



Rhode Island BioBlitz 2014: Summary Report

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From 3 p.m. on Friday, June 13, to 3 p.m. Saturday, June 14, 2014, a "bioblitz" event was held at Rocky Point in Warwick, Rhode Island. During this 24-hour period, 184 volunteer naturalists documented 969 species of animals and plants on roughly 100 acres of land, shoreline, and the immediately adjacent Bay waters. The participants included 27 secondary school students and 13 college students. This accomplishment is remarkable because the participants were not, by in large, professional biologists and taxonomists but rather were amateurs and hobbyists from community and also because the weather was poor, with cool temperatures and rain. Such a large species tally under difficult circumstances is an indication of the passion for biodiversity that exists within the general population. Also, the program was made possible by extraordinary contributions of money, time, and in-kind support from many government bodies and organizations and this is another passion brought out in the community by the bioblitz event, passion for Rocky Point the place, with its history, present uses, and potential future contributions.



What is a Bioblitz?

In a BioBlitz, volunteer naturalists, working in teams, have 24 hours to tally as many species of animals and plants as they can on a particular parcel of land.

The BioBlitz idea was pioneered by biologists from the National Park Service and from Harvard, including E.O. Wilson. The first BioBlitz was held in Washington, D.C., in 1996. Now BioBlitzes are held all across the United States and around the world. The Rhode Island Natural History Survey (RINHS) organized the first Rhode Island BioBlitz in 2000, in Roger Williams Park in Providence. There, even though much of it is mown lawn or eutrophic pond, 31 volunteers found 663 species. Since then, BioBlitz has been held at nature preserves and other public lands all around the state including: Middletown and Westerly, at Trustom National

Wildlife Refuge in S. Kingstown, a town forest in Tiverton, a farm in Bristol, and recreation land in Cumberland. A typical year now draws approximately 200 participants from throughout the northeast and identifies 900 to 1,100 species. Results and pictures of past BioBlitzes can be seen at www.rinhs.org/whatwedo/bioblitz or you can watch a short video made at the 2010 BioBlitz on Block Island at www.youtube.com/rinaturalhistory.

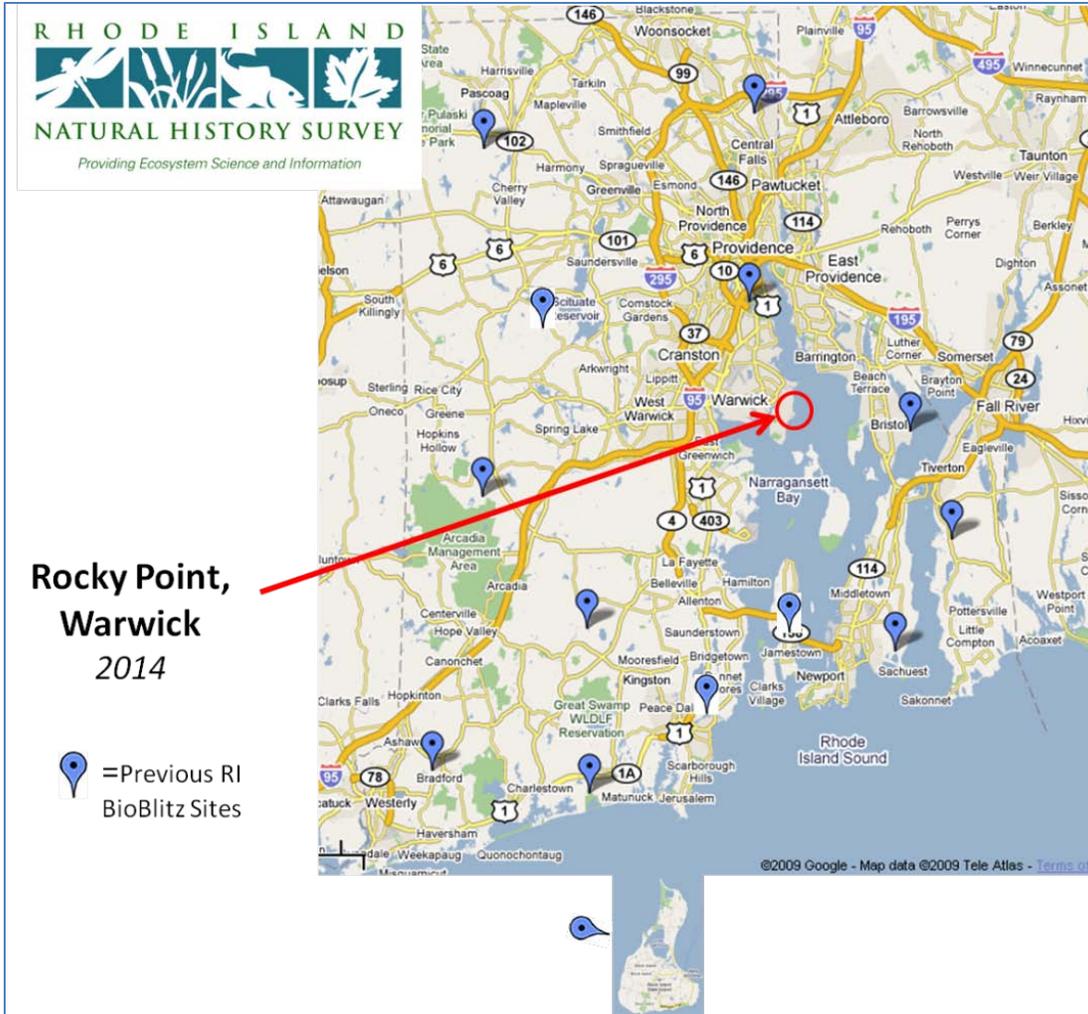
The goals of all Rhode Island BioBlitzes include:

1. to demonstrate that biodiversity is important right here at home, not just in distant rain forests or coral reefs, etc., and great diversity can be found almost anywhere;
2. by example to show the public how field biologists and naturalists learn about species and the environment;
3. to encourage communication and learning among diverse people--from scientists to amateur naturalists to school kids--who nonetheless share a curiosity about biodiversity and the local environment;
4. to survey the species on the property for the benefit of the landowner for planning and conservation purposes.

