Salt Ponds Coalition

The Tidal Page

News of the Rhode Island Salt Ponds

www.saltpondscoalition.org | Official Watershed Council for the Salt Ponds | Summer 2007

In This Issue

Weekapaug Inn Update

There has been a lot of action around the Weekapaug Inn project since our last update. The Inn received septic design approval from RI DEM on May 24th, and not long after that they and RI DEM were sued by a group of Weekapaug residents who had not signed on to the agreement that had been reached between the Inn and the Weekapaug Fire District. These residents were upset over what they considered a lack of public comment on the application and argued that the system design was so new

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SPC Expands Focus on Point Judith Pond

The Salt Ponds Coalition has been focusing on Point Judith Pond this season and has made a big effort to become more involved with issues there. So far we've had great success. As reported in the last issue of the Tidal Page, we have added three new testing stations to help Narragansett, and our partner The Southern Rhode Island Conservation District, track down the source of pollution entering the eastern pond in the vicinity of Harbor Island. We have met with the leaders of the Great Is-

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Aquaculture

Pros and Cons of Farming in the Salt Ponds

With the reduction in native fish and shellfish stock has come the painful reduction in the number of commercial fishermen able to support their families in traditional fisheries. Aquaculture, the cultivation of fish and shellfish in tidal waters, has become a popular means of seafood production. Aquaculture is nothing new; it has long been practiced throughout the world, and oyster farming on Narragansett Bay was a very important part of the state's economy for over 100 years. Lately, many of the existing aquaculturists are looking to expand and several others are entering the aquaculture business. Many of our members have expressed concern over the expansion of privately leased aquaculture grounds. We will attempt to provide some information in order to help citizens understand what the operations are, and what safeguards are in place to secure public health and the well being of the salt ponds. Since fish pens and fish farms are prohibited in the salt ponds, only shellfish issue will apply here.

The R.I. General Assembly assigned responsibility over aquaculture to the Coastal Resources Management Council (CRMC). The Department of Environmental Management (DEM) and the Department of Health also play major roles. Site selection is approved by CRMC after their usual regulatory process. An operations plan is submitted and approved by all three agencies and the CRMC staff makes annual inspections for compliance. All issues relating to human health and shellfish sanitation are addressed by appropriate personnel of DEM and the Department of Health, which comply with the Interstate Shellfish Sanitation Program.

Most, if not all shellfish aquaculture

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Message From Our President

Dear Members,

2007 marks another year of growth for the Salt Ponds Coalition. From Winnapaug Pond in Westerly, to Point Judith Pond, and on all the lovely ponds in between including Quonochontaug, Ninigret, Green Hill, Trustom, Card and Potter, the Salt Ponds Coalition has been hard at work.

The core of our mission remains the Pond Watcher program, which focuses on water quality monitoring. In 2006, thanks to many generous donations, we were able to expand our ongoing testing programs to include nutrient monitoring in four of the area salt ponds. Nutrient contamination is an important bellwether for pond health. Thanks to the efforts of Ted Callender, I am pleased to report that we have now expanded this important monitoring to include Point Judith Pond as well.

Our on-going testing programs are building a comprehensive record of salt pond health and are regularly utilized by researchers and policy makers. Please let me emphasize, no other group or agency collects and freely distributes this information. Salt Ponds Coalition is the sole source providing ready access to comprehensive water-quality data, and, in these days of tightening government budgets, most of our funding for these critical programs comes from your membership dues and gifts. Without your support, this important work would not be done.

Our plans are underway for an active 2007. To further serve the salt-pond community, we are working hard at strengthening alliances with several powerful environmental groups. I'll convey more information as details develop. In the meantime, I invite you to visit our new web site, which has all sorts of information on SPC and the salt ponds, including news, scheduled activities, the results of pond sampling, and, coming soon, analyses by Dr. Callender. Several other reports on water quality are also posted, as is our new Kayakers Guide to the Salt Ponds.

We continue to benefit from office and meeting space in the facility at Kettle Pond Center and we hope you will continue to assist us in paying the rent either through cash donations or by volunteering at the center. The U.S. Fish & Wildlife Service has suffered large cutbacks and more and more of the Kettle Pond services will be done by volunteers. Please call us at 322-3068 if you'd like to help.

Thank you for your generous support to date and please encourage your friends and neighbors to join, too. If you joined SPC this season at a level of $75 or higher, you are entitled to a stylish new SPC hat. You can pick it up at the gift shop at the Kettle Pond Visitor Center. Just give them your name and they'll check it off the list.

Yours for a better environment,

Art Ganz

Salt Ponds Coalition

The Salt Ponds Coalition stands up for the health and sustainable use of the southern Rhode Island salt ponds. SPC is the only organization whose sole charter is to monitor and protect these unique resources.

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Weekapaug Inn Update

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there was little actual performance data to reference. They also voiced concern that similar systems installed in Rhode Island had suffered failures and if such a failure occurred on the sensitive sight of the Inn, it could result in the release of raw sewage into Quonnie Pond. This suit appears like it may be resolved out of court, but as of press time it was still pending

The approved system - a membrane filtration wastewater treatment plant (WWTP) - is part of an overall plan that is designed to reduce the concentration of total nitrogen to less than 10mg/L. Once the wastewater is treated through the WWTP, the effluent is distributed to the disposal system that is spread across the site. This disposal system is comprised of Pressurized Shallow Narrow Drainfields (PSND) and Bottomless Sand Filters (BSF). PSND are installed within the first foot of the soil (root zone) on site. In doing so, additional nitrogen is absorbed by the vegetation (grass) planted over these systems. URI has completed a study that found that up to an additional 30-50% of the residual total nitrogen can be absorbed by the vegetation when this type of system is used. Scientific papers on this topic point out that it can be tricky to balance the nutrient flow to the needs of the vegetation, but mostly seem to support it as a good enhancement to other techniques such as the membrane and sand filters.

