# RINHewS

## The Newsletter of the Rhode Island Natural History Survey

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## *The President's Corner*

by Richard W. Enser

Preservation of open space in Rhode Island is serious business. The citizens of this state have recognized the importance of open space to their quality of life and have overwhelmingly supported the expenditure of millions of dollars annually for development rights, conservation easements, and outright acquisition of land. At times the work is daunting and increasingly compounded by high demand as more property owners seek ways to preserve their land in the face of rising taxes or pressure to sell from other family members, or to protect their legacy from uncaring heirs. Within this context I am sometimes asked, "How will we know when we've protected enough open space?" In response, I am sometimes compelled to counter with: "Do you like the way Rhode Island is now? If so, take a mental snapshot, because there will never be any more open space in this state than there is at this moment."

Each scoop of a backhoe, acre of asphalt laid, and "insignificant alteration" of a wetland results in the degradation of natural land and the ecological services it provides. This concept should not be difficult to comprehend, as there are numerous studies documenting the greater species richness and general ecological integrity of natural land as opposed to urbanized, suburbanized, or otherwise developed land. Not so easily understood is which pieces of the landscape are most critical to secure, and which are the ones that can be sacrificed to the onslaught of urban sprawl. Traditionally, land protection for ecological purposes has focused on fairly distinct properties: rare species, unique plant communities, fishable streams, good turkey habitat, etc. All are admirable values, and it is often suggested that by protecting these identified special elements we coincidentally protect a large array of associated species and processes about which we know relatively little. Included in this group are the 80-90% of species that are neither very rare nor very common, but which instead fall into the all-inclusive category of "present." In other words, we know they're out there, but we're not too sure exactly where or how many. Our knowledge about ecological processes is even poorer. Granted, studying processes is extremely difficult, but we know little about metapopulation dynamics, movement corridors, nutrient cycling, food webs, and the myriad other functions that might govern how we select conservation lands, provide connections between protected sites, and manage it all to ensure stability.

The Rhode Island Natural History Survey cannot answer all of these questions, but it can provide continuity among the many scientists who are seeking answers, and provide the forum for communicating the information to the widest audience. The Biota of Rhode Island project, with its concurrent assemblage of on-line databases, will provide a catalog of the state's biodiversity and a template for conducting further research on the distributions and interactions among species and ecosystems. Hence there will be a greater opportunity to consider a wider representation of the state's natural history when deciding what lands need to be preserved, and what to let go. Moreover, this information is an important component in the relatively new enterprise of ecological restoration. Although the steady conversion of natural land cannot be halted, there is much potential to returning some formerly converted

*continued on page 15*

## *What's Inside?*

# Research Reports

## *Evidence for Seasonal Range Expansion by the Ctenophore* **Mnemiopsis leidyi** *in Northern Coastal Waters of the United States*

by Barbara K. Sullivan

"In the latter part of the summer and early autumn these jelly-fishes fill the water…" So reported Fewkes (1881) in the earliest published record of the comb-jelly *Mnemiopsis leidyi* in Narragansett Bay, Rhode Island. Blooms of these beautifully iridescent and bioluminescent creatures (Fig. 1) appear to have occurred regularly in Narragansett Bay through the late 1970s, but only in late summer and fall, according to the last published record (Deason 1982). The relatively late summer seasonal appearance has been assumed to be due to the fact that, in Narragansett Bay, the species is at the northern edge of its geographic distribution, a range that is bounded on the north by Cape Cod, but extends to the south along the Atlantic seaboard (Fig. 2). Cape Cod marks the northern distributional boundary of a great many coastal species that are adapted to warmer waters, making ecosystems in this region particularly sensitive to small changes in temperature associated with climate change.

Given the potential significance of that first observation we have continued weekly sampling until the present to document the relationship of ctenophore abundance to water temperature, and in 2000 we began to document possible impacts of this seasonal shift on other plankton in Narragansett Bay. We have also reconstructed what exists of the historical record of seasonal appearances of *M. leidyi* in Narragansett Bay (Sullivan et al. in press). The historical record of *M. leidyi* is not always as complete as for other species due to the fact that most ctenophores, including *M. leidyi*, dissolve in preservatives used to store plankton samples for counting. In fact the species is typically viewed as a sticky nuisance that clogs nets, and in many recent studies in Narragansett Bay has been excluded from net samples and dumped over board without quantitative measurement.

It does appear that blooms of *M. leidyi* had never previously been recorded in Nar-

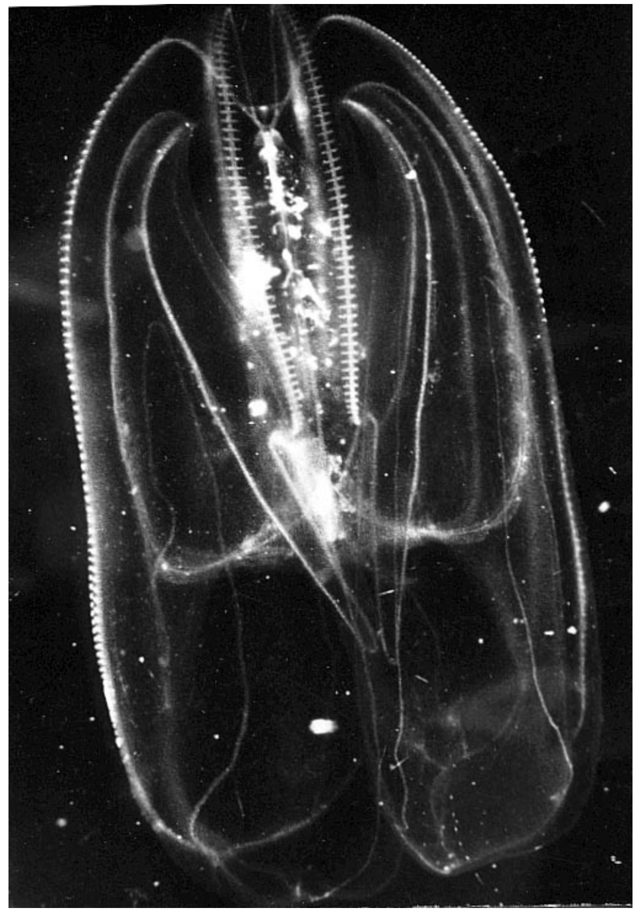

***Figure 1.*** Mnemiopsis leidyi. *Photo by H. Wes Pratt.*

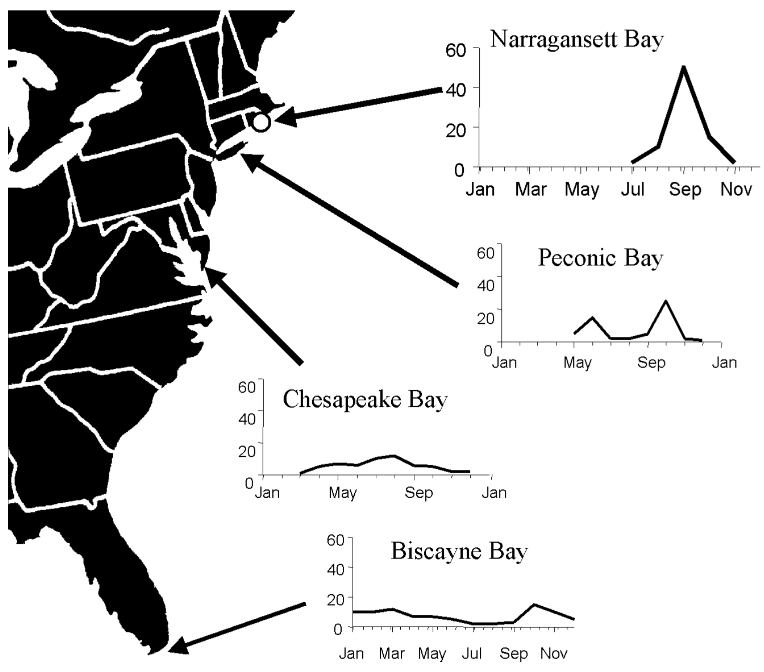


***Figure 2.*** *Geographic and seasonal distribution of the genus* Mnemiospis *along the Atlantic seaboard. Cape Cod marks the northern boundary of* M. leidyi. *The southern boundary remains unclear due to the possibility that* M. mccraydii, *reported in Florida, may not be a separate species. Systematic studies indicate that the criteria used to distinguish the species represent morphological variations within a single species rather than valid characters separating two distinct species (Seravin 1994a, 1994b).*

| Date | First Appearance | Bloom Peak | Peak Abundance no $m^{-3}$ | Average Temperature in May °C | Reference |
|---|---|---|---|---|---|
| 1950 | July 25 | Oct 2 | n.d | n.d | Frolander (1955) |
| 1951 | July 25 | Sept 7 | n.d | n.d | Frolander (1955) |
| 1971 | July 29 | Aug 20 | 27 | 9.67 | Kremer (1975) |
| 1972 | July 6 | Sept 8 | 18 | 10.61 | Kremer (1975) |
| 1973 | July 15 | July 31 | 70 | 12.11 | Hulsizer (1976) |
| 1974 | July 15 | Aug 20 | 38 | 10.94 | Kremer (1975) |
| 1975 | July 20 | Aug 3 | 27 | 10.89 | Deason & Smayda (1982) |
| 1976 | July 26 | Aug 1 | 5 | 12.11 | Deason & Smayda (1982) |
| 1977 | n.d | Aug 30 | 7 | 13.22 | Deason & Smayda (1982) |
| 1978 | July 20 | Sept 23 | 8 | 11.61 | Deason (1982) |
| 1979 | n.d | Aug 11 | 70 | 13.56 | Deason (1982) |
| 1983 | Aug 15 | Sept 5 | 80 | 12.39 | MERL (unpublished) |
| 1985 | June 10 | June 16 | 250 | 12.50 | MERL (unpublished) |
| 1986 | May 18 | n.d | 60.5 | 13.00 | MERL (unpublished) |
| 1990 | n.d | early July | n.a | 12.06 | Keller et al. (1999) |
| 1999 | May 18 | June 12 | 350 | 14.60 | this study |

