disposal Systems (ISDS Rules)* and the *Water Quality Regulations* throughout the State.

### **Availability of maps, Rules, forms, etc.**

The maps that illustrate the jurisdictional line are available for inspection at the CRMC, the DEM Office of Technical and Customer Assistance, and the applicable coastal Town and City Halls. Hard disk "ARCVIEW" versions of the maps are expected to be available in the Spring of 2000. Copies of the *Rules and Regulations Governing the Protection and Management of Freshwater Wetlands in the Vicinity of the Coast* are available from the CRMC, as are application forms, data sheets, etc.

### **For further information on freshwater wetlands regulations please contact:**

CRMC at Oliver H. Stedman Government Center, 4808 Tower Hill Road, Wakefield, RI 02879; Phone (401) 222-2476 or the DEM Office of Technical and Customer Assistance at (401) 222-6822, Office of Water Resources Wetlands Program at (401) 222-6820, Office of Compliance and Inspection at (401) 222-1360. All DEM Offices are at 235 Promenade Street, Providence, RI 02908

## **Coastal Resources Management Council Members**

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Beverly, Massachusetts. As the Supervisor of the Engineering Department, Dave was responsible for the design, construction, and installation of aquatic housing systems. One of his chief responsibilities was designing recirculating systems for biomedical research. As CRMC's Aquaculture Coordinator, Dave's responsibilities will run the gamut from permitting to policy and planning. Dave's interests include fishing and boating on Rhode Island's coastal waters.

## **CRMC Adds Two New Staffers**

CRMC recently added two new members to its staff. Sean Feeley is the second Freshwater Wetlands Biologist to be added to the staff this year. Sean will work primarily on Freshwater Wetlands issues as a member of the Permitting Staff. He received a Bachelor of Science degree in Environmental Management from the University of Rhode Island in 1996. Sean also worked as a Research Assistant at URI for three years. His work focused on avian usage of wetlands habitats, and environmental monitoring of salt marsh restoration at the Galilee Bird Sanctuary in Narragansett. Sean's interests run to the great outdoors on a year-round basis. He is an avid birder, hiker, biker, and cross-country skier.

With the hiring of David Alves, CRMC added an Aquaculture Coordinator to its staff for the first time. Dave received a Bachelor of Science in Aquaculture with a minor in Zoology from the University of Maine in 1995, and earned a Master of Science degree in Zoology from the University of Rhode Island in 1997. A steady stream of Aquaculture related experience runs through his work background. Dave worked as an Aquaculture Extension Agent with URI's Department of Fisheries, Animal, and Veterinary Science from 1997 to 1999. Immediately prior to being hired by CRMC, Dave was a Senior Member of the Engineering Department at Marine Biotech, Inc., in

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