Construction fencing and drill rigs define the look of the Weekapaug Inn this summer

This system will include a monitoring system to ensure these levels are maintained throughout operation. As part of the ISDS approval, an Operation and Maintenance program will be required which includes normal operating procedures as well as contingency plans and emergency responses in the event that the target concentrations are not achieved or if system failures occur.

Once reopened, the Weekapaug Inn will be extending the operating season from 2.5 months to 10 months per year and concern has been raised as to whether the annual loading of total nitrogen reaching the pond will increase as a result of this expanded operating schedule. Engineering studies commissioned by the Inn report that the combination of advanced treatment and a reduction in the number of rooms will result in a net reduction from what is currently discharged through five cesspools and a 1970's vintage septic field.

The goal of SPC throughout this process has been to work with the designers, regulators, and local interests, to ensure that 1) the plans approved are as scientifically sound as possible; 2) the unique vulnerabilities of the ponds are properly weighed, and; 3) solid scientific data is being used. We feel the resulting plans represent a marked improvement over the previous wastewater system and will result in cleaner water in Quonnie Pond. The Buffum family has been cooperative through this process and their stated goal is to achieve a LEED level certification for green building design. Visit www.usgbc.org/ to learn about this program.

Point Judith

Continued from front page

land home owners association and will be working with them to develop plans for decreasing their environmental footprint on the ponds. We have delivered a presentation to about 50 members of the Harbor Island Garden Club as well as another presentation to approx. 75 people at the Great Island Homeowners Association meeting in July.

Point Judith Pond is unique in many ways . It is the only pond along the south shore that has an active fishing fleet and working waterfront, and it is the only pond that has a major river running into it. It has more marinas and large pleasure boats than any of the other ponds and it also has several densely populated islands, which are not serviced by municipal sewer systems.

The goal of SPC is to work with other environmental and educational organizations, as well as neighborhood, municipal and governmental institutions, to understand the status of the pond and then develop a plan for how best to ensure its wellbeing.

An example of this approach might be the work that was recently completed with Green Hill Pond. In 2002, SPC convinced the Rhode Island DEM to fund a study of the deteriorating conditions in Green Hill Pond and Eastern Ninigret Pond. The Environmental consulting firm of Horsley/Witten was engaged to study the ponds and their watershed and they recently submitted their final report to the technical advisory committee associated with this project. The towns of South Kingstown and Charlestown, and the state of Rhode Island, are now in the position of understanding which mitigation programs can be utilized to achieve various water quality goals.

Point Judith Pond is a complex system and formulating a comprehensive plan will take time, but the concern and enthusiasm shown by local residents suggests that the will is there to achieve great results.

WATER-QUALITY AND NUTRIENT STATUS OF WINNAPAUG POND

Dr. Ted Callender
Chair, Environmental Committee

Introduction

Salt Ponds Coalition (SPC) re-introduced a water-quality and nutrient monitoring program for Winnapaug Pond in 2006. Before this time, the only water-quality and nutrient data available for Winnapaug Pond was published by the University of Rhode Island's Sea Grant Program for the years 1986 through 1993. It is unfortunate that there is such a large time gap in data (1993 to 2006) as a good time series of water quality and nutrient information is very useful in determining whether the aquatic health of Winnapaug Pond is improving or deteriorating with time.

Two organizations contributed generous donations to pay for water-quality and nutrient analyses; the Weekapaug Foundation for Conservation and the Weekapaug Golf Club. Salt Pond Watchers (SPC) contributed their time to collect water samples and measure temperature, dissolved oxygen, and filter for chlorophyll a (a measure of algae). The University of Rhode Island Watershed Watch Program's Analytical Laboratory, under the direction of Linda Green, analyzed all samples for several forms of nitrogen and phosphorus and Watershed Watch students, under the direction of Elizabeth Herron, analyzed samples for pH, salinity, bacteria, and chlorophyll a.

Four stations were sampled in Winnapaug Pond: the first where the breachway enters Winnapaug Pond, the second halfway up Golf Course Cove, the third adjacent to Jeff Gardner's aquaculture site, and the fourth in the western part of the pond. The location of these stations are shown on the aerial photo of Winnapaug Pond (Figure 1). All stations were sampled bi-weekly for water-quality parameters (temperature, dissolved oxygen, chlorophyll analyses); and monthly for nutrient parameters (nitrate, ammonia, total nitrogen; dissolved phosphate and total phosphorus). SPC Pond Watchers sampled the waters of Winnapaug Pond bi-weekly (from June until August) for fecal coliform bacteria that were determined at URI's Department of Microbiology.

Fig. 1

The Data

All four stations (Breachway, Golf Course Cove, Aquaculture, Southwest Corner) were shallow water stations and water samples were collected approximately 1 foot below the surface. The Breachway station receives appreciable water from Block Island Sound on any flood tide, but its location suggests that the southern Weekapaug housing tract (south of Shore Rd.; more than 100 homes on small lots) could have an influence on the water quality and nutrient status of this station. The Golf Course Cove station is decidedly influenced by runoff from the Weekapaug Golf Course. The other two stations, -Aquaculture and Southwest Corner - appear not to be under the influence of any point or major non point sources.