*Table 1. Date of first appearance and bloom peak of* Mnemiopsis leidyi *(>1 cm length) obtained from published and unpublished records from 1950-1999. Bloom peak was determined by the date at which maximum numbers of* M. leidyi *were reported. No data available = n.d.*

ragansett Bay prior to the second week in July, until the mid-1980s (Table 1). Temperature may be a factor in both timing of blooms and abundance of individuals during bloom peaks (Fig. 3). There has been a significant increase of close to 2 ºC in average winter water temperatures in the Bay since the 1950s (Hawk 1998). Temperature variation and differing seasonality of *M. leidyi* is quite evident in the contrast between a "cold" year in the 1970s and a warm year in 1999 (Fig. 4). We found a significant correlation between average temperature during May and the date on which maximum numbers of *M. leidyi* have been observed in published and unpublished records for Narragansett Bay (Fig. 4).

When *Mnemiopsis leidyi* once again made an early seasonal appearance in 2000 we documented a significant decline in numbers of zooplankton during July, the period of peak abundance of the ctenophores (Fig. 5). This observation is indicative of a significant change in the ecosystem. Historically, zooplankton have reached maximum, not minimum, abundance in July (Frolander 1955, Martin 1965, Hulsizer 1976). Low numbers of zooplankton could have important consequences, for example, potentially reducing success of larval fish in Narragansett Bay which depend on zooplankton for food at this time of year (Keller et al. 1999). *M. leidyi* also directly preys on fish eggs. In years where *M. leidyi* appears in June its predation on fish eggs could have a large impact on fisheries. In fact, significant declines in ichthyoplankton (fish eggs and larvae) have been reported in Narragansett Bay since the 1970s. These losses do not appear to be related to

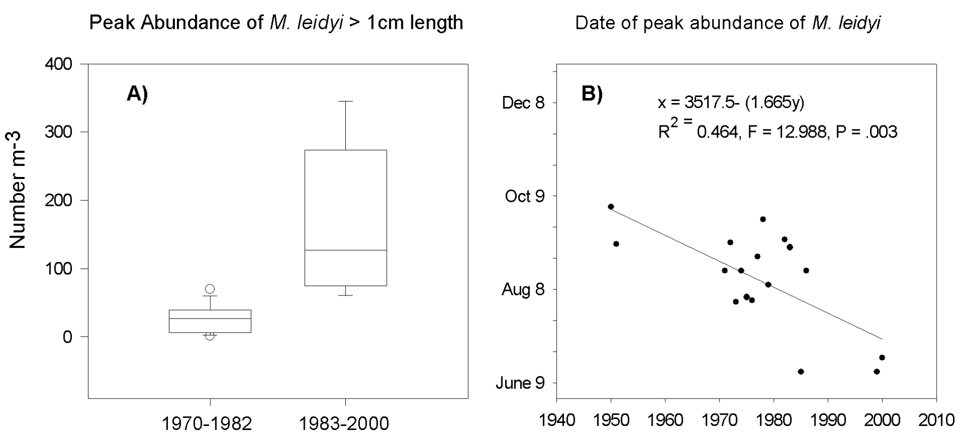


***Figure 3.** Population maxima of* Mnemiopsis leidyi *in Narragansett Bay since 1950. Numbers for individuals > 1 cm long used to make data taken with different mesh nets comparable from Frolander (1955); Kremer (1975); Deason and Smayda (1982); MERL (unpub.); Sullivan et al. (in press). Historical data on* M. leidyi, *as with all lobate ctenophores, is limited by their poor preservation.* ***A**) Maximum abundance has increased significantly since 1983 (Mann Whitney Rank Sum test, t=44, p= 0.017). Box in plot shows median with 25th and 75th percentiles and error bars at 10th and 90th percentiles.* ***B**) Regression analysis reveals a significant trend in timing of the period of peak abundance shifting from late summer in 1950 to spring in 1999-2000.*

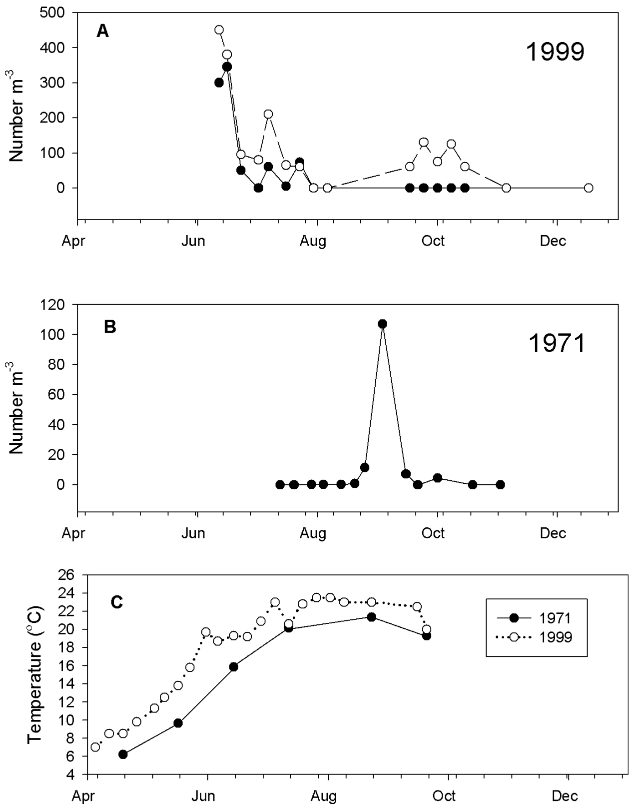


***Figure 4.*** *Abundance of* Mnemiopsis leidyi *and water temperature in Narragansett Bay.* ***A****) Abundance in 1999 at the Graduate School of Oceanography dock. Open circles are ctenophores < 1 cm length; closed circles are > 1 cm in length.* ***B****) Abundance of* M. leidyi *> 1 cm during 1971 from Kremer (1975), Appendix II, Station 3.* ***C****) Surface temperatures in Narragansett Bay during spring and summer of 1971 and 1999.*

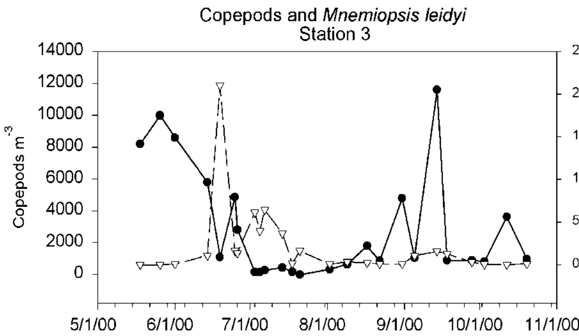


***Figure 5.*** *Abundance of calanoid copepods (·) and* M. leidyi *( ) at the Graduate School of Oceanography Dock in 2000. Copepod abundance was drastically reduced for the entire month of July and most of August following the ctenophore increase in mid-June. This period of low copepod abundance contrasts sharply with historical patterns because July and August have typically been the periods of maximum yearly copepod abundance in Narragansett Bay (Frolander 1955; Martin 1965; Hulsizer 1976, Deason and Smayda 1982).*

fishing pressure or other sources likely to reduce fish spawning (Keller et al. 1999), but could be related to increased numbers of *M. leidyi* during critical spawning times.

We hypothesize that in addition to increasing its numbers during spring, *Mnemiopsis leidyi* could be expanding its range northward, due to recent increases in temperature of inshore waters. Given that this species can have profound effects on ecosystem dynamics in areas that represent geographic range expansion, such as in the Black Sea where its introduction was associated with catastrophic declines in fisheries (Malyshev and Arkopov 1993), its geographic and seasonal distribution should be closely monitored.

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***Barbara K. Sullivan*** *is a Senior Marine Research Scientist at the Graduate School of Oceanography, University of Rhode Island.*

## *Changes in Lobster Populations in Narragansett Bay 1959–2000*

by J.S. Cobb and M. Clancy

### INTRODUCTION

The past 35 years have seen an extraordinary increase in the commercial catch of American Lobster, *Homarus americanus*. Throughout their range catches have doubled since the early 1970s, and in some locations catches are still increasing despite strong indications that the population is overfished. In Rhode Island, the catch has increased from approximately 300 metric tons annually in the early 1960s to nearly 3,000 mt in the late 1990s (Figure 1). An increase in catch can, in part, be attributed to an increase in fishing effort (expanding range in fishing, better technology, and larger vessels). However, fishery biologists generally agree that, when controlled for increased effort, a real increase in population size has occurred.