The 15th annual Rhode Island BioBlitz was held on the second Friday and Saturday of June, the 13th and 14th, 2014 at Rocky Point in Warwick. The specific goals for BioBlitz at this site included:

1. encourage public awareness of, and interest in the present and potential future ecological and social value of the Rocky Point site
2. develop data and interpretation of value to ongoing site use planning
3. further the cooperative relationship among the City of Warwick, the Rhode Island Department of Environmental Management, and community groups with active interests in Rocky Point and its environs such as the Rocky Point Foundation, Buckeye Brook Coalition, and Save The Bay



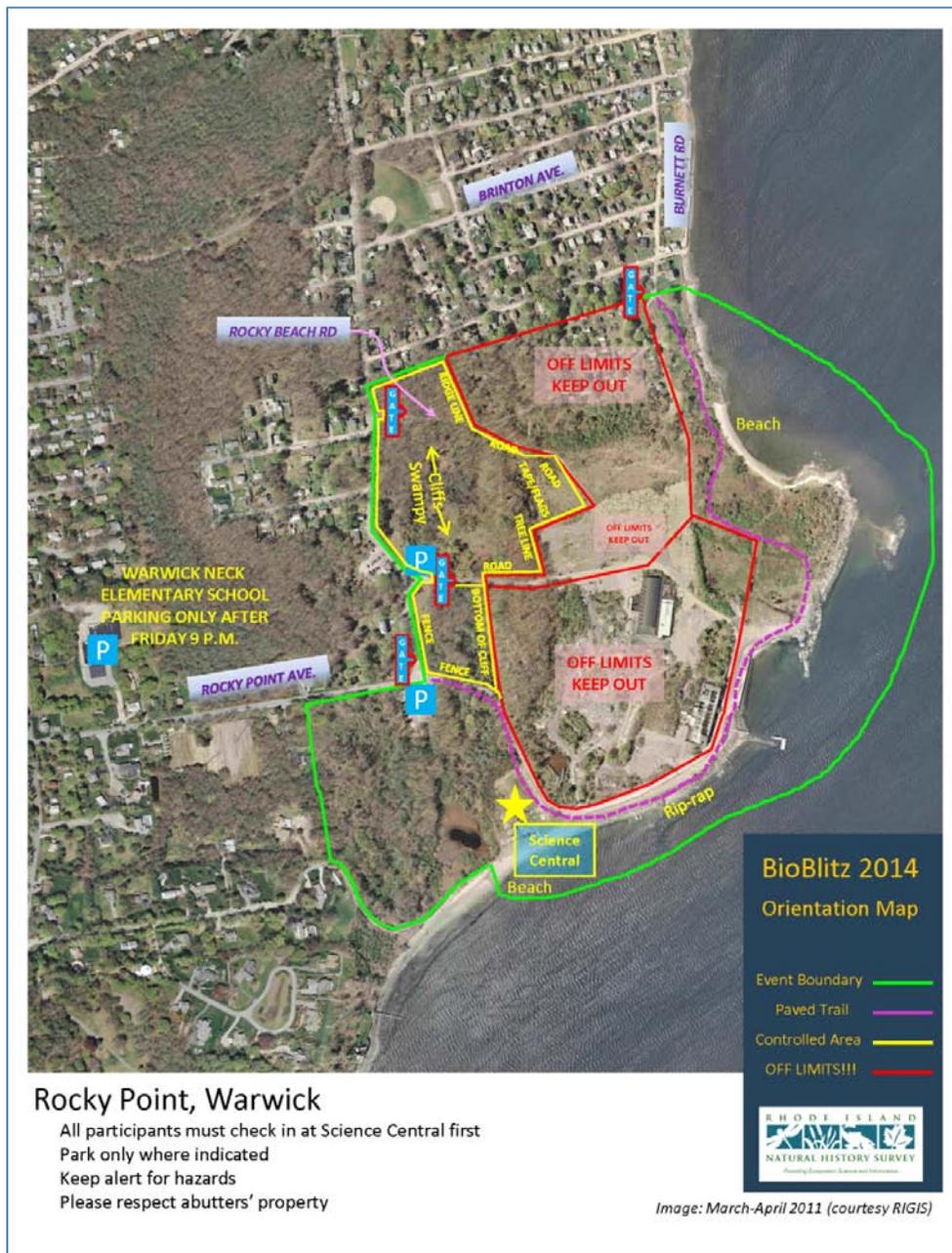


The event site is the former amusement park of Rocky Point, in Warwick, now divided in ownership between the City of Warwick and the Rhode Island Department of Environmental Management. At the time of the event, the Warwick section had been recently redeveloped for public access. The RIDEM section was largely fenced off and contained many significant safety risks.

The event boundaries were carefully selected after site visits and through extensive consultation with the City of Warwick, RIDEM, and Rocky Point Foundation. The goal was a balance of the following criteria:

- an extensive area
- encompass diverse ecological communities and habitats
- boundaries that are natural and clearly visible on the ground (roads, fences, treelines, etc.)
- avoid unsafe conditions
- discourage access to the RIDEM part of the site by people not participating in the event

Event boundaries:



The local hosts were:

City of Warwick
Rhode Island Department of Environmental Management
Rocky Point Foundation

Sponsors and financial supporters included:

Roger Williams Park Zoo
Buckeye Brook Coalition
Largess Forestry
Copy World Printing
Chopmist Charlie's
Iggy's Doughboys & Chowder House

Additional contributions were made by:

Save The Bay
University of Rhode Island College of the Environment & Life Sciences