Temperature and Dissolved Oxygen

The temperature change in waters at the northeastern end of Winnapaug Pond varied from 61 degrees in early June to a high of 72 degrees in mid July to the end of August. Thereafter, temperatures declined to 65 degrees in September and early October. The dissolved oxygen saturation values approached 100% in June and declined slightly to 80% in September. [Dissolved oxygen saturation is defined as the measured dissolved oxygen concentration divided by the oxygen concentration that a water sample can hold (depending upon the water temperature and salinity) times 100]. The fact that the extreme northeastern end of the Pond is fed by water, through the breachway, from Block Island Sound, is the main reason why there was essentially no dissolved oxygen deficit in these waters.

Figure 2 shows the time trend of temperature and dissolved oxygen at the Golf Course Cove site. The temperature trend is similar to that for the Breachway station in that water temperatures did not get warmer than 73 degrees in July and early August. However, the dissolved oxygen trend is different! In June, dissolved oxygen saturation values were 90%; by July the saturation had decreased to 70%, a value that continued into August. By September the dissolved saturation had decreased to 65%! As we will see in the next section, chlorophyll-a concentrations [a measure of algae] in Golf Course Cove waters had soared from 6 parts-per-billion (ppb) in June to 35 ppb in July and August! When the algae respire and eventually die, they consume dissolved oxygen. It is apparent that this process occurred during the summer in Golf Course Cove and resulted in a substantial dissolved oxygen deficit for waters in the cove.

Water temperatures at the Aquaculture and Southwest Corner stations reached 81 degrees at the end of July. These are the highest water temperatures recorded for the summer of 2006 in the South County coastal ponds. The reason is that these waters are far removed from the breachway and that water depths are generally very shallow in Winnapaug Pond. Thus, the small volume of water is more susceptible to solar heating.

Chlorophyll

Chlorophyll-a is the major pigment and energy driving force for aquatic plant life. Thus, the concentration of chlorophyll-a extracted from filtration of Winnapaug Pond waters is a measure of the quantity of algae in those waters at the time filtration occurred. There is only one chlorophyll peak recorded for the Breachway site; that is, at the end of June.

Figure 3 is a plot of the time trend of chlorophyll-a for the Golf Course Cove station in Winnapaug Pond. There are two striking features about this trend; the magnitude of the chlorophyll-a concentrations and the presence of multiple peaks. The chlorophyll-a concentrations are 5-10 times greater than those at the other three stations in the Pond. Also, one peak occurs in mid July and the other at the end of August. The other stations have chlorophyll-a peaks, with maximum concentrations of 6 to 9 ppb, in June-early July-end of August. It is apparent that some process has produced very high algae concentrations in Golf Course Cove.

Nitrogen

The inorganic forms of nitrogen, -nitrate and ammonia - are the most important nutrient constituents in brackish waters (Coastal Salt Ponds) with respect to fertilization of algae. Nitrate is most easily absorbed by algae and when all the nitrate is consumed, ammonia is utilized for further growth of algae. Figure 4 is a time series plot of nitrate concentrations in Winnapaug Pond. The Aquaculture and Southwest Corner stations had little nitrate (15 ug/L) for most of the sampling season. On the other hand, waters at the Breachway and especially at the Golf Course Cove stations contained large concentrations of nitrate (100 to 1000 ug/L). The Breachway station is bordered by a high-density housing tract and the Golf Course Cove station is bordered by the Weekapaug Golf Course.

There is a large decrease in the nitrate concentration at the Golf Course Cove station for the middle of August sampling time. If one refers to Figure 3, the explanation for this decrease is clear. The very elevated algae levels, fertilized by the high nitrate concentrations in May-June-July, have exhausted the nitrate supply such that the nitrate concentration has decreased drastically to barely measurable values in August. Once the algae die off, nitrate concentrations increase once again to high values in September and October.

As stated above, nitrate is the nitrogen form that most easily fertilizes the growth of algae in brackish waters. After nitrate is consumed, then ammonia is utilized for algae growth. Figure 5 is a time series plot of ammonia at the four sampling stations in Winnapaug Pond. For the months of May through August, the concentration of ammonia is relatively low; 60 to 100 ug/L. Since there is substantial nitrate available for algae growth at the Breachway and Golf Course Cove stations, it is expected that ammonia concentrations would be unaffected by the algal growth dynamics. However, when the algae population declined ("crashed") in August (see Figure 3), the dead algae cells released ammonia to the water column. Thus, the peak in ammonia concentrations (175 to 300 ug/L) for September.