One explanation of the increase in the abundance of lobsters could be that recruitment has increased, perhaps in response to climate change. Water temperature increase frequently has been mentioned as a possible factor. Campbell et al. (1991) used time-series models to fit catches and surface temperature. In two regions, inclusion of temperature in the models improved forecasting ability, but not in a third area. Koeller (1999) suggested that lobster catches in Nova Scotia were correlated with temperature at large scale, but not at smaller spatial scales. However, in a detailed examination of temperature and lobster catch over the range of the fishery, Drinkwater et al. (1996) found that temperature-catch regressions developed in earlier studies did not predict later landings. They also found that the increase in lobster landings was not correlated with temperature throughout the range of the lobster. Thus, they suggest, there is not a link between ocean temperature and lobster catch. Clearly, if there is a relationship between temperature and catch, it is a complex one.

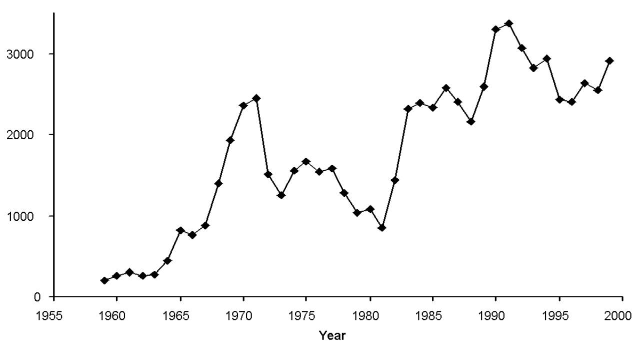


***Figure 1.*** *Annual landings of lobsters (metric tons) in Rhode Island reported by the National Marine Fisheries*

Larval delivery may also affect lobster populations and potentially the catch rate. Katz et al. (1994) and Incze and Naime (2000) used coupled physical-biological models to examine possible larval delivery scenarios in the southern New England region and in the Gulf of Maine, respectively. In both cases wind played an important role in the inshore movement of late-stage larvae. If, as is suspected, lobster nursery grounds are primarily in nearshore locations, then the amount of onshore wind during the larval season may be an important determinant of year class strength.

The existence of a long time series of lobster abundance in research trawls conducted by the University of Rhode Island at two locations in Narragansett Bay (Jeffries 1985, 2000) provides an excellent opportunity to test the hypotheses about climate change on a local population of lobsters.

In this brief analysis we will determine correlations between lobster abundance and climate variables. In particular we will address the following questions: 1) Is there a statistical relationship between lobster abundance and water temperature? and 2) is there a statistical relationship between lobster abundance and North Atlantic Oscillation (NAO) indices?

### METHODS

Weekly 30-minute benthic tows have been made since 1959 using a research otter trawl near Fox Island in the west passage of Narragansett Bay, and at Whale Rock, at the mouth of the Bay. Lobster abundance, expressed as mean number of lobsters per tow, was obtained from this data set, courtesy of Dr. Jeremy Collie (Graduate School of Oceanography, University of Rhode Island). Surface and bottom water temperatures were taken at the time of each trawl. Details of the methods are found in Jeffries (1984). Landings data in the commercial fishery were obtained from the NMFS website (http://www.st.nmfs.gov/st1/commercial/) on June 15, 2001. The NAO indices were obtained from http://www.cru.uea.ac.uk/ftpdata/nao.dat on May 29, 2001. Pearson Correlation coefficients were determined using SAS. To explore the relationship between climate variables and lobster catch in the experimental trawls, we determined correlation coefficients between temperature (surface temperature, determined at the time of the trawl) and catch lagged by 0 to 6 years, and between the NAO and catch at similar lags. A 0-year lag suggests immediate effects of the temperature that might influence catchability, while longer lags suggest effects operating via recruitment. It takes a lobster 4 to 7 years to reach legal size from the egg.

## RESULTS

The pattern of change in abundance of lobsters in the trawl surveys over the 42 year period 1959–2000 shows a gradual increase starting in the 1960s, a striking jump in abundance in the late 1980s at the Fox Island station, and a dual-peaked pattern at Whale Rock (Figure 2). There is no correlation between the catches at the two stations (Pearson Correlation Coefficient, r = 0.17, p = 0.28). There is a significant correlation (r = 0.73, p = 0.0001) between the Fox Island catch and the Rhode Island landings, however there is no correlation between the Whale Rock catch and the RI landings (r = 0.09). The correlations changed very little when landings (legal-sized lobsters) lagged trawl catches (dominated by smaller, younger lobsters) by one or two years.

Water temperature in Narragansett Bay has shown a steady increase during the period 1959–2000. The surface water temperatures in Narragansett Bay, illustrated in Figure 3 by data from the Whale Rock station, indicate that the annual mean temperature has risen from about 10.5 ºC to about 12.0 ºC. Unlike lobster abundance, bottom water temperature is highly correlated between the two stations (r = 0.97, p <.0001).

There is a significant correlation between the Rhode Island landings and annual mean surface water temperature at a 0-year lag (r = 0.60, p = 0.0001), suggesting the possibility of immediate effects of temperature on catchability by lobster traps. Correlations at other lag times (3–6 yr) are not significant (Table 1). Just the opposite was true at the Fox Island station, where the trawl catches were correlated with surface water temperature at all lags, with the strongest correlations at 0 and 6 years. In contrast, the annual mean surface water temperature at Whale Rock was not correlated with the catch at Whale Rock at any lag.

To further examine the effect of climate on local lobster catch, we attempted to determine if there was a correlation between the North Atlantic Oscillation (NAO) winter index and Rhode Island lobster catches (Table 2). Correlations when the Fox Island catch data lagged the NAO winter

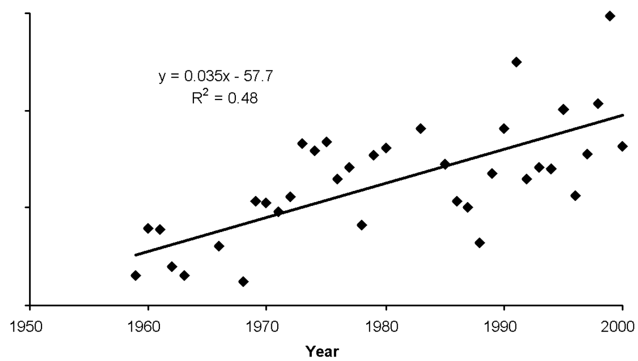


*Figure 3. Annual mean surface water temperature at the mouth of Narragansett Bay, 1959–2000. Water temperatures were taken during weekly trawl surveys.*

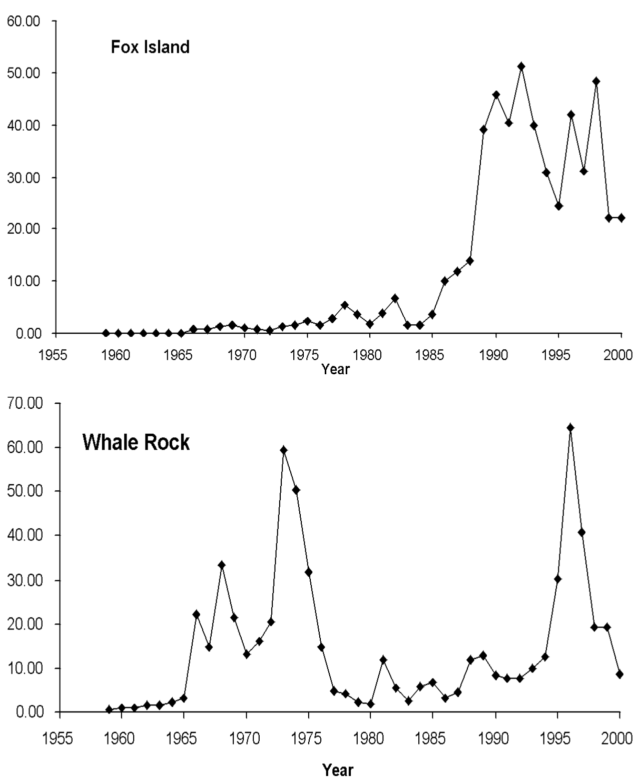


*Figure 2. Annual mean catch of lobsters (mean no. per tow) in weekly experimental otter trawls at two stations in Narragansett Bay, RI. Top: Fox Island; bottom: Whale Rock.*

| Lag | Fox Island | Whale Rock | RI Landings |
|---|---|---|---|
| 0 yr | 0.41 (0.008)* | 0.17 (0.301) | 0.60 (0.0002)* |
| 3 yr | 0.37 (0.023)* | -.01 (0.957) | 0.33 (0.059) |
| 4 yr | 0.34 (0.042)* | 0.04 (0.839) | 0.34 (0.055) |
| 5 yr | 0.46 (0.005)* | -.01 (0.959) | 0.32 (0.076) |
| 6 yr | 0.53 (0.001)* | -.18 (0.332) | 0.34 (0.065) |

*Table 1. Pearson Correlation Coefficients between annual mean surface water temperature and lobster catches at Fox Island, Whale Rock, and the RI commercial landings. The water temperature at Whale Rock was correlated with the landings data. Probabilities given in parentheses; significance indicated by *.*

index by 0 and 3 years were remarkably high at r = 0.88 and r = 0.84 respectively. They were considerably lower but still significant at longer lags. The Whale Rock catch data and the NAO winter index were correlated at 0 and 3 yr lags (r = 0.69 and r = 0.33 respectively) but not at greater lags.