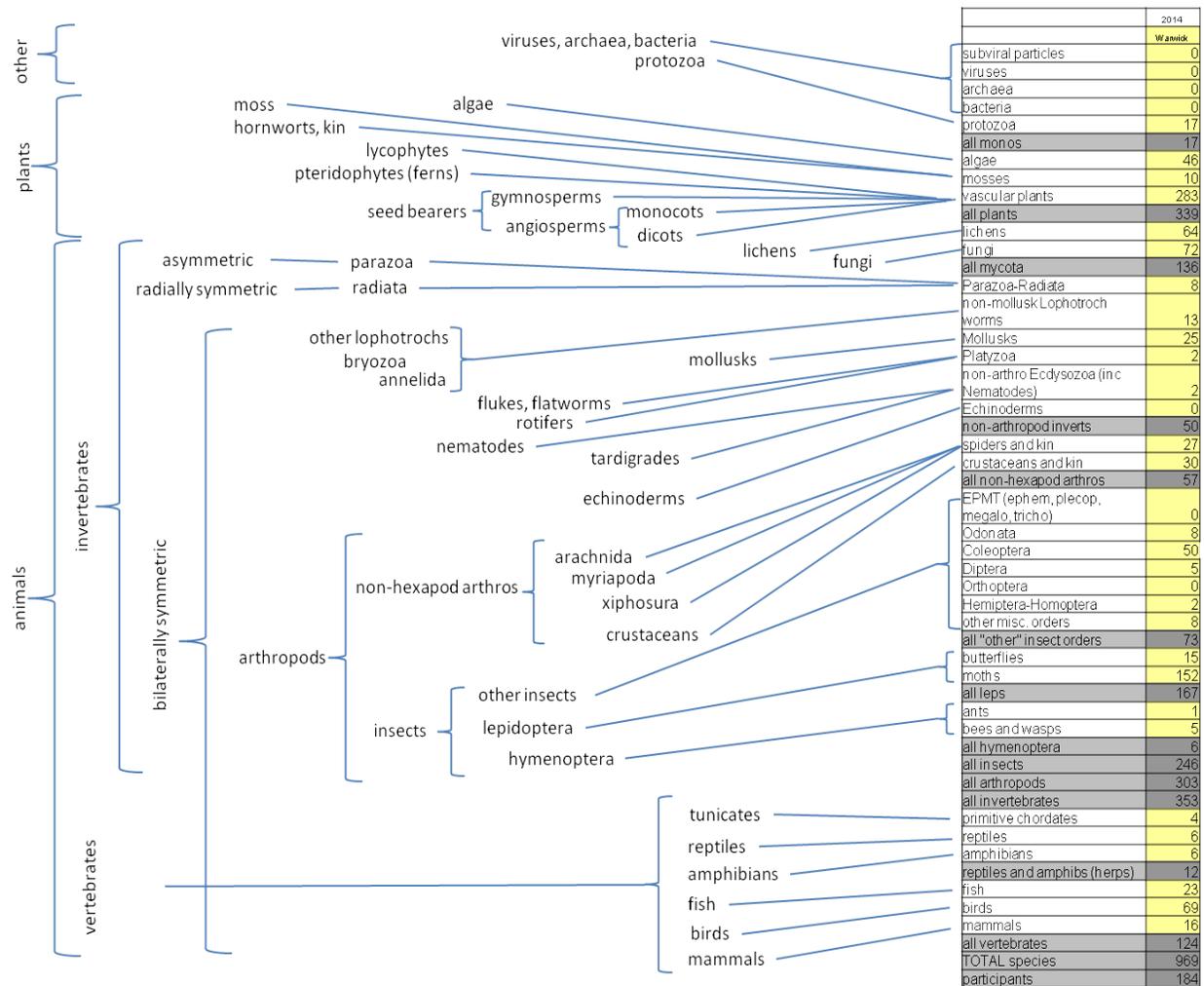
Results:

In just 24 hours, 184 people found 969 species of animals and plants at Rocky Point. The results are tallied by taxon (plural "taxa"), a category of phylogenetically (evolutionarily-related) organisms. Some simplifications are required of the phylogeny because more obscure taxa have no Rhode Island examples or because no naturalists with appropriate skills for identifying obscure taxa came forward for the event. The taxonomic



groupings are a compromise between the evolutionary categories of all life on earth and the practical fact that naturalists tend to specialize in taxa that have interesting, readily observable diversity in our area.

RI BioBlitz Reporting Taxonomy and Phylogenetic Chart



Since 2010, the Rhode Island BioBlitz has also had teams that focus on art, creative writing, photography, journalism, and other creative expressions. The philosophy is that there are many different ways to "know" interesting and useful information about a particular parcel of land and science is just one of those ways. The Rocky Point BioBlitz volunteers included art and creative writing teams.

Results Summary Table:

[Shaded lines are totals of the named taxa.]

Taxon	Count
subviral particles	0
viruses	0
archaea	0
bacteria	0
protozoa	17
all monos	17
algae	46
mosses	10
vascular plants	283
all plants	339
lichens	64
fungi	72
all mycota	136
Parazoa-Radiata	8
non-mollusk Lophotroch worms	13
Mollusks	25
Platyzoa	2
non-arthro Ecdysozoa (inc Nematodes)	2
Echinoderms	0
non-arthropod inverts	50
spiders and kin	27
crustaceans and kin	30
all non-hexapod arthros	57

Taxon	Count
EPMT (ephemerop, plecop, megalop, trichop)	0
Odonata	8
Coleoptera	50
Diptera	5
Orthoptera	0
Hemiptera-Homoptera	2
other misc. orders	8
all other insect orders	73
butterflies	15
moths	152
all leps	167
ants	1
bees and wasps	5
all hymenoptera	6
all insects	246
all arthropods	303
all invertebrates	353
primitive chordates	4
reptiles	6
amphibians	6
reptiles and amphibs (herps)	12
fish	23
birds	69
mammals	16
all vertebrates	124
TOTAL species	969

PLANTS

	Rocky Pt	Avg RI BioB	Record RI BioB	Max in RI	Notes
Algae	46	46	135	1,000 est	sample
Mosses	10	23	77	352	low; moss expert didn't make it
Vasc Plants	283	318	384	1620	very good given site size, condition

At Rocky Point the Vascular Plant team was strong, both in numbers and knowledge. Because the plant team is reliably strong, comparison of the plant list from Rocky Point to that of other BioBlitz sites and to the state plant list is probably a reliable rough index of the site's relative biodiversity. The RI BioBlitz average plant count is 318 with an average deviation from the mean of 34. So the Rocky Point plant diversity is about average but taking the site's relatively small size into account, it can be considered a good result. Compared to other BioBlitz sites, there were relatively few rare species encountered.

Two plant species of note are velvety rosette panicgrass (*Dichanthelium scoparium* Lam.) and bitter panicgrass (*Panicum amarum* ssp. *amarum* Elliot). Velvety rosette panicgrass is listed as SH or "state historical" by the Rhode Island Natural Heritage Program. It has not been recorded in the state at least 20 years. The New England Plant Conservation Program (NEPCoP) of the New England Wildflower Society lists it as a Division 4 species, meaning there are no sites currently known anywhere in New England.