Using the water quality and nitrogen data for the Golf Course Cove station as an example, one can reconstruct the ecological events for Winnapaug Pond for the summer of 2006. Abundant nitrate fertilized substantial algal growth starting in late June and continuing into early August. When the algae population crashed, ammonia was re-

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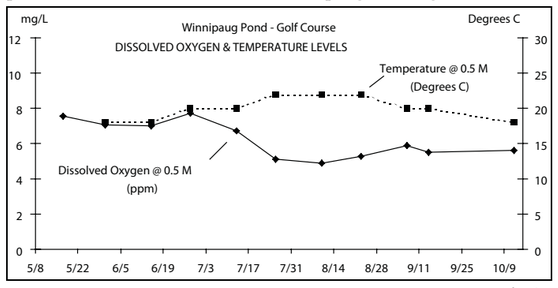


Fig. 2

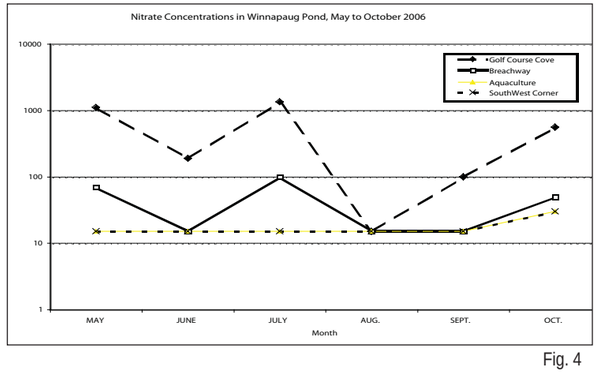


Fig. 4

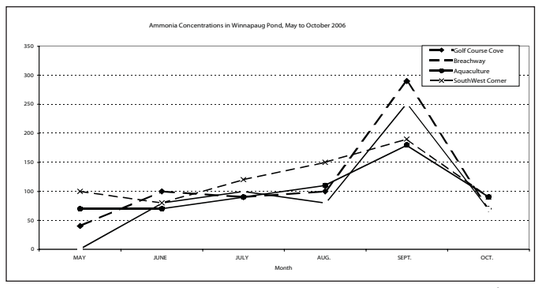


Fig. 5

Testing results for Winnapaug Pond from the 2006 Season.

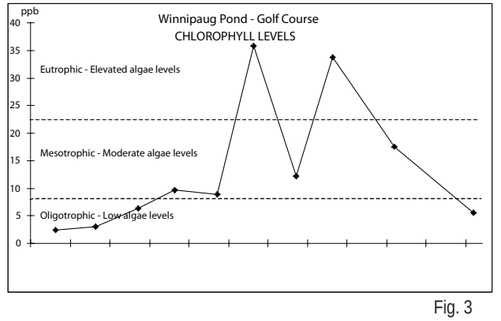


Fig. 3

leased to the water column from the dead cells. During the peak algae growth times, July and August, a dissolved oxygen deficit occurred in the water column as a result of algae respiration and some decay of organic matter from dead algae cells.

The total nitrogen concentrations for Winnapaug Pond average about 400 ug/L, excluding the Golf Course Cove station. These total nitrogen concentrations, as determined by the Massachusetts Estuary Project, classify Winnapaug Pond as currently having a "moderate quality" environmental health status. However, the total nitrogen concentration for the Golf Course Cove station (915 ug/L) place this area in the "severe degradation" status; but, many of the ecological observations associated with this status do not apply to this site. It should be noted that 85% of the total nitrogen at the Golf Course Cove station consists of nitrate while at the other three stations nitrate represents only 36% of the total nitrogen.

Phosphorus

Phosphorus is a nutrient that appears to be more important in the fertilization of algae in fresh waters. The dissolved phosphorus concentrations in Winnapaug Pond waters are low, 9 ug/L, throughout most of the sampling period from May to September. In October the dissolved phosphorus concentrations increased five times to 45 ug/L. A possible explanation is that after a plankton (algae) bloom in September, the algae die and their cells release dissolved phosphorus to the water column.

Fecal Coliform Bacteria

The concentration of fecal coliform bacteria, in MPN/100ml, were measured on surface water samples collected at four stations in Winnapaug Pond during the period May 17 to August 23, 2006. Bacteria concentrations in waters from the Breachway station and the aquaculture station average 7 and 8 MPN/100ml respectively. At no time did the bacteria concentrations exceed 17 MPN/100ml and these only occurred after substantial rains in May and June. On the other hand, stations from the two major coves along the northwest shore, the cove opposite the aquaculture site and Golf Course Cove, averaged 23 and 28 MPN/100ml respectively for the sampling period. There were spikes in bacteria concentrations after summer rains. The above average bacteria concentrations exceeded the RI Department of Environmental Management shellfish standards, 15 MPN/100ml, by a substantial amount. Given the fact that a commercial shellfish nursery is located in the area, these bacteria concentrations could be a cause for concern with relation to human consumption of the shellfish.

Past and Present Nutrient Concentrations in Winnapaug Pond

Comparing against the nitrate and dissolved phosphorus concentrations in Winnapaug Pond as measured between 1986 to 1993, the nitrate concentrations in Winnapaug Pond (all stations except Golf Course Cove) varied from 43 to 95 ug/L with an average of 61 ug/L. In 2006, the Pond, with exception of Golf Course Cove, averaged 45 ug/L. Thus, nitrate concentrations appear to be decreasing somewhat in the main portion of Winnapaug Pond.

As for the Golf Course Cove area of Winnapaug Pond, the average nitrate concentration for the years 1988 to 1994 was 310 ug/L. The 2006 average concentration is 550 ug/L. It appears that runoff from the golf course may be impacting the Cove with nitrate.

The average dissolved phosphorus concentration for Winnapaug Pond for the years 1986 to 1993 is 55 ug/L; the 2006 average is 16 ug/L. Obviously, Winnapaug Pond has experienced a sharp decline in dissolved phosphorus concentrations in the last ten years.