A project monitoring young-of-the-year (YoY) lobsters in nearshore waters of Rhode Island from 1991 to 2000 has produced a 10-year time series of YoY abundance data (R. Wahle, Bigelow Labs, Boothbay Harbor, ME, personal communication). Wahle also has been monitoring YoY abundance in central Maine since 1989. There has been a declining trend in YoY abundance at both locations (Figure 4). The annual YoY indices in RI and ME are significantly correlated with each other (r = 0.68, p = 0.031). The NAO winter index is significantly correlated with the Rhode Island YoY time series (r = 0.65, p = 0.041), while the Maine data series is not, but approaches significance (r = 0.51, p = 0.088).

| Lag | Fox Island | Whale Rock | RI Landings |
|---|---|---|---|
| 0 yr | 0.88 (0.0001)* | 0.68 (0.0001)* | 0.74 (0.0001)* |
| 3 yr | 0.84 (0.0001)* | 0.33 (0.036)* | 0.67 (0.0001)* |
| 4 yr | 0.41 (0.008)* | 0.17 (0.30) | 0.61 (0.0001)* |
| 5 yr | 0.37 (0.023)* | -0.01 (0.957) | 0.31 (0.062) |
| 6 yr | 0.34 (0.043)* | 0.04 (0.836) | 0.29 (0.092) |

***Table 2.*** *Pearson Correlation Coefficients between the North Atlantic Oscillation winter index (NAO) and lobster catches at Fox Island, Whale Rock, and the RI commercial landings. Probabilities given in parentheses; significance indicated by *.*

Lobster catches are seasonal, with lobstermen reporting peak catches in June, July, and August. On the assumption that the seasonality of catch in lobster traps might be reflected in seasonality of abundance in the experimental trawl data, we determined the first month in each year in which the catch was more than 10% of the total annual catch, and the month in each year that had the largest catch. We determined the mean of each for the first and second halves of the time series (Table 3). Fox Island showed no difference between the first and second halves of the time series in average month with the largest catch (mid-July) or average first month in which the catch was >10% of the annual catch. However, at Whale Rock, the peak catches seem to have moved earlier in the year by several weeks over the 42-year duration of the trawl survey. There, the average month with the largest catch changed from mid-July in the first half of the time series to early June in the second half. Also, at Whale Rock, the first month in which the catch was >10% of the total changed from early June to mid-May. Increased water temperature may be a factor in the seasonal shift at Whale Rock, but it is not clear to us why the same pattern was not seen at Fox Island.

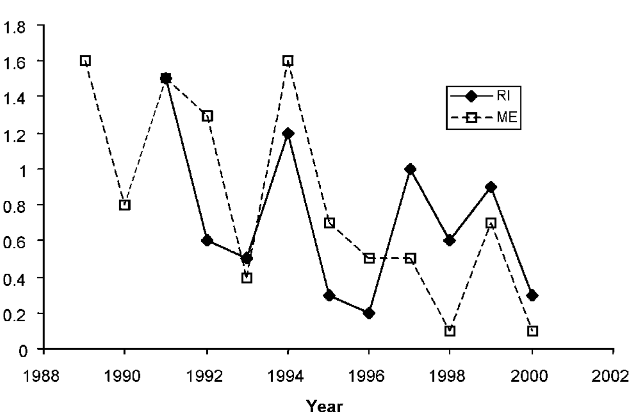


***Figure 4***. *Annual mean abundance of young-of-the-year lobsters in Maine (1989–2000) and Rhode Island (1991–2000).*

## CONCLUSIONS

The past 35 years have seen a large increase in the commercial landings of lobsters in Rhode Island, and this is reflected in the experimental trawl catches at the Fox Island site. The experimental trawl series at the Whale Rock site showed increased abundance of lobsters in the 1970s, and another peak in the late 1990s. Annual mean surface temperature in Narragansett Bay has increased steadily from 1959 to present and currently stands about 1.5°C above the mean temperature in the early 1960s. Sea surface temperature and trawl catches were correlated with each other at Fox Island but not at Whale Rock. It is not clear to us why the Whale Rock and Fox Island stations are so different in patterns of catch and relationship to temperature.

| Station | Month with largest catch | | First month when catch is >10% of annual total | |
|---|---|---|---|---|
| | 1st 21 yr | 2nd 21 yr | 1st 21 yr | 2nd 21 yr |
| Whale Rock | 7.5 | 6.2 | 6.2 | 5.3 |
| Fox Island | 7.5 | 7.3 | 5.8 | 5.7 |

***Table 3.*** *Seasonality in lobster catches in the experimental trawl at two stations in Narragansett Bay. Numbers represent months (e.g. 7.5 = mid July).*

The North Atlantic Oscillation (NAO) winter index is strongly correlated with commercial landings and the abundance of lobsters at Fox Island at 0-year and 3-year lags, suggesting a climate effect on recruitment to the adult (fishable) stock and perhaps on catchability. The NAO has been in a positive phase since the late 1970s, which in general fits with the increase in temperature and lobster catch, although the timing of the start of the increases do not coincide.

There is a remarkable coincidence in the 10-year time series abundance of young of the year lobsters in Rhode Island and Maine, suggesting that lobster recruitment processes in the two regions may be affected by the same mesoscale oceanographic mechanisms. The correlation between the Rhode Island YoY data and the NAO, and nearly significant correlation with the Maine data, supports this suggestion. It is interesting to note that the generally declining YoY abundance is found at a time of generally increasing water temperature.

At Whale Rock the timing of the beginning of peak catches in the trawl survey has moved several weeks earlier in the year, presumably due to a change in lobster activity correlated with increased temperature. It is puzzling that the Fox Island catch data did not show the same pattern. Lobstermen report that the timing of the "run" is variable from year to year and place to place. The Fox Island station is farther up the Bay, shallower, and dominated by soft substrate. Perhaps the difference in environment contributes to the differences seen in lobster abundance patterns.

**ACKNOWLEDGEMENTS**

We are grateful to Jeremy Collie and David Taylor, who graciously allowed us access to the long-term trawl data set. Many thanks go to Perry Jeffries who ran the trawl program for many years, accumulated much of the data, and was a strong advocate for the program.

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***J.S. Cobb*** *and* ***M. Clancy*** *are affiliated with the Department of Biological Sciences, University of Rhode Island.*

## *Cypress Spurge Biological Control in Rhode Island*

by Heather Faubert

Cypress Spurge, *Euphorbia cyparissia*s, is an herbaceous, perennial weed in the family Euphorbiaceae. Originally from Europe, it was intentionally introduced in the United States in the 1860s as an ornamental plant. From gardens and graveyards it spread and became established on open ground, particularly pastures. Today, Cypress Spurge can easily be found on roadsides throughout Rhode Island and the Northeast. Cypress Spurge is also found in pastures and hayfields throughout the state and this is a problem for grazing animals. Most grazing animals avoid eating Cypress Spurge, but if cows or horses accidentally ingest it they can become sick and perhaps die. The white, milky plant sap can also be an irritant to humans.

The Watson Farm in Jamestown, Rhode Island had a huge infestation of Cypress Spurge. Approximately 80 acres of the 265-acre historic farm was contaminated by Cypress Spurge, making much of the land unusable. Don and Heather Minto, the caretakers of the farm for the Society for the Preservation of New England Antiquities (SPNEA), learned about insects being used in the Great Plains to control Leafy Spurge, *Euphorbia esula*, a close relative of Cypress Spurge. Leafy Spurge is a huge weed problem in the West. In 1961, the USDA initiated a biological control program to find insects in Europe that would control Leafy Spurge in this country. After years of research, 11 European insect species were released to control Leafy Spurge. These insects would only feed on *Euphorbia* plants in the subgenus *Esula*. The Mintos were told that insects controlling Leafy Spurge in the West would probably control Cypress Spurge in the East since the two plants were so closely related.

Beginning in 1995, we released five species of insects at Watson Farm and also on an infested hayfield at URI's W. Alton Jones campus. Four of the insects are root-feeding chrysomelid beetles in the genus

*Figure 1.* Cypress Spurge.

*Aphthona*. The fifth insect is a gall-forming midge, *Spurgia esula*. Since the original release, one insect species, *Aphthona flava*, has reproduced extremely well and has eliminated the Cypress Spurge infestation at W. Alton Jones. The Watson Farm infestation has been greatly reduced and each year continues to decline. This has been a very successful project!

In the summer of 2000, *Aphthona flava* emerged in huge numbers at W. Alton Jones and within a few weeks defoliated all the Cypress Spurge. Defoliation alone will not kill Cypress Spurge, but the *Aphthona* beetle larvae feed on the Cypress Spurge roots, killing the plants. Even though there were thousands (perhaps millions) of *Aphthona* beetles and very little Cypress Spurge, the beetles fed only on the Cypress Spurge. It was quite an amazing sight. We collected approximately 60,000 of these beetles with sweep nets and distributed them to other Cypress Spurge infested hayfields and pastures in Rhode Island.