Bitter panicgrass is listed by the Rhode Island Natural Heritage Program as S1 (state concern), meaning there are five or fewer populations known in Rhode Island and the species continued existence in the state is in question due to factors of rarity or vulnerability. The New England Plant Conservation Program (NEPCoP) of the New England Wildflower Society lists it as a Division 2 species, meaning there are fewer than 20 sites currently known anywhere in New England and it is considered regionally rare.

Both these species of grass were identified at BioBlitz by a skilled grass taxonomist, (Prof. Rebecca Brown of URI) but because they are historical and rare, respectively, and because this group of grasses is notoriously difficult to identify, the finds would need to be confirmed by further fieldwork. It is also possible that these species are not as rare as the heritage programs and NEPCoP recognize them to be because they are so difficult to identify.

The plant team also located white ash (*Fraxinus americana*). This species is not currently listed as rare in Rhode Island but it is a main host for the invasive emerald ash borer beetle (EAB)(Buprestidae: *Agrilus planipennis*) which is now widespread in Massachusetts and Connecticut. Based on the experience in the midwest, where the beetle has been present longer, it is likely that over the next decade or so ash trees will be extirpated from Rhode Island, the only survivors being trees treated aggressively with systemic pesticides. To the extent that white ash is an aesthetically, historically, or ecologically important part of the tree-scape at Rocky Point, some consideration should be given to replacing them with non-EAB hosts. Ongoing treatment is expensive and currently the most effective pesticides (neonicotinoids) have risk of significant

unintended negative environmental effects (harm to non-target insects such as leaf-eating caterpillars and pollinators).

It is interesting that in a place with so much disturbed surface no milkweed of any species were found. They may have been still at an inconspicuous stage of development during this early summer event. If further fieldwork continued to show so few milkweeds and if plans for the site permitted it, and with the recent public interest in conservation of monarch butterflies, planting milkweeds could be a productive activity ecologically and for public engagement.

Another area potentially to combine public engagement with habitat improvement would be over invasive management. Thirty five species of noxious weed or invasive plant were found (invasive as determined by RINHS (2007) based on review of federal, Rhode Island, or neighboring state noxious weed and invasive plant laws/policies):

Norway maple	<i>Acer platanoides</i> L.
sycamore maple	<i>Acer pseudoplatanus</i> L.
tree of heaven	<i>Ailanthus altissima</i> (Miller) Swingle
silver hairgrass	<i>Aira caryophylla</i> L.
garlic mustard	<i>Alliaria petiolata</i> (Bieb.) Cavara & Grande
Japanese barberry	<i>Berberis thunbergii</i> DC.
drooping brome grass	<i>Bromus tectorum</i> L.
oriental bittersweet	<i>Celastrus orbiculatus</i> Thunb.
spear thistle	<i>Cirsium vulgare</i>
crown vetch	<i>Coronilla varia</i> L.
Queen Anne's lace	<i>Daucus carota</i> L.
autumn olive	<i>Elaeagnus umbellata</i> Thunb.
winter creeper	<i>Euonymus fortunei</i> (Turcz.) Hand.-Mazz.
cypress spurge	<i>Euphorbia cyparissias</i> L.
Japanese knotweed	<i>Fallopia japonica</i>
gill-over-the-ground	<i>Glechoma hederacea</i> L.
yellow iris	<i>Iris pseudacorus</i> L.
privet	<i>Ligustrum</i> L.
Japanese honeysuckle	<i>Lonicera japonica</i> Thunb.
Morrow's honeysuckle	<i>Lonicera morrowii</i> A. Gray
purple loosestrife	<i>Lythrum salicaria</i> L.
white mulberry	<i>Morus alba</i> L.
common reed	<i>Phragmites australis</i> (Cav.) Trin. ssp. <i>australis</i>
flattened meadowgrass	<i>Poa compressa</i> L.
tufted knotweed	<i>Polygonum cespitosum</i> Blume
white poplar	<i>Populus alba</i> L.
creeping buttercup	<i>Ranunculus repens</i> L.
common buckthorn	<i>Rhamnus cathartica</i> L.
alder buckthorn	<i>Rhamnus frangula</i> L.
black locust	<i>Robinia pseudoacacia</i> L.
multiflora rose	<i>Rosa multiflora</i> Thunb.
wineberry	<i>Rubus phoenicolasius</i> Maxim.

sheep sorrel	<i>Rumex acetosella</i> L.
climbing nightshade	<i>Solanum dulcamara</i> L.
black swallowwort	<i>Vincetoxicum nigrum</i>
Spanish bayonet	<i>Yucca filamentosa</i> L.

Algae & Mosses: The algae count, though numerically high (46) largely reflects the efforts of a small number of participants looking at marine plankton. In fact, it was disappointing that the event was not able to attract any better talent with marine macroalgae (seaweeds) because they are probably a diverse taxon at Rocky Point. RI BioBlitz moss lists can be good, if the right scientists participate, but identifying mosses is an esoteric skill and without the right scientists the moss list is a representation gross diversity not a reliable count at the species level. This was the case at the Rocky Point event.

MOLLUSKS

	Rocky Pt	Avg RI BioB	Record RI BioB	Max in RI	Notes
Mollusks	25	14	33	100 est	

Though mollusks are mostly thought of as a marine taxon, many species occur in freshwater and even terrestrial habitats. Taking all habitats together the diversity is good compared to the BioBlitz average. However, it is most productive to compare the mollusk diversity at Rocky Point with other marine sites and there the average is 22, making Rocky Point average. The team was part of the generally strong overall marine effort, and produced 11 marine gastropod mollusks and 8 marine bivalve mollusks.

CRUSTACEANS

	Rocky Pt	Avg RI BioB	Record RI BioB	Max in RI	Notes
Crustaceans	30	13	70	50 est	good, in large part due to good people

As with the mollusks, crustaceans are thought of as a marine taxon but there are many freshwater species such as fairy shrimp (Amphipoda) and even common terrestrial species such as pill bugs (Isopoda). Taking all habitats together, the crustacean diversity documented was good. Because it takes experience and special skills to find and identify a wide range of crustaceans the documented diversity is probably due as much to the presence of a small number of very good naturalists as to the absolute diversity present. Nonetheless, the range of habitats even in such a small area could be expected to be good for crustacean diversity.