Summary

- The summer (May to September) of 2006 was very warm and surface water temperatures in the main part of Winnapaug Pond reached 81 degrees F at the end of July. These are the warmest water temperatures recorded for the Coastal Salt Ponds in 2006.
- Substantial dissolved oxygen depletion occurred in the waters of Golf Course Cove during July and August of 2006. This dissolved oxygen depletion was driven by the presence of a very substantial algae bloom that occurred from early July to early September. It appears that this substantial algae bloom was the result of nitrate fertilization of Golf Course Cove waters.
- While the main portion of Winnapaug Pond waters averaged 20 ug/L nitrate in 2006, the waters near the breachway adjacent to the housing tract averaged 45 ug/L and those in Golf Course Cove averaged 550 ug/L. The high nitrate concentrations fertilized the very substantial algae blooms in this cove
- Fecal coliform bacteria concentrations (28 MPN/100ml) in waters of the two major coves on the northeastern shore of Winnapaug Pond exceeded the RI Department of Environmental Management's shellfish standard of 15 MPN/100ml.
- It appears that the dissolved phosphorus concentrations in Winnapaug Pond have decreased threefold during the last ten years. However, nitrate concentrations in Golf Course Cove and adjacent waters have remained very high (310 versus 550 ug/L) during this time.

Editor's note: The Weekapaug Golf Club is now part of the Audubon Cooperative Sanctuary Program and has been working to reduce its use of fertilizer and other lawn chemicals. The club sponsors two SPC testing stations to monitor results and current management has been an active partner in improving pond water quality.

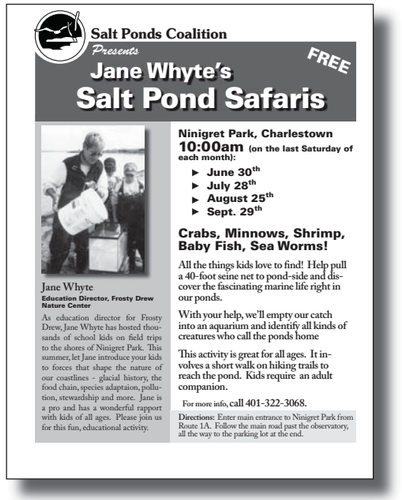
Salt Ponds Safaris Are Great Fun, and Educational, Too

Our Salt Ponds Safari series are off to a great start. On June 30th, we hosted a respectable even dozen of adventurers, ranging in age from three to fifty something. On July 28th, five times that many took to the shore of Ninigret Pond and pulled the Coalition's forty-foot seine net through the eel grass close to shore. During both trips, we hauled in lots of Silversides and Mumichaugs (common baitfish in the ponds), several tiny baby jellyfish, a Pipe Fish (which is related to the Seahorse), Blue Shell Crab, and more. In the July haul, we also collected an unidentified small fish that was most likely a tropical visitor. Tropicals are not uncommon in the hot summer months, so it will be fun to see what we get in August!

The safaris are lead by Jane Whyte, the education director of Frosty Drew Nature Center in Charlestown and occur on the last Saturday of each month through September. Jane has been the education director at Frosty Drew for sixteen seasons. During her tenure with the group she has hosted thousands of school kids on field trips to Ninigret Pond. She strives to stimulate a sense of discovery and understanding with kids and adults alike and to introduce the forces that shape the nature of our coastlines - glacial history, the food chain, species adaptation, pollution, stewardship and more. Jane is a pro and has a wonderful rapport with children of all ages.

The outings form up and start at the Grassy Point parking area at the end of the main road into Ninigret Park. From Route 1 in Charlestown, follow signs for Ninigret Park onto Route 1A and then into the main park entrance. Bear left at the tennis courts and continue past the Frosty Drew building and observatory. At the fork in the road, proceed straight, to the parking area at the very end of the road.

For more information, please visit saltpondscoalition.org, or call 401-322-3068. SPC recommends participants bring sun block, drinking water, water shoes, and bug spray.



Aquaculture

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in the salt ponds entails the grow-out of young (seed) shellfish to market size on pond bottom, leased from the state. In most cases shellfish are grown in cages, resembling pots, set in deeper water on the pond bottom, but two operations are done in very shallow water out of the normal navigation zone. Areas leased for aquaculture are first examined by DEM to determine that they do not contain significant natural shellfish. All sites must be located away from heavily traveled areas, and have little or no impact on surrounding water uses.

All shellfish seed planted in aquaculture operations must be certified as disease free by a recognized pathologist. DEM and Health Department inspections are carried out on farmed animals as well as commercial harvests from the wild fisheries. All shellfish, both wild and aquaculture is tagged and dated when harvested. Issues relating to aquaculture include:

Shellfish and Water Quality. All molluscan shellfish are filter feeders. They filter many gallons per day and extract nutrients to feed. An oyster can pump up to 32 gallons per day. Research has shown that a shellfish-rich environment has a clarifying effect on water and can reduce nutrient overload in the ponds. Efforts to increase native shellfish populations in the ponds have seen some success, but a concentrated bed of shellfish, as found in a well-operating aquaculture system, will do just as good a job. It is worth emphasizing that shellfish are not fed artificial feed, and so do not pose the pollution threat that fish farms do.

Employment and Economy. The culture of shellfish provides a healthy commerce to the community. The same people who once commercially harvested fish and shellfish in years gone by have been replaced by a new generation of watermen.