In 2001 there were no Cypress Spurge plants at W. Alton Jones. We were curious about the *Aphthona flava* beetles. Were they still there? *Aphthona flava* adults lay eggs in the summer and die by the fall. The eggs hatch in the summer and the larvae feed on the roots in the summer and fall, spend the winter under ground, then pupate in the spring and emerge as adult beetles in the summer. Would huge numbers of beetles emerge in 2001 and find no food? In early summer, we placed six potted Cypress Spurge plants on the edge of the field. These plants were checked several times throughout the summer. We found a total of 39 beetles. Evidently, the Cypress Spurge plants died in 2000 before many larvae had completed their development, so the insects died.

Alice learned about this probable outcome in "Through the Looking Glass," when a gnat told

*Figure 2. A. flava* defoliating Cypress Spurge.

*Figure 3. A. flava* on Cypress Spurge.

her,

> "You may observe a Bread-and-Butterfly. Its wings are thin slices of bread and butter, its body is a crust, and its head is a lump of sugar."
> "And what does it live on?"
> "Weak tea with cream in it."
> A new difficulty came into Alice's head. "Supposing it couldn't find any?" she suggested.
> "Then it would die of course."

Lewis Carroll, 1872.

***Heather Faubert*** *is a research associate in the Department of Plant Sciences at URI.*

## *Species Databases and the Bioinformatics Revolution*

by Stephen S. Hale

Biological databases are having a growth spurt. Much of this results from research in genetics and biodiversity, coupled with fast-paced developments in information technology. The revolution in bioinformatics, defined by Sugden and Pennisi (2000) as the "tools and techniques for storing, handling, and communicating the massive and ever-increasing amounts of biological data emerging principally from genomics research," has given biodiversity databases a boost.

Species research and museum collections are going online. Groups are striving for "interoperability," the ability to share data from sources with different formats (Edwards et al. 2000). People are now constructing databases such as Species 2000 (Bisby 2000; Species 2000) and the World Biodiversity Database (WBD 2001), whose goal is to catalog all the known species. The growth in biodiversity databases has been accompanied by a resurgence in systematics. The NSF Partnerships for Enhancing Expertise in Taxonomy (PEET) is helping train new systematists who view contemporary taxonomy as a rigorous, hypothesis-driven science that has embraced molecular biology techniques and evolutionary principles (Pennisi 2000).

About 1.5–1.8 million species have been described so far out of the 10–100 million thought to exist on the planet (Edwards et al. 2000; Wilson 2000). Reasons for describing all the species include conservation, bioprospecting, assessing environmental impacts, and understanding ecosystem function and evolution, not to mention the thrill of scientific exploration (Wilson 2000).

But taxonomy is not a straightforward subject for databases, because of the instability of its basic unit (binomial name) and disagreements over taxonomic hierarchy. The scientific name for a taxon is determined by following the rules set forth in the relevant international code of nomenclature. Determining whether a taxon is biologically meaningful, however, is a matter of scientific judgment (Blum 2000). Database managers, who like things to be clearcut and unambiguous and are not usually noted for their sense of adventure in these matters, look for an authoritative table of species that gives the "official" name, spelling, and code. Such precision does not always exist with species. Bisby (2000) noted that "The fluid nature of nomenclature and classification has continued to infuriate system administrators, and doomed attempts to freeze taxonomy continue to this day."

Luckily, authoritative lists exist for at least some taxa. The American Fisheries Society publishes a standard list of scientific and common names for fish species (Robins et al. 1991). The Integrated Taxonomic Information System (ITIS 2001), supported by the Smithsonian Institution, is working toward a standard database of North American species. Species 2000, an international project, aims to produce a checklist of all known species by linking a federation of databases. Two other major efforts are the International Plant Name Index (IPNI 2001) and the Index to Organism Names (ION 2001).

Although genetics research has led to the growth of biodiversity databases, it has also persuaded some researchers to challenge the binomial name system itself and suggest a system based on phylocodes (Pennisi 2001). While database managers expect additions, deletions, and corrections to their databases, they might be taken aback if the fundamental unit of nomenclature were changed to something that did not match it one-to-one. Someday, perhaps, we will store the entire genome of each species as an identifier. Meanwhile, a commonly agreed-upon code, such as the Taxonomic Serial Number (TSN) of ITIS, can help organize species databases and make it easier to share data. (By the way, the TSN of those of you who call yourselves *Homo sapiens* is 180092.)

New tools are making it easier to work with species databases. The Species Analyst (TSA 2001) uses a common search protocol (Z39.50) and XML to search and retrieve information from biological collections connected by the Internet. Previously, this sort of interoperability has been difficult. Similarly, the Global Biodiversity Information Facility (GBIF 2001) plans to be an interoperable network of biodiversity databases and information technology tools. BioBot (NBII 2001) is a search tool that crawls the Web looking for specific biological data. These tools provide new research possibilities, such as analyzing biodiversity data in ecological niche modeling, which can be used to predict potential species invasions (Peterson and Vieglais 2001).

RINHS has several species databases in the works. The most advanced are for vascular plants, vertebrates, beetles, and fungi. Plans are underway to make the data available on the Web. The beetles are already there (Sikes 2001), having beat the Rhode Island spiders to the Web.

Who would have thought that species databases could be so exciting? To catch a sense of the dynamic happenings that quicken the heartbeat of otherwise taciturn taxonomists, see the special section on bioinformatics in *Science* (Sugden and Pennisi 2000) and the special issue of *Oceanography* on the Ocean Biogeographic Information System (Grassle 2000).


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***Stephen Hale***, an ecologist at EPA's Atlantic Ecology Division on the URI Bay Campus, manages the data from EPA's national Environmental Monitoring and Assessment Program, is currently hard at work on a national coastal species database, and is co-investigator on a project to improve EPA's access to a unified national database on threatened and endangered species. Stephen also serves on the RINHS Advisory Board.

## Training for Invasive Species Inventory

The impacts of invasive plant species on our native plants and habitats is evident: throughout New England, roadsides, conservation lands, woodlands, and wetlands are being negatively affected. Ecologists and conservationists are struggling to come to grips with the advance of these aggressive species, which threaten local biological diversity. Human and financial resources are limited, and many of the worst invasive species infestations go unnoticed until it is too late.

But help is at hand. A regional corps of volunteers is being recruited and trained to survey lands (with a particular emphasis on protected natural areas) throughout New England, for the presence, distribution, and abundance of some 90 non-native plant species suspected of being invasive. It may seem surprising that we must inventory invasive species on the landscape, but it is only through a systematic and scientific process that we can identify the worst invaders and those infestations in greatest need of management.

Currently there is little data available on the distribution of even the most abundant invasive species, such as Japanese Knotweed; other species, such as Japanese Stiltgrass, are unknown to most people. Few herbarium records for these species exist. What we do have is an abundance of anecdotal data that needs to be converted into cohesive written format through the completion of data collection forms. The collection and deposit of this data will allow invasive species ecologists and local land managers to make scientifically based decisions on the control and management of these troublesome species in Rhode Island and throughout the region.

Training in the methodology and data forms being used in this survey effort is being provided to all interested citizens. Come join us for a daylong foray and help combat the continued spread of invasive plant species.

**When:** Saturday, May 4, 2002. **Where:** Location (in Rhode Island) to be announced. **Who:** The session will be led by Chris Mattrick, Senior Conservation Programs Manager at the New England Wild Flower Society, and is sponsored by the New England Wild Flower Society's Plant Conservation Program and the Rhode Island Invasive Species Council. **Registration:** No fee, but registration is required. Contact the Rhode Island Natural History Survey, (401) 874-5800 or email RINHS@etal.uri.edu.


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# *In Memoriam: Irene H. Stuckey 1911-2001*

Irene Hawkins Stuckey, well-known in Rhode Island for her stunning photography and fascinating plant lore, died in Nashville, Tennessee on November 10, 2001 at the age of 90.

The daughter of Henry Perkins Stuckey and Cornelia Childress Martin, Irene grew up on the grounds of the Georgia Agricultural Experiment Station in Griffin, Georgia, where her father was horticulturist and then director. It was here that Irene developed a love of plants that would last a lifetime.

Irene received a B.A. from Vanderbilt University, graduating magna cum laude with a major in chemistry and minor in mathematics. Her doctoral work was done at Cornell University, where she earned a joint degree in cytology and plant physiology, with a minor in bacteriology. Irene came to Rhode Island in the summer of 1937 and worked for over forty years as a full-time faculty researcher at the University of Rhode Island. Her initial appointment at the University was as assistant plant physiologist with the Agricultural Experiment Station. Here she studied basic and applied aspects of forage crop production, pasture renovation, and bentgrass breeding, also working with nursery stock, potatoes, celery, cotton, and other plants.

The work was varied: Irene loved to tell the story of how, during World War II, she and a colleague were among the few faculty members remaining at the Experiment Station. They were asked to stabilize the sandy soil at the Quonset Point airfield, where sands were blowing into the airplane engines and causing respiratory ailments among the men stationed there. While working among the ammunition mounds and embankments at the airfield, they literally had to keep a low profile to avoid being part of the target during the soldiers' target practice!

In the decades following WWII, dairy farming and the need for pastures declined in Rhode Island, and Irene's work shifted to the conservation of native plants and to saltmarsh ecology. It was Irene who laid out the trails at the Nettie Jones Nature Preserve shortly after the W. Alton Jones Campus in West Greenwich was donated to URI, and she led wild flower walks there for 33 years.