FISH

	Rocky Pt	Avg RI BioB	Record RI BioB	Max in RI	Notes
Fish	23	10	26	281	very good, esp. considering no freshw. fish

A total of 23 species of fish were recorded during the BioBlitz. This is near the RI BioBlitz record of 26, from Jamestown, which on its face is a much better habitat. In part it reflects a particularly good effort by the marine team, augmented for the event by staff from Save The Bay. In all likelihood it also reflects particularly diverse types of fish habitat located together in a relatively small stretch of shore. The southern end of the park is a flat, sand and muddy bottom with sandy shore and significant freshwater flow coming from the stream and other surface sources as well as probably influx from groundwater. Rocks and pilings and the point itself provide pockets of shelter from long shore current and waves. The shore to the north of the beach includes rocky structure, pilings, and areas exposed to different amounts of bay current. The beaches and shallow water north of the point have a different wind and wave exposure and stonier bottom. Each type of habitat being attractive to different types of fish this likely contributed to the observed fish diversity.

Only one species of fish, American eel, was recorded in freshwater and it is catadromous itself. The killifish and ninespined sticklebacks found in the ocean at the mouth of the stream are probably using the pond behind the old swimming pool site, too, but none were recorded there during BioBlitz.

The saltwater species of note included four types of the Order Clupeiformes alewife, atlantic menhaden, atlantic herring, and bay anchovy, ecologically and economically important species and three species of flounder (summer, windowpane, and winter), also economically important. In Rhode Island the nine-spine stickleback is mostly limited to certain coastal streams and ponds and along the shore near streams. That Rocky Point offers good shore fishing is well known and visitors were seen fishing throughout BioBlitz. Even BioBlitz participants caught a keeper striped bass from the beach during the event.

BUTTERFLIES AND MOTHS

	Rocky Pt	Avg RI BioB	Record RI BioB	Max in RI	Notes
Butterflies	15	16	27	107	good showing given weather
Moths	155	110	214	839	very good, esp. given the weather

For species lists, see the appendix. Though common in Rhode Island, the three swallowtail species seen, tiger, black, and spicebush (*Papilio polyxenes*, *Pterourus glaucus*, and *Pterourus troilus*, respectively) are nonetheless large, conspicuous butterflies that attract the interest of the public. The red banded hairstreak in a southern species considered unusual in Rhode Island until just the last decade, during which it has recently become relatively common. The years 2013 and 2014 were breakout years for red banded hairstreak with it being seen very frequently. If its presence at Rocky Point says anything, it is about the warming climate of Rhode Island than about Rocky Point in particular. The situation of the zabulon skipper (*Poanes zabulon*) is similar

to that of the red banded hairstreak. This was considered a rare butterfly more typical of southern and inland eastern North America until relatively recently but it has become more common, presumably due to climate change (Breed, et al. 2012). As with the two previous species, the wild indigo duskywing (*Erynnis baptisiae*) was once considered a bit unusual of a find but is seen more commonly of late. This expansion has been attributed to the spread of one of its host plants, crown vetch (*Coronilla varia*), in waste spaces (crown vetch grows extensively along the paved shoreline path at Rocky Point).



Baltimore checkerspot (*Euphydryas phaeton*)

hayfields, gardens, or cultivated flower bed. The total of 15 butterfly species, close to average for BioBlitz of 16, is good considering the weather and site conditions, though it is only just over half the BioBlitz record of 27, at Alton Jones Campus in West Greenwich in 2004.

Generally the moth count at a bioblitz is affected by the same factors as butterflies: cold, wet, or windy weather, small total area with proportionately low habitat diversity. It is noteworthy that moths provided 155 species to the count, 30% above the bioblitz average of 110. This is the third highest moth count for a Rhode Island BioBlitz: the record is 214 at Trustom Pond, S. Kingstown, with 179 moths found at Eppley Preserve in Exeter. Not only was the number of species high, but the diversity was made up of from two-thirds (103) so-called macro-moths and just one-third (52) so-called micro-moths. Despite there being approximately equal numbers of micro- and macro-moth species in Rhode Island, micro-moths reach a higher proportion in degraded habitats and so a high species count at Rocky Point, without a greater proportion of micro-moths could be a good sign for local species diversity. It should be noted that micro-moths are tough to collect and count and usually the BioBlitz finds a lower proportion of micro-moths.

None of the moth species found are listed by the Rhode Island Natural Heritage Program and none are listed by the state as Species of Greatest Conservation Need. Speaking generally, the moth fauna reflects a hardwood forest, such as the eyed bailey moth (*Baileya ophthalmica*) and even the morbid owlet moth (*Chytolita morbidalis*) which feeds on dead, dry leaves or forest edge/successional shrub habitat with species such as Abbott's sphinx (*Sphex abbottii*) which feeds on grape, ampelopsis, and other woody vines, or *Metarranthia indeclinata*, which feeds on blueberry and cherry. Some species of moth reflect the presence of forested wetlands, such as the

Butterflies are rarely a large contributor to the species count at BioBlitz, providing just 16 species on average out of the total of 107 known from Rhode Island. In part this is because the June BioBlitz date falls after the flight time of spring species and before the flight time of summer species. In part the low average is due to frequent poor weather at BioBlitz events. At Rocky Point, poor weather probably played a factor again, with significant rain Friday afternoon and early Saturday. Also, compared to other BioBlitz sites, Rocky Point was a small site, with proportionately less potential diversity and having relatively little typically rich butterfly habitat such as

hebrew (*Polygrammate hebraicum*) which feeds on black gum (*Nyssa sylvatica*), or open ground such as the orange holomelina (*Virbia aurantiaca*), which feeds on dandelions and English plantain among other low plants. The relatively high macro-moth diversity, which is good ecologically speaking, belies the absence of moths of conservation concern--those which could occur in this type of habitat but are more sensitive to habitat degradation and stressors, such as giant silk worm and sphinx moths.

BEETLES

	Rocky Pt	Avg RI BioB	Record RI BioB	Max in RI	Notes
Beetles	50	82	178	2500	weather a factor & lower effort than usu.

The event discovered one important beetle species, the nine spotted ladybug, *Coccinella novemnotata*.