Stock Replenishment. Shellfish raised in aquaculture do reproduce and the shellfish larvae travel throughout the pond ecosystem - adding more biomass to the resource as a whole.

Oysters and Scallops. Both species are no longer self-propagating in our salt ponds. In order for these species to continue to exist in the ponds, they must be raised through aquaculture, whether from state stocking of hatchery stock or from independent aquaculture. Oyster have fallen victim to two formerly southern shellfish disease, probably due to global warming. Introduction of disease-free oysters in aquaculture provides a first class oyster, which can be harvested prior to the third year, when MSX or Dermo disease can manifest itself. Scallops have not naturally propagated since the 1970's. Efforts by state biologists have had marginal results in sustaining

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Creature Feature

Who can be crabby when on the salt ponds? Well, in addition to some sunburned boaters, there is a whole population, just below the surface.

Some Advice Concerning Crabs

Blue crabs may be friendly,
Blue crabs may be nice,
but if you meet a blue crab, let me
give you some advice-

Say "hello, how do you do?"
Smile and be polite.
Comment on the weather;
say "It's such a lovely night."

Ask him if he travels;
if he's been to many lands-
but never, never, never, ever
offer to shake hands.

© Joe Thompson
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One has only to visit our breachways or small bridges on a summer day to see how popular crabbing is with young and old alike. It's an easy pastime, and inexpensive, too. With just a bucket, a length of line attached to a raw chicken leg, and perhaps a dip net and a pair of polarized shades to help see through the glare, a patient crabber can collect a wide variety of the Krusty Krab. There are easily 30 or more species of crabs that frequent the area. Some are good to eat, some are good for bait, some are just fun to look at, and all can be released with no ill effects as long as they aren't kept too long. Crabs require well-oxygenated water and will succumb if left in the same water for long. They are also susceptible to die-offs if dissolved oxygen levels in the ponds dip too low. This happens in several of our ponds when elevated nitrogen levels combine with summer heat to create anoxic conditions, often in thermal layers trapped along the bottom.

Crabs are known as Arthropods, which mean jointed legs. There are male and female crabs which can be identified by observing different characteristics. In most case males are larger and have a pointed tail or "telson" on their underside. Females have a rounded telson, which is modified to carry her eggs. Egg-bearing females are called "eggers" or gravid. They all have a shell outside their bodies called an exoskeleton. As they grow, they will shed their old shell and expose a larger soft shell that has grown beneath the old shell. This process, called shedding, happens more frequently when the crabs are young. In many species of crabs, reproduction occurs when the female's shell is soft.

Most of the crabs are bottom dwellers called walking crabs. Two local species, the blue crab and the lady (or calico) crab, which have modified back legs that look like paddles, are called swimming crabs or paddler crabs. Most crab species are predators, which feed on juvenile clams, scallops, oysters and fish. In turn, they are eaten by several species of fish. In recent years, the reduction of some of these fish species has resulted in an explosion in the crab population, which has created an increased predation on clams and scallops.

The crabs most prevalent in the shallows along the salt marsh are fiddler crabs. Hermit crabs are common in shallow intertidal areas. Mud crabs, green crabs, spider crabs, lady crabs and blue crabs are found in a bit deeper water. Both sand crabs and an occasional Jonah crab are found near the breachways. A recent newcomer to our area is the Japanese shore crab, which is considered an invasive species. Most likely, they came over in the bilge or attached to the hull of a merchant ship. Both the green crab and the shore crab are considered to be very detrimental to shellfish.

Many of the crab species are caught and used as bait. The two species typically caught for human consumption are the blue crab and the Jonah crab. Jonahs are typically caught in lobster pots as a by catch. They have a tough shell, but wonderful meat in the legs. The most sought after crab is the blue crab. Only R.I. state residents are allowed to harvest blue crabs, and they may only he caught by dip net or a baited line (raw chicken leg on a string). There is a 25 crab daily limit and the minimum size from spike to spike is 5 inches. No egg-bearing females can be possessed.

One major crab, which isn't a true crab, is the venerable horseshoe crab. Since the horseshoe crab is such a special critter in so many ways, we will dedicate a special creature feature to our wonderful ancestor!

Footnote: The Web site of the R.I. D.E.M. contains the 2007 marine fisheries abstract has wonderful images of the various crab species. www.dem.ri.gov , go to Fish & Wildlife, then Marine Fisheries.

Kayak Trip on Quonnie Pond a Big Success

SPC hosted a guided kayak trip on Quonnie Pond on June 1st. It was a great success. Here's a recap.

They arrived in trucks and on top of cars, some paddled in from across the pond and some were towed to the start behind motorboats. But come they did - dozens and dozens of kayaks and canoes - to an interpretive kayak trip on Quonochontaug Pond on Saturday, June 2nd, hosted by the Salt Ponds Coalition. It started at the Quonochontaug Breachway state boat launch at 9:00am, and the group worked its way counterclockwise around the perimeter of the pond, returning to the launch around noon.

As the brightly colored contingent progressed, bystanders took notice. In Weekapaug, Jane Arnell, of Englewood Florida, herself a kayak guide, wished she had a boat handy to join in. Her companion, 12-year-old Morgan who is a lifelong resident on the pond, exclaimed that he had never seen such a large group of paddlers on Quonnie Pond. Passengers on a passing pleasure boat paused, Champagne glasses in hand, and took in the colors and wind milling paddles as the group passed.