Products of Irene's native plant research and burgeoning interest in nature photography include her pamphlet *Endangered Plants of Rhode Island* and the classic *Rhode Island Wildflowers*, which was published in 1967 and won a national graphic arts award. Renowned for their beauty and technical detail, Irene's photographs also appeared in professional articles, the *Providence Journal-Bulletin*, *Natural History*, the *USDA Yearbook of Agriculture*, and in publications of The Nature Conservancy and World Wildlife Fund. Her photographs are a treasure not only for their technical quality, but also because of the data they contain: they are records of when and where hundreds of species of plants, invertebrates, fungi, and birds could be found in Rhode Island over a forty-year period. RINHS is in the process of entering those records

in its Biota of Rhode Island databases.

In 1975 Irene began a series of articles, "Plants Beside the Sea," in URI's Graduate School of Oceanography magazine, *Maritimes.* Each article featured a plant that grew in Rhode Island coastal habitats and included a photo of the plant and a lengthy explanation of the plants's diagnostic and ecological characteristics. The last and sixty-first of those articles was published 20 years later, in 1995. At the encouragement of the late Polly Matzinger, first editor of *Maritimes,* Irene decided to put the *Maritimes* articles into book form. The result of that work--*Coastal Plants from Cape Cod to Cape Canaveral,* co-authored with Lisa Gould and published by the University of North Carolina Press--includes plants far beyond the original Rhode Island borders and was celebrated at a combined book-signing and 90th birthday party in April 2001.

Irene retired from the University of Rhode Island in 1978, but evidently no one ever told her the meaning of the word "retirement," as she continued full-steam, leading walks, giving lectures, consulting on wetland assessment and restoration projects, writing articles, preparing slide programs for elementary school children, adding to her extensive slide collections, and helping to prepare an updated list of Rhode Island's flora [*Vascular Flora of Rhode Island* was published by the Rhode Island Natural History Survey in 1998].

Irene was always generous with her knowledge and especially enjoyed helping young people get started in research. Her prodigious memory was legendary: she could remember details of field trips, plant sightings, conversations, meals, and weather from decades ago. As a field botanist who loved "to feel the land with my feet," she had a passion for accuracy, a desire to know for herself, from living experience, what was happening in the lives of the organisms she studied. She scoffed at scientists who knew animals and plants only from long-dead specimens and the writings of others.

Irene was also known for her willingness to state things as she saw them. One colleague recalls a field trip Irene led through a salt marsh. When Irene showed the group a species of snail crucial to the marsh's functioning, one man asked her, "Just how important is this little snail?" Irene replied, "Just about as important as you are."

Irene received the Rhode Island Natural History Survey's first "Distinguished Naturalist Award," in recognition of a lifetime spent furthering our knowledge of Rhode Island's plants and habitats, and her tireless work to share that knowledge, and her enthusiasm and respect for the natural world, with her peers and the public. She will be sorely missed.

Donations in Irene's memory can be made to the URI Foundation, earmarked for "The Irene Stuckey Endowment Fund for the Nettie Jones Nature Preserve," and sent to: URI Foundation, Davis Hall, URI, Kingston RI 02881.

*Photo and text by **Lisa L. Gould**, executive director of the Rhode Island Natural History Survey and research associate, URI Department of Natural Resources Science.*

# *Rhode Island Collections:*
## *The Stuckey Slide Collection*

Irene Stuckey's slide collection spans nearly six decades and contains over 20,000 slides. The earliest pictures deal mostly with her work at the Agricultural Experiment Station, especially work on turf plots and pasture renovation. But the vast majority of slides were taken from the 1960s into the mid-1990s and reflect Irene's growing interest in native plants and salt marsh ecology.

◎€ The plant slides include native and naturalized North American plants; plants with horticultural, medicinal, or agricultural uses; and plants in botanical gardens as well as from several trips that Irene took to Europe. Among the native and naturalized plants (including ferns and fern allies, gymnosperms, and angiosperms), 131 plant families are represented, and nearly 500 species. There are also over 60 species of fungi and lichens in the collection.

◎€ It's clear that Irene had a great fascination with orchids: approximately 4200 of the slides in the collection are of orchids, with 46 species represented. She worked very hard to get the "perfect" shot of each species and variety, seeking to make the photos useful for identification down to variety or subspecies.

◎€ But plants weren't Irene's only interest: the collection also contains shots of 47 species of mollusks, 25 crustaceans, 80 birds, and a variety of other organisms including sponges, jellyfish, fish, reptiles, amphibians, mammals, spiders, butterflies, and other invertebrates. In addition, there are hundreds of slides of coastal areas and other habitats in Rhode Island.

◎€ What makes Irenes slides so valuable--in addition to their technical excellence and beauty--is the information they contain. Each slide is carefully labeled with the scientific name, as well as the date and location. Irene also noted the camera settings for each slide (f-stop, aperture, and amount of flash used).

◎€ With the help of URI MasterGardener volunteers, RINHS will soon be entering the species, date, and location data for the Rhode Island organisms into the Biota of Rhode Island databases, ensuring that this important information is not lost. The slide collection itself will shared among several organizations and individuals, as requested by Irene.

*--Lisa L. Gould*

# *Focus On RINHS Organizational Members*

## *Rose Island: Jewel of Narragansett Bay*

by Charlotte Johnson

Open space is a precious commodity on the New England coast. Open space on an island of historic significance that *also* supports valuable natural habitats and educational opportunities is as rare as a blue diamond—Rose Island is just such a treasure. That is why we think of it as the "jewel of Narragansett Bay."

The crown jewel, of course, is the Rose Island Lighthouse. Abandoned and vandalized after the Newport Bridge was built, the restored, operating lighthouse has its own success story. The most exciting chapter on the rest of the island was written in June 1999 when the non-profit Rose Island Lighthouse Foundation (RILF) bought the remaining 17 acres of Rose Island, a feat which took one year of perseverance for each acre, financial assistance from RIDEM, the Alletta Morris McBean Charitable Trust and Prince Charitable Trusts, plus the negotiating expertise of Peter Merritt, in whose memory this article is written.

When Native Americans named it Conockonoquit (meaning "place of the long point"), Rose Island was more than 25 acres in size. Like many of the other grassy Bay islands, it was highly valued during Colonial times for grazing animals away from predators. Livestock were ferried out and summarily shoved off to wade through the shallow waters thick with eelgrass and brimming with shellfish. However, by 1898 a series of severe storms had reduced the long grassy north point to the rocky tidal flats seen today, leaving a total of about 18 acres.

Because of its strategic location inside the entrance of Narragansett Bay with an unobstructed view to the sound, Rose Island was critical to the early coastal defense of Newport Harbor. An early British battery, plus French earthworks, were constructed there before 1780, and it was purchased in 1799 for $1,500 from the Goddard family (of cabinet-making fame) by the United States for the site of the nation's first Fort Hamilton. Despite the fact that it was never finished or manned, Rose Island's Ft. Hamilton has been determined eligible for the National Register of Historic Places. Its most innovative remaining features are two circular bastions and a brick barracks building (considered by all accounts to be bombproof).

As military technology improved, defending Newport from inside the Bay became pointless. However, Yankee ingenuity wouldn't allow what remained of Ft. Hamilton to go to waste. In 1869 the Rose Island Lighthouse was built upon its southwest bastion to guide the Bristol and Fall River Line steamships; the bombproof barracks were put to use, first as a quarantine hospital when Asiatic cholera hit the area in 1820, and then through both World Wars as one of the Naval Torpedo Station's explosives magazines. Leaving the lighthouse still operated by the US Coast Guard on a separate 1.5 acre lot, the Navy abandoned 17 acres after WWII. Ownership changed on paper several times with various developments being proposed while the island was in reality being left to the scavengers, vandals, campers, and picnickers, and ultimately to Mother Nature (the real hero), who successfully reclaimed it over the next 55 years.

Initially a haven for Herring Gulls, the Torpedo Station's once-conscientiously mowed grass began to grow and attract a wider variety of birds that dropped seeds there. Dormant seeds in the soil sprouted and grew, and an even wider variety of birds were attracted that dropped different seeds that sprouted and grew, and so on. By the mid-1980s the grass had given way to a tangled succession of hundreds of species of native and naturalized plants, creating an area that is recognized today as one of the Bay's most best habitats for colonial maritime nesting birds, including Glossy Ibis, Great and Snowy Egret, Black-crowned Night-heron, and Little Blue Heron (the current bird list exceeds 75 species).

Rose Island's rocky shores have become home to another keynote bird—the American Oystercatcher—arguably the most handsome of New England's shorebirds. Two to three pairs nest annually near the dilapidated TNT filling station on the southeast corner of the island, therefore, walking around the island (even on the beaches) is prohibited from April 1 to August 15.

As colder months approach we watch for Harbor Seals to return. From December to April up to 100 at a time haul out on Citing Rock on the island's east side. Happily, this area (once proposed to be dredged for a 250-slip marina) is known today for its healthy, ever-increasing amounts of eelgrass. As for the Torpedo Station buildings, some will have to be demolished, others will be left to fall into picturesque ruin or may have a future as blinds for researchers and photographers, while still others (like the circular bastions and the bombproof barracks) are slated to be restored for educational purposes. We are moving carefully and deliberately in our efforts to balance environmental protection, historical preservation, and education and public access, and we are recording everything we do. We welcome your ideas and expertise as future chapters of this exciting story are written.