C. novemnotata used to be a common species throughout the eastern United States, one of several dozen kinds of ladybugs, which are technically beetles, not bugs. But over the past 30 or 40 years, this particularly beautiful species, the official state insect of New York, all but disappeared. A single specimen was discovered during the Rocky Point BioBlitz, only the second site for this species east of the Great Plains (the other being on the south fork of eastern Long Island, NY) and the first sighting in Rhode Island in at least 30 years. It is still not clear why the nine spotted ladybug has virtually disappeared, though a huge increase in non-native ladybugs, imported to fight crop pests, may be to blame, and it is therefore impossible to say why it might be hanging on at Rocky Point. This discovery and subsequent further information about the beetle's presence could be very important for understanding its situation across the eastern United States.

Over all, the beetle list was unusually low, 50 species, compared to the average Rhode Island BioBlitz (82 species) and barely scratched the surface of the state's 2,500 potential species. Some notable absences are among the fireflies (Lampyridae) which are usually found at RI BioBlitzes, and longhorned beetles (Cerambycidae) of which only a single species was recorded. Even some

of the numerically largest beetle taxa produced few species: leaf beetles (Chrysomelidae) 3 species, and weevils (Curculionidae) 3 species. There were larger numbers of scarab beetles (Scarabaeidae), 9 species, but given the size and diversity of this taxon (including flower and leaf chafers, dung beetles, and june beetles) that is still a low result. Beetles tend to be more active in warmer, drier weather and the weather probably had a lot to do with the result. Also the beetle team did not have as many active members as it sometimes does.

Generally speaking, the types of species observed are a typical suite for short foray at a site of this type. Despite the low overall diversity, the beetle team effort produced two beetles not previously recorded in Rhode Island, both ground beetles (Fam. Carabidae). One, *Amara aulica*, is a European adventive species introduced into North America in the 1920's in Nova Scotia. It is previously known from further north in New England. It prefers open habitats on coastlines.



Amara aulica



Calleida punctata

Another species not previously recorded in Rhode Island is *Calleida punctata*, a native North American species of wide distribution but difficult to identify from its congeners, probably why it had not been noted before in the state.

A third ground beetle species, *Agonum muelleri*, had been previously seen in Rhode Island only at the Narragansett BioBlitz, though it is not uncommon in other states and probably had not been detected due to lack of effort and expertise.



Agonum muelleri

These three ground beetle discoveries have already been published by the beetle team leader (Ferreira 2014)

REPTILES AND AMPHIBIANS ("HERPTILES")

	Rocky Pt	Avg RI BioB	Record RI BioB	Max in RI	Notes
Amphibians	6	5	10	25	good; salamanders disappointing
Reptiles	6	7	12	19	great; three interesting species
Both	12	12	18	44	

The reptile and amphibian results are worth noting. Statewide, much of the diversity of these taxa is made up of at-risk species so one would expect a small, impacted site like Rocky Point to have low diversity. Herptiles at Rocky Point are nonetheless relatively diverse. The teams found 6 amphibians, including all the common ones to be expected given the site. This is good for people who want to see and live near amphibians. Although two common salamander species were eventually located, it took the team a lot of effort and they never did find the spotted salamander. Given the mature forest and forested wetland and abundant debris and cold, wet weather, this was disappointing and why salamanders are not more numerous may be worth investigating.

Among the 6 species of reptile found during the event, three reptiles of conservation interest were located: smooth green snake (*Opheodrys vernalis*), eastern ribbon snake (*Thamnophis sauritus sauritus*), and eastern box turtle (*Terrapene carolina carolina*). This diversity is below average for BioBlitz but several common species we expected to see were not found, probably due to weather. If we had found more common species, the addition of rare species would have lifted the total reptile diversity to a good level.

Smooth green snake is not listed by the Heritage Program nor is it a Species of Greatest Conservation Need; however, it is noted as declining in Rhode Island and Massachusetts and of state concern in New Hampshire. The ribbon snake is declining statewide and is a natural heritage species of special concern and a Species of Greatest Conservation Need. The shrubby grassland and without regular human disturbance is good habitat for green snake and ribbon snake but the fact that it is isolated from other likely habitats by development makes their presence gratifying if a little surprising.



Box turtles have the status "Protected" under Rhode Island law and possession without a permit is illegal at any time. The box turtle is very unusual and it is hard to know what to make of finding it. The habitat is good for box turtle, with mature forest with openings, ruderal shrub and

grassland with abundant berries and other food, and low human disturbance. Box turtle populations are very vulnerable to habitat fragmentation due to road mortality and predation by scavengers and edge predators associated with residential development. It is unlikely there is connectivity to another box turtle population and it is hard to imagine that a viable box turtle population persists at Rocky Point from before the development of the area. It is possible that someone who had a box turtle as a pet or picked it up elsewhere released it at Rocky Point. Box turtles are hard to study in the field because they're hard to find reliably. Ecologists have a variety of ways to do it, for instance using specialized sniffer dogs. It might be worth investigating box turtles at Rocky Point to determine if this is an isolated individual or if there is a breeding population.



Box Turtle at Rocky Point (photo: Nancy Karraker)



Smooth Green Snake (file photo)

BIRDS

	Rocky Pt	Avg RI BioB	Record RI BioB	Max in RI	Notes
Birds	69	73	100	323	total # low, but many good species

The Rhode Island BioBlitz usually has a strong bird team and 2014 was no exception. Experienced birders explored throughout the site all during the event. The total species diversity observed (69) was low compared to the average Rhode Island BioBlitz (73) and especially so if counting only bird lists from other bioblitzes with marine habitat (average species count 83). This is, again, probably due in part to the weather and in part to the relatively small site size. The particular bird species found were actually quite interesting and indicate a good place for birds, regardless of the total observed species diversity. Bird team participants spoke highly of the birding opportunities at Rocky Point noting three groups of birds in particular: flycatchers, wading birds, and forest birds.

The five species of flycatchers are eastern phoebe, willow flycatcher, olive-sided flycatcher, great crested flycatcher, and eastern kingbird. This would not be an unusually long list of flycatchers for a larger, more remote tract of land but for a small parcel in a highly developed landscape this is considered noteworthy. The phoebe and great crested flycatcher are commonly associated with suburban landscapes but the willow flycatcher and olive-sided flycatcher, both IDs confirmed by the most experienced birders, are relatively rarely encountered. Willow flycatcher is a bird of streams, shrub wetlands, and wet wood edges. Olive sided flycatcher is typically seen in coniferous forests and areas disturbed by fire or earth movement. It is rarely



Olive-sided flycatcher (stock)

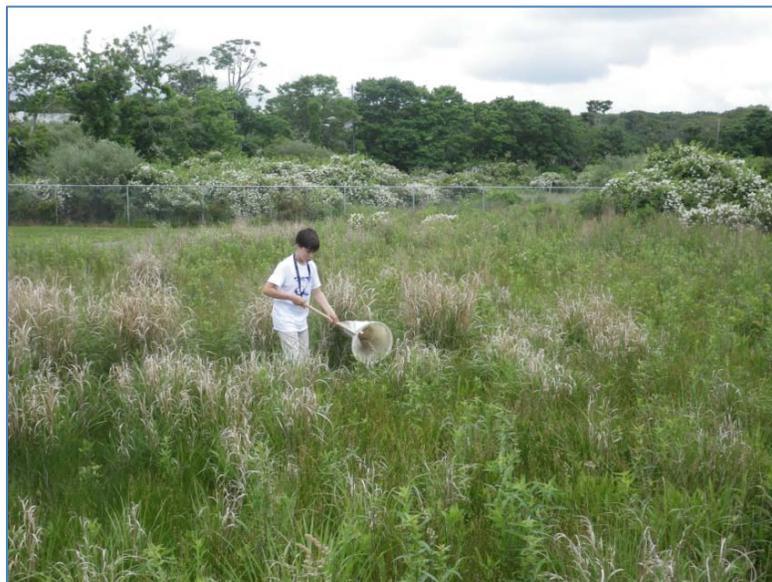
seen in Rhode Island. The willow flycatcher, great crested flycatcher, and kingbird are all listed as Species of Greatest Conservation Need in the 2015 State Wildlife Action Plan.

The wading birds found were great blue heron, green heron, snowy egret, great egret, black crowned night heron, glossy ibis, killdeer, and American oystercatcher. These are not unusual species for Rhode

Island but seeing them all in one place is a treat for birders and

indicates a generally good habitat. Habitat features attractive to this group include abundant fish and aquatic macroinvertebrates, diverse, low-wave energy microhabitats, mature trees for roosting, and a modicum of human disturbance. The egrets, black crowned night heron, ibis, and oyster catcher are all listed as Species of Greatest Conservation Need in the 2015 State Wildlife Action Plan.

Other species that helped make the bird list a highlight of the event include black billed cuckoo, wood thrush, ovenbird, northern waterthrush, brown thrasher, and eastern towhee. The first four are birds of mature forest and forested wetlands and as a group are noteworthy as indicating good forest habitat with mature trees, complex physical structure, and abundant food (primarily insects). The brown thrasher and eastern towhee are birds of forest edges and shrubland, a habitat type threatened around Rhode Island by development, sea level rise, and ecological succession. Though not rare per se, the black billed cuckoo, wood thrush, northern waterthrush, brown thrasher, and towhee are all listed as Species of Greatest Conservation Need in the 2015 State Wildlife Action Plan because their habitat is vulnerable.



Discussion:

Major Taxonomic Teams	2014 Species Found	RI BioBlitz AVG	2014 compared to Average	The'retical max # in RI	2014 compared to max	RI BioBlitz record
all monos	17	12	140%	1000	2%	55
algae	46	46	100%	1000	5%	135
mosses	10	23	44%	352	3%	77
vascular plants	283	318	89%	1620	17%	384
lichens	64	63	102%	339	19%	95
fungi	72	35	205%	1469	5%	88
Mollusks	25	14	174%	100	25%	33
non-arthropod inverts	50	28	176%	3000	2%	120
spiders and kin	27	29	92%	500	5%	61
crustaceans and kin	30	13	223%	70	43%	50
Odonata	8	16	49%	138	6%	45
Coleoptera	50	82	61%	2500	2%	178
Diptera	5	19	26%	2000	0%	51
Orthoptera	0	5	0%	75	0%	11
Hemiptera-Homoptera	2	12	17%	500	0%	28
other misc. orders	8	7	115%	800	1%	16
all "other" insect orders	73	149	49%	6113	1%	261
butterflies	15	16	94%	107	14%	29
moths	152	110	138%	839	18%	214
ants	1	5	22%	58	2%	12
bees and wasps	5	13	39%	1000	1%	30
all insects	246	292	84%	15030	2%	470
all arthropods	303	335	90%	15600	2%	476
all invertebrates	353	364	97%	19170	2%	523
reptiles	6	5	110%	25	24%	10
amphibians	6	7	90%	19	32%	12
reptiles and amphibs (herps)	12	12	129%	44	27%	18
fish	23	10	223%	281	8%	26
birds	69	73	95%	323	21%	100
mammals	16	15	104%	86	19%	22
all vertebrates	124	111	115%	734	17%	137
TOTAL species	969	973	100%	25684	4%	1338
participants	184	142	129%	1000000	0%	302

Because BioBlitz is a unique biodiversity inventorying and monitoring methodology, there are limitations to its use in comparison to fieldwork using techniques developed for that purpose: it happens all in a single 24 hour period using the volunteers who come forward, regardless of their background or experience. This requires, therefore, unique ways of assessing the results. It has proven useful to evaluate BioBlitz results is against the potential maximum number of species as well as against the results of the other 14 RI BioBlitzes held since 2000.

Among all 15 Rhode Island BioBlitz sites, Rocky Point produced an average number of species—969 species versus an average 973. No major taxonomic teams set BioBlitz records at Rocky Point for numbers of species found, however the work on marine invertebrates is noteworthy. These taxa (worms, mollusks, and crustaceans, among others) have great overall diversity, they should have great diversity and productivity in Narragansett Bay, and there are many species among them with economic importance...positive (fisheries) and negative (invasives). The RI BioBlitz has not often had the capacity to investigate them thoroughly but at Rocky Point a good showing by key people helped them reach their potential.

The maximum numbers given in the table are rough estimates from readily available published sources or unpublished estimates by BioBlitz team leaders. On average, RI BioBlitz identifies about 13% of the major taxa species thought to occur in the state. At Rocky Point that number was 14%. The major team that got closest to the maximum, as a percentage, was the herptile team, at 32%.



Gaps: By its nature BioBlitz is a potluck event and in that sense the results are shaped by the participants who happen to attend and the observing conditions at the time. The Rocky Point BioBlitz had several large gaps due to the lack of skilled naturalists. Compared to the potential number of species, the largest gaps are in arthropod taxa such as ants, bees, and wasps (Hymenoptera), flies (Diptera), and spiders and kin. Another hole is in the crickets and grasshoppers (Orthoptera) where the diversity in RI isn't overwhelming and good texts are available but still there was no one able to sample and identify even a handful of species. The

crustacean and mollusk teams did very well for the circumstances but given their diversity of habitats and modes of life and their economic importance, a greater capacity to inventory and study these taxa would benefit not just BioBlitz but environmental management in Rhode Island. There is such diversity in non-arthropod invertebrate taxa that it would be unrealistic to expect a BioBlitz, even one as well known as the RI BioBlitz to attract skilled experts in more than a few. From an educational point of view, it is a shame that no echinoderms were found, for example, or no one was able to collect and organize a representative sample of nematode worms.

Conclusion:

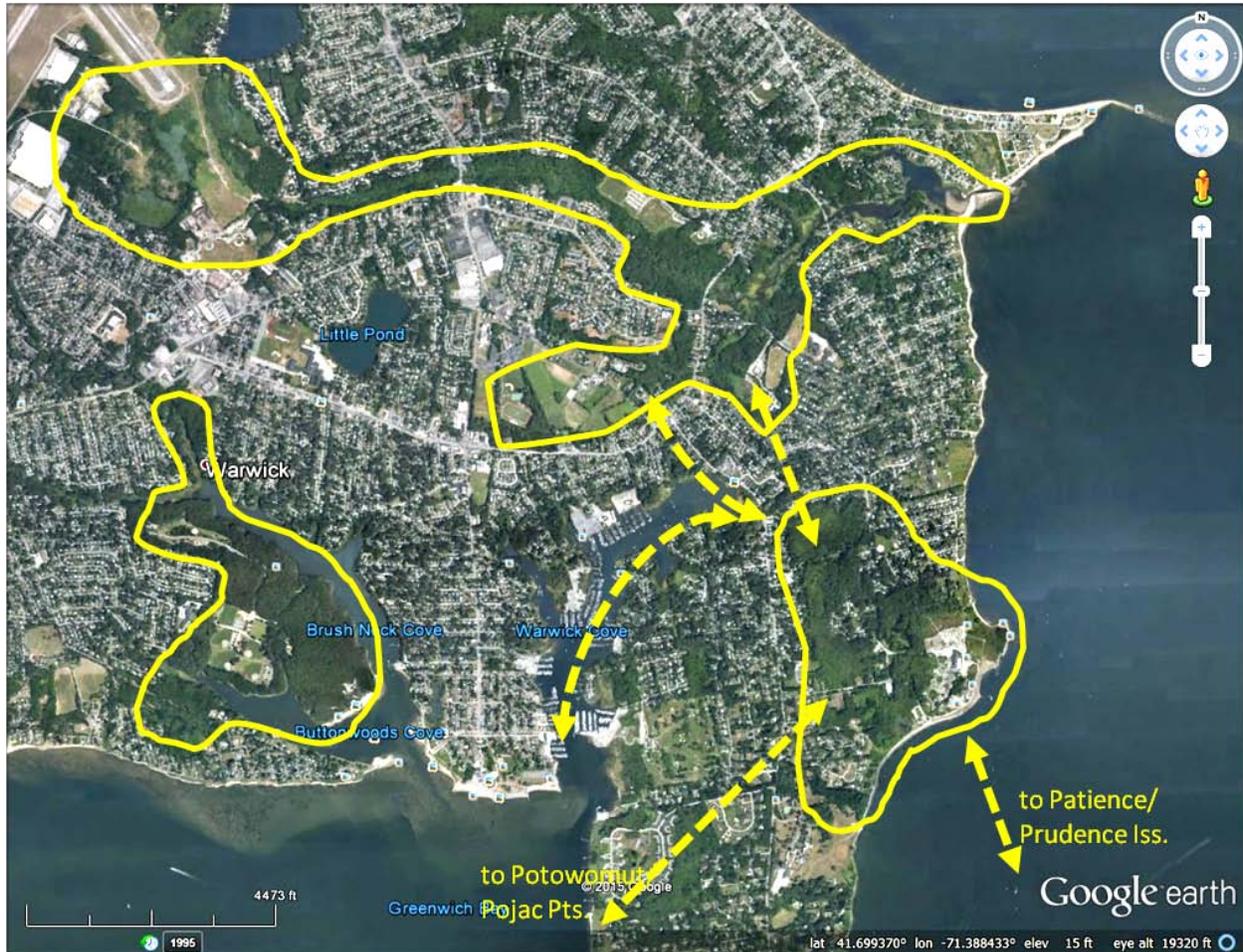
It is important to remember that BioBlitz is primarily an educational and outreach activity and is not crafted to produce statistically robust results about biodiversity. Nonetheless, the BioBlitz methodology is similar from site to site and team skills and effort year to year can be somewhat accounted for.

BioBlitz suggests several directions for researchers as well as for managers. The presence of a 9-spotted ladybug needs to be followed up on as having national level significance. If a substantial, self-sustaining population can be confirmed, it could contribute genetic diversity to captive breeding efforts, already begun with a population from Long Island, aimed at species recovery. The potential presence of breeding populations of box turtle and smooth green snake need to be investigated because if confirmed this could tell scientists and conservationists something new and important about the factors that determine the species' ability to sustain a population in suburban conditions.



Through BioBlitz, a picture emerges of Rocky Point as a place that, despite obvious impairments in some respects, has a number of notable habitat functions, especially when taken in context with surrounding areas. The forest habitat on the site, on and west of the ridge line, probably working together with the forested wetland west of Palmer Ave., could well be attracting birds such as the tyrant flycatchers that would otherwise find little habitat in the area. This is the so-called "Central Park Effect" or urban oasis effect. If one looks at Rocky Point as an ecologist might assess a parcel for general habitat value, using measures of total size, homogeneity or diversity, and connectedness to larger systems, the assessment might not be that good because it is small, largely composed of coastal forest and scrub community types, and separated from other similar habitat parcels by substantial areas of suburban development. However, BioBlitz

results suggest that this isn't the whole story and point to the operation of three important phenomenon that should be considered in evaluating the site's ecological prospects: the "Central Park effect", the presence of the