During the paddle, participants learned about historic points of interest from Anne Doyle, the unofficial town historian and representative of the Quonochontaug Historical Society. At one point the whole contingent beached their vessels (below) and inspected the remains of the Quonochontaug lifeboat station, which was destroyed in the hurricane of 1938. Sassy Dodd spoke on birds around the pond and her husband Tom, a water-quality tester in the SPC Pond Watchers program, demonstrated testing techniques.

Paddlers (above) set off across the pond. Historian Ann Doyle (center) discusses local lore, and below, leads group to the remains of an old lifeboat station.

Art Ganz, a retired marine biologist and leader of the trip, talked about the pond environment and many of the creatures that call it home. "Learning about all of these points of interest while in the field, adds a whole new level of understanding to the topics we discussed," said Ganz. "Our goal with the SPC is to raise awareness of what wonderful resources these ponds are, and how important their health is to wildlife, our local economy, and our own enjoyment."

But mostly the trip was about fun, and participants enjoyed meeting new friends and being on the water for a beautiful June morning. With fair skies, light breezes, and comfortable temperatures, this trip stood in contrast to the past two SPC paddles. Last fall the wind blew so hard the outing had to be cut short, and the trip before that had to be cancelled due to thick fog. "Third time was the charm," said Ganz, "we couldn't have asked for a better day."

SPC has another guided kayak trip scheduled for September 29th on Point Judith Pond. Please watch our web site for details.

Volunteer News

It has been just over one year that Salt Ponds Coalition has had an office at Kettle Pond Nature Center. During that time we have had wonderful volunteers who have helped us offset the rental costs by giving generously of their time and talents at the center. Mr. William Crossgrove is our most active volunteer having given us fifty hours of his time at the information desk as well as many more uncounted hours proofreading for the US Fish and Wildlife Service volunteer coordinator.

Mr.. Crossgrove is a retired professor of German and Comparative Literature at Brown University. In his spare time

Bill Crossgrove

he is the administrative director of the Howard Foundation which gives grants to faculty on scholarly topics. He is also a docent of the Roger Williams Park Zoo. He volunteers here at Kettle Pond during the summer and fall months, as he lives in Ocean Ridge in South Kingstown during those months. During the winter he resides in Providence. Bill and his wife Lo (also a retired teacher) have two children, a granddaughter age 4, and a grandson age 3. Bill and Lo enjoy kayaking on Green Hill and Ninigret Ponds and the family enjoys the South County beaches.

There is always need for more volunteers. We need people to help with water sampling, walking the beaches and trails, and assisting with a wide range of special programs to name just a few. Some are a couple hours here and there, and some need a more regular time commitment. All can be tailored to your own level of participation. All will be rewarding and will allow you to meet some wonderful new people.

Volunteers Needed

Work with great people in a super wildlife center, mixing with families, school kids, and Fish & Wildlife Service staff. Training is provided and schedules are flexible. We need people to help on the water, in our offices and at the Kettle Pond reception desk. All organization-related skills are welcome.

To learn more about volunteer opportunities for adults, and students, please visit the volunteer page at
www.saltpondscoalition.org.

SPC Schedule

August 20th, 6:00pm
SPC Annual Meeting - all members invited - Kettle Pond Center

August 25th, 10:00am
Salt Pond Safari with Jane Whyte Ninigret National Wildlife Refuge

September 29th, 10:00am
Salt Pond Safari with Jane Whyte Ninigret National Wildlife Refuge

September 29th, 9:00am
Guided kayak trip on Point Judith Pond. Watch web site for details

Salt Pond Outings

Kettle Pond Visitor Center

We are grateful to have our office space in the business wing of the Kettle Pond Visitor Center, on Bend Road, just off Route 1 South in Charlestown. The most common comment we hear when we host new visitors to the center is "I had no idea this was here!"

The Visitor Center is a beautiful new building that makes you feel like you're visiting a national park. The building is nestled in the woods and is a headquarters for the U.S. Fish & Wildlife Service. For visitors there is a wonderful display area full of interactive dioramas, which spotlight a variety of ecosystems, including several found in or around the salt ponds. There are activities for kids, a fund-raising gift shop , and miles of hiking trails.

SPC Hats Are In!

Don't venture out without your Salt Ponds hat! If you joined at the $75 level or higher, you are entitled to a free Salt Ponds Coalition hat! They are a high-quality cap, sewn from stylish Nantucket-red cloth and sport a dark blue SPC embroidered logo on the crown.
You can pick yours up at the gift store at the Kettle Pond Visitor Center. Just ask at the counter and they will check your name from a list of members.

Ponderings

Personal reflections about life on the salt ponds.
This piece submitted by Mark Bullinger, Executive Director, Salt Ponds Coalition

In May of 2006, squid filled the western end of Quonnie Pond in numbers I had never before seen. We first became aware of the squid during an evening stroll past the Weekapaug Yacht Club. Two young boys had about a dozen dead squid lined up along the dock, which they were inspecting with great intent. Upon inquiry, they directed us to an area of marsh grass under another pier, where fifty or sixty dead squid were awash at the tide line. We saw no other signs of squid in the harbor, so that night I went home uncertain as to whether these were native critters, or a large flat of bait that had been disposed of on the cheap.