***Charlotte Johnson** is the executive director of the Rose Island Lighthouse Foundation. For more information call (401) 847-4242, or visit online at www.RoseIsland.org.*

## *RINHS Organizational Members: Special News & Events*

**Norman Bird Sanctuary** in Middletown announces upcoming winter events. *Owl Prowls*: Besides going out on a hike seeking out owls, participate in a slide presentation as well. January 24th & 25th, 6:00 pm-7:30 pm, $6/member, $8/non-members, maximum 20 per night. *Blizzard Talk with Tony Petrarca*: Meteorologist Tony Petrarca will give a talk on Rhode Island blizzard history, how blizzards develop, and what to expect for the remainder of the winter. February 18th, 2001, 10:00 am-11:00 am, $0/members, $5/non-members, maximum 40 people.
Contact the Sanctuary at (401) 846-2577 or visit the website at www.normanbirdsanctuary.org.

**Rhode Island Wild Plant Society** will hold a General Meeting and lecture on Saturday, January 12, 2002 (snow date: Jan. 19) at the Weaver Auditorium, Coastal Institute-Kingston, URI, Kingston. Meeting will begin at 1 pm, refreshments and fellowship at 1:30 pm, with announcements followed by the speaker. Lisa Primiano, Supervisor of the Land Conservation and Acquisition Program in the RI DEM Division of Planning and Development, will speak on *Land Conservation in Rhode Island: Creating Our Own Legacy*. Her talk will enhance understanding of current methods used in land preservation at the federal, state, and local levels. She will inform us about the various agencies and organizations involved, give examples of creative strategies that can be used, and provide information on sources of funding for acquisition, and make suggestions for our individual involvement at the local level.

**Roger Williams Park Zoo** has announced its *2002 Conservation Lecture Series*, a collection of both day and evening programs, which explores a variety of topics and environments sure to please and intrigue those interested in the natural world.

This year's series kicks off on Sunday, January 13th and continues into the spring. Sunday afternoon lectures will feature local experts, from presentations about the Zoo's efforts to save the endangered American Burying Beetle to a behind-the-scenes look at the everyday challenges faced caring for the Zoo's three female African elephants. There's even a special Valentine's lecture devoted to the unusual mating rituals of reptiles.

Thursday evening lectures feature a diverse line-up of international conservationists, including Robin Wingrave, an Australian artist whose draws inspiration for his exquisite wildlife sketches from high above the canopy of the New Guinea rainforest.

For a complete listing of *Conservation Lecture Series* dates, topics, and guests, log on to the Zoo's website, www.rogerwilliamsparkzoo.com starting in January, or call the Zoo at (401) 785-3510.

***The President's Corner,*** *continued from page 1*

data to ensure viability.

Finally, in the race to protect as much open space as possible, relatively little attention has been paid to how these lands should be managed to ensure the perpetuation of the identified species and functions. To date, management planning has principally addressed public access issues (trails and parking lots) and how to maintain fields and meadows, where present. However, consideration also needs to be given to natural disturbance regimes, movement corridors, control of invasives, co-management between sites, and other issues that require good biological information gained through both statewide and local inventory and monitoring efforts.

These are the challenges facing the Rhode Island Natural History Survey as the state's principal source of natural history information. The Survey's Board is currently engaged in a strategic planning effort to identify reasonable goals for the near future, and the mechanisms needed to achieve those goals. I encourage all members, and all those who value open space and preservation of the state's natural heritage, to contribute their thoughts on the direction the Survey should follow in the years ahead.

## *Bioblitz 2001!*


*Bioblitz 2001*, the second bioblitz conducted by the Rhode Island Natural History Survey, took place on Aquidneck Island for 24 hours September 14-15. Eighty-four enthusiastic scientists and volunteers combed Norman Bird Sanctuary, Sachuest Point National Wildlife Refuge, Raytheon Corporation property, Oakland Forest, and the Nunes Farm to find a total of 774 taxa.

Recorded were: 14 mammals; 80 birds; 192 insects; 16 arachnids, isopods, chilopods, and diplods; 10 crustaceans; 13 mollusks; 6 annelids; 50 ciliated protists (this count is tentative, since the samples taken had to be cultured and then identified; a full report on the protists collected will appear in the April 2002 *RINHewS)*; 1 urochordate; 1 hydrozoan; 2 echinoderms; 5 fungi; 56 seaweeds; 1 freshwater alga; 1 true moss; and 319 vascular plants. For a list of the taxa recorded within each group, go to the RINHS website at: http://www.uri.edu/ce/rinhs/pages/bioblitz2001results.html

As can be seen from the counts above, some taxonomic groups were well covered (such as marine algae, vascular plants, and birds), while other groups (such as mosses, fungi, and many invertebrates) needed far more expert attention. The weather also played a part in the results: Friday evening was damp and cold, which kept the numbers of beetles and moths low.


*Bioblitz 2001* was the combined effort of RINHS, Norman Bird Sanctuary, U.S. Fish & Wildlife Service, Raytheon Employees Wildlife Habitat Committee, and Aquidneck Island Land Trust. Food for the participants was provided by the Sodexho Corporation. We are already thinking about *Bioblitz 2002*—suggestions for locations are welcome.

## *Ecological Research in Rhode Island: Snapshot--Where We Are Today*

The Rhode Island Natural History Survey's 7th conference will be held on Friday, March 1, 2002 at the Radisson Airport Hotel in Warwick, RI. A Call to Abstracts is out, requesting contributed papers on any topic related to natural history in Rhode Island. We encourage participation by college researchers, students (including high school), state and federal scientists, naturalists, people involved with environmental organizations, and others. Topics may include geology, hydrology, and soils; ecosystems and habitats; life history, distribution, or status of particular taxonomic groups; analyses of impacts to ecological systems; monitoring and restoration; natural history collections; environmental education; or other pertinent work. Oral presentations will be a maximum of 15 minutes; poster presentations are also welcome. The conference will also include a keynote speaker, presentation of the

*continued on p. 20*

## *Natural History Opportunities*

**Massachusetts Audubon Society** has positions for Coastal Waterbird Interns (20), Coastal Waterbird Monitors/Naturalists (2), Piping Plover/Tern Monitors (5), and a Shorebird and Horseshoe Monitor. All positions are salaried and some have housing available. Positions begin in Spring 2002 and end in later summer or early fall. To apply, please send a cover letter, resume, and list of three references to: Coastal Waterbird Program, Attn: Seasonal Positions, 2000 Main St. Marshfield, MA 02050. Interviews are beginning in January and all jobs will be filled by April 1, 2002. Please direct initial inquires to Matthew Bailey at: (508) 362-7475 or mbailey@massaudubon.org.

Members of the **Barrington Land Conservation Trust** have captured and marked nesting female Diamondback Terrapins of Rhode Island's largest breeding population for 12 years. Research opportunities exist for students/scientists interested in (1) applying population-modeling software to our database to determine the population's size and viability, and/or (2) conducting field research at the nesting site in cooperation with BLCT's field research and monitoring team.

Our database contains records for each of the 200+ terrapins during our 12-year study, including full recapture history, weight, and carapace measurements. Interested persons should contact: Steve Reinert at SReinert@lifespan.org.

**The Friends of the National Wildlife Refuges of Rhode Island** and the **US Fish & Wildlife Service** are looking for volunteers to help run the Friends' Winter and Spring field studies for middle schools. These field studies involve teaching students about the barrier beach and salt pond ecosystems of southern RI. Students and their teachers are taken out in the field (Trustom Pond NWR in the winter, Ninigret Conservation Area in the spring) and are led through a series of activities designed to teach natural history and ecology. The field studies take place during the week and involve small groups of students. Training is provided to all volunteers. This is a great opportunity to have some fun while teaching local kids about the wonders of Rhode Island. Contact Jim Lemire at (401) 364-9124 ext. 25; email education@FriendsNWR-RI.org or Kimberly Hayes at (401) 364-9124 ext. 29, email Kimberly_hayes@fws.gov

**The Nature Conservancy** (Rhode Island Field Office, 159 Waterman Street, Providence, RI 02906) is looking for volunteers to monitor Piping Plover and Least Tern sites in Rhode Island; a minimum commitment of a half-day training session and 2 days of monitoring is expected. Unique opportunity to help endangered species! Call Cheryl Swinconeck at (401) 331-7110.

TNC would also like volunteers to help with field, lab, and clerical work for the Odonata atlas being compiled by Virginia Brown, and Julie Lundgren is seeking volunteers to help inventory TNC properties for birds, herptiles, invertebrates, etc. Contact Ginger and Julie at (401) 331-7110.

**Rhode Island Sea Grant Communications** is looking for an intern for the spring semester. Requirements: a junior or senior college student with good writing ability, with duties to include writing for the joint Sea Grant/Land Grant magazine at URI, *41 Degrees North* [website: http://www.uri.edu/41n] and/or researching and writing fact sheets. 10 hours per week. For college credit, if available. Contact: Rhode Island Sea Grant Communications, URI Bay Campus, Narragansett, RI 02882. Tel: 401-874-6842. Fax: 401-874-6817. E-mail: allard@gso.uri.edu. <http://seagrant.gso.uri.edu/riseagrant>

**Rhode Island's Source Water Assessment Program,** a unique approach through citizen involvement. The University of Rhode Island Cooperative Extension (URI CE) is working with the RI Department of Health to complete the State's Source Water Assessment Program, as required by EPA. This program was established by the 1996 Amendments to the federal Safe Drinking Water Act and assesses threats to public water supplies throughout the State.