A day or two later, I was walking down the hill that approaches the yacht club harbor and noticed a large number of the big herring gulls actively feeding on something in the harbor. I altered my course and walked out on the main pier to check it out. There were dozens of birds working and I noticed hundreds of ripples on the smooth surface of the water. Being a bit of a fisherman, I took an interest in what the birds were after and watched until I saw one of the gulls come up with a foot-long squid. As soon as it did, all hell broke loose in bird land, as half the flock took off after the successful gull. Even when food is plentiful, those big gulls have larceny in their hearts.

Realizing that squid were in the pond thick, I peered into the water, and… there they were! And not just one or two, either: they were really plentiful. Some were solo, but often they passed by in groups of three or four. Now squid are very odd creatures to see in the wild. They move forward and backwards without any obvious effort. Their tentacles are pressed together to form a pointed extension of their bodies, so they look a bit like a bottle, and their large eyes are dark and vacant. Often, they will hover in one spot, idling, with no movement other than the rippling of the lateral fins along their sides, only to shoot forward or back with no obvious source of propulsion. Really alien looking creatures.

With visions of calamari and free bait dancing through my head, I ran home and got my spinning rod, a squid jig that I'd had for Lord knows how long and never used, and rounded up my six-year-old daughter. I didn't really know how to work the jig, but after a few casts, we had a squid on the line. Squid, quite possibly, are the perfect creature for kids to catch. They're not too hard to hook, they reel in easily, and they come out of the water spinning like a top and spurting a large volume of water and ink in all directions. What is more, they aren't really hooked, but are more tangled on the multiple rows of sharp, up-turned barbs that form the business end of the jig, and so, are easy to release unharmed.

Soon we had a dozen squid in the pail, some of which I cooked and the rest of which went in the freezer for fluke bait. My daughter had such a good time the whole family went back a couple of days later for more fun. I had scouted out the scene driving home and the birds were hard at it again, so walking down to the water, anticipation was high. We collected a curious neighbor along the way and as we passed under an ornamental cherry in full bloom, set against a waxing moon and the blue sky, I thought, how can life be better than this?

On this evening, news of the squid had spread and there were half a dozen guys on the dock filling their buckets, including an old-timer I know named Dell. The catching was good, so everyone was in a light mood, and the kids were having a blast. A squid had just latched on to my daughter's line when Dell pulled in a particularly vigorous specimen, which, spinning and spurting, squirted the mother load of black ink all over her pink velour sweat suit.

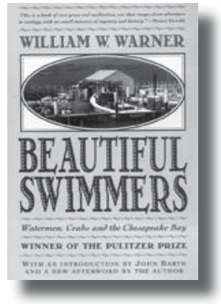
Everyone on the dock started laughing (with the exception of my daughter), who just stood there looking shocked. For five or ten seconds I didn't know if she'd burst into tears or turn and run from the dock; but then, she, too, started laughing. And so there we were, a young girl looking like a pink Dalmatian, a dock full of salty characters, and all of us doubled up with fits of belly laughter. It was quite a picture. What a treasure these ponds are! They provide so much to so many, and in such uncountable and wonderful ways.

Click This

www.uri.edu/ce/wq/ This site is full of information for people interested in our water quality. There are sections on waste water considerations for home owners and municipal officials; drinking water protection; landscaping for resource protection; pollution prevention around the home; the Rhode Island Watershed Watch (which SPC participates in) and loads of other interesting subjects related to water quality.

Interesting Reading

Beautiful Swimmers, Watermen, Crabs and the Chesapeake Bay.
William W. Warner, Back Bay Books.



Beautiful Swimmers is a beautiful book. And recommending it ties nicely into the crab theme of this issue's Creature Feature section. Beautiful Swimmers is set in the Chesapeake Bay and is largely about the Blue Crab fishery in Maryland and Delaware. Along the way, the author illuminates the life and social fabric of the watermen and delves deeply into the coastal traditions and natural history of the bay. Much of what the book covers is relevant to our salt ponds. It's a wonderful beach read, and is available from Amazon, or better local bookstores.

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Aquaculture

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scallops. Most bay scallops on the market today are from aquaculture.

Aesthetics and User Conflicts. The major objection that opponents voice seems to be over user conflicts. Most plots are in deeper water, but a couple are in very shallow water and the cages and markers are quite visible at low tide, and, according to some residents, block recreational boating at high tide. Marking of boundaries is specified by CRMC.

In Rhode Island, all access to marine resources are free and common, as designated by the state constitution. The private leasing of public water has long been controversial, whether it be for marina construction, waterfront development or aquaculture. In CT and MA, leasing of public waters for aquaculture is far more extensive than what we have seen so far in Rhode Island.

The position of the Salt Ponds Coalition is that a certain amount of aquaculture is beneficial to both the resource and the local economy. SPC would, however, like to see CRMC observe a moratorium on new leases until it completes a master plan that clearly states, pond by pond, the maximum amount of acreage that can be given over to aquaculture expansion - particularly in the shallow plots where passage and views are affected. SPC board member, Barbara Engel, is following up with CRMC on this issue. The Salt Ponds Coalition is committed to wise use of the salt ponds, and to an equitable allocation of resources that balances beneficial economic activity with the preservation of natural systems and beauty.

Salt Ponds Coalition

Annual Meeting

Monday August 20th at 7:00pm

- **Review of Operations**
- **Nominations**
- **Announcement of major new initiatives to protect the ponds**
- **Refreshments**

Please plan on attending

Kettle Pond Visitor Center
50 Bend Road, Charlestown

The **Tidal Page** ***News of the Rhode Island Salt Ponds***