There are two different volunteer opportunities—Inventory and Assessment. Some volunteers will work with maps to inventory land use changes and potential pollution sources within the public water supply protection areas, while others will provide input on the risk assessment model and analysis options. Volunteers can participate in one or both portions.

Inventory and Assessment workshops will begin for the towns of Bristol, Warren and Barrington during January 2002. Please contact Holly Burdett, URI CE at (401) 874-5398 to volunteer or find out more. You can also learn more by visiting our website www.uri.edu/ce/wq.

**Roger Williams Park Museum of Natural History** (Elmwood Avenue, Providence, 02905) has several curatorial projects for knowledgeable volunteers or student interns, including taxonomic updating, identification, cataloging, and organizing the herbarium, mollusk, and insect collections. Opportunities to work with other collections exist as well. Student research or internships that earn academic credit are encouraged and welcomed. For information contact Marilyn Massaro, Curator, at (401) 785-9457 ext. 248.

**Roger Williams Park Zoo** (1000 Elmwood Avenue, Providence, RI 02905). We need you at the Zoo: become a Roger Williams Park Docent! Learn about our animals, work with people who are interested in nature and the environment, and make a difference by teaching our visitors about conservation. Anyone age 18 and older may volunteer. For more information call: Debbie Richmond, Coordinator of Volunteer Resources, (401) 785-3510 ext. 356.

**URI Watershed Watch** (Room 01, Coastal Institute in Kingston, 1 Greenhouse Road, URI, Kingston, RI 02881) is seeking volunteer monitors of all ages for the 2002 season! URI Watershed Watch is sponsored by URI Cooperative Extension, the RI Department of Environmental Management, and also by a number of municipalities, environmental, watershed, and lake organizations, and the Narragansett Indian Tribe. Sponsoring organizations choose the monitoring locations, at last count more than 120 in RI and CT. We match volunteers to a location near them or of particular interest to them. Volunteers receive classroom and field training in the basics of aquatic science, equipment, and supplies, and detailed instructions on how to monitor their lake, river, stream, or surfing spot. No prior scientific experience is expected of volunteers, just the time to devote to monitoring and the interest in the water quality of a favorite place.

Volunteers spend 1-2 midday hours each week from mid-May through mid-October monitoring their assigned location. Most monitoring is done mid-stream or mid-lake, rarely from the shoreline. Volunteers must provide their own boat/kayak/canoe, anchor, and personal flotation devices (life preserver). We encourage teams of volunteers to share monitoring duties. The list of potential locations for the 2002 season is on our web page, and can also be sent to interested parties. For more information, visit our web site at www.uri.edu/ce/wq, email us at uriww@etal.uri.edu, or phone us at (401) 874-2905.

## *RINHS Continues Strategic Planning Process*

The RINHS Board of Directors is currently undergoing phase two of a strategic planning process begun in 1997. Under the leadership of Abu Bakr, Director of Organization Development Consulting at URI, RINHS is working to strengthen its structures and practices, clarify its vision and mission, and work on specific strategies to meet long-term goals. A full report of the planning process will appear in the April 2002 *RINHewS.*

RINHS is grateful to the Virginia Butler Fund of The Rhode Island Foundation, a charitable trust serving the people of Rhode Island, for its support of the planning process.

***Rhode Island Natural History Survey, Inc.***
Room 101, the Coastal Institute in Kingston
1 Greenhouse Road, URI, Kingston, RI 02881-0804
*Telephone:* (401) 874-5800; Fax: (401) 874-4561
*Email:* rinhs@etal.uri.edu
*Website:* http://www.uri.edu/ce/rinhs

## *Weaving the Web: Electronic Resources*

**The World Resources Institute** has developed a free, interactive online resource called *Earth-Trends: The Environmental Information Portal* (http://earthtrends.wri.org).

**The U.S. EPA** has published the spring/summer 2001 volume of the *Water Quality Criteria and Standards Newsletter* at: www.epa.gov/waterscience/pc/wqnews/

**The U.S. Fish and Wildlife Service** has produced an extensive national database outlining the distribution of disease-associated pathogens in America's wild and free-ranging fish populations (http://wildfishsurvey.fws.gov).

**New England Seabirds** (www.NEseabirds.com) is a free reference website for pelagic birders from Emmalee Tarry.

**The Wildlife Society Bulletin** has a new web address to access software published in their journal (http://fwie.fw.vt.edu/wsb/).

**Ecological Indicators: Integrating Monitoring, Assessment and Management** is a website (www.ecologicalindicators.org) and corresponding journal with information about key texts in the field of ecological and environmental indicators.

**The U.S. Geological Survey** (USGS) has launched the online National Water Information System. NWISWeb (http://water.usgs.gov/nwis/) offers free access to several hundred million pieces of archival and real-time water resources data.

**Washington State University Cooperative Extension** has developed a video and fact sheet intended to improve the success of streamside planting projects. The video, *Plant It Right: Restoring Our Streams*, and fact sheet are available online at http://wawater.wsu.edu.

**Endangered Species Protection Program** (ESPP), from the Office of Pesticide Programs at EPA, is available online at www.epa.gov/espp/. This website includes information on protecting endangered species from harmful pesticides and a downloadable database (from 1999) of endangered species listed by county.

**Office of Protected Resources**, from NOAA's National Marines Fisheries Service is online at www.nmfs.noaa.gov/prot_res/prot_res.html. The office's website lists protected resources programs and protected marine species, has FAQ and news sections, and an electronic reading room.

**The Endangered Species Program** of U.S. Fish and Wildlife Service has a website at http://endangered.fws.gov/. The website includes information about habitat conservation planning, international agreements to protect species, and information for landowners and others on how to protect both the land and the creatures that live there. The site offers a Kid's Corner and contact information for specialists in different parts of the United States.

**The World Conservation Monitoring Centre** has published its database, *Threatened Animals of the World*, online at www.wcmc.org.uk/data/database/rl_anml_combo.html.

**The 2000 IUCN Red List of Threatened Species** (www.redlist.org/) from the International Union for the Conservation of Nature, provides taxonomic and distribution information on threatened species.

Please include me as a member of the

**Rhode Island Natural History Survey, Inc.**

Annual dues (check one) *(see over for membership benefits)*:

______Individual ($25) _____Family ($40) _____Student/Senior Citizen ($15) _____Organizational ($100)

Name ____________________ Telephone____________________

Affiliation____________________ Fax ____________________

Address ______________________________

E-mail ____________________

Make checks payable to: ***RINHS*** and send to:

### *Benefits of membership in the Rhode Island Natural History Survey*

*For Individual, Family, and Student Members*

- *RINHewS*, the newsletter
- Participation in the RINHS List-Serve
- Free membership list
- 10% discount on all publications
- Discount on annual conference fee
- 20% discount on subscription to the journal *Northeastern Naturalist*

*For Institutional Members*

- *RINHewS*, the newsletter
- Participation in the RINHS List -Serve
- 2 free membership lists
- Listing in Program for Annual Conference
- 10% discount on all publications
- 1 free registration at annual conference
- 20% discount on subscription to the journal *Northeastern Naturalist*

## *Thanks!*

The Rhode Island Natural History Survey is grateful for the following donations to our library: *Biotos Journal,* 2001, published yearly by The Prout School, from Katie Almeida; *The Macrolichens in West Virginia,* by Don G. Flenniken, 1999, from Don Flenniken; *Ocean Sciences, Resources, and Technology,* 1998, by Bernard L. Gordon, Joseph Gordon, and Roger H. Charlier and *If an Auk Could Talk,* 1995, by Ester and Bernard Gordon, from Bernie Gordon; *The Birds of Allens Pond: Ecology of a Coastal Masssachusetts Avifauna*, 2001, The Lloyd Center for Environmental Studies, from Steven Reinert; and a number of circulars from the CT and RI Agricultural Experiment Stations, from Marilyn Massaro.

**RINHS Conference,** *continued from page 16*

Distinguished Naturalist Awards, and organizational displays. We anticipate excellent attendance, with a broad range of participants. This is a great opportunity to tell people what you are doing.

Abstracts should be 200 words or fewer. Please indicate whether you prefer to give an oral or poster presentation, and use the following format:

TITLE IN CAPITAL LETTERS
Author(s), affiliations, and address (including email)
(skip a line)
Body of abstract

Submit abstracts by **January 15, 2002** via email (preferred), fax, or mail to RINHS (contact information is on p. 18). Conference registration information will be sent out in January.

RINHS is very grateful to the Virginia B. Butler Fund of The Rhode Island Foundation, a charitable community trust serving the people of Rhode Island, for supporting the conference and making it possible for secondary teachers and high school students to participate.

## *Collection Cabinets Purchased*

Thanks to a grant from the Champlin Foundations, RINHS has been able to continue purchasing specimen cabinets to protect valuable Rhode Island collections. In this second round of requests, RINHS is providing cabinets to RIDEM's Natural Heritage Program, URI Department of Plant Sciences, and URI Department of Natural Resources Science. Some funds are still uncommitted; requests are filled on a first-come-first-served basis, and and the program is available to all RINHS organizational members.

Rhode Island Natural History Survey
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1 Greenhouse Road, U. R. I.
Kingston, RI 02881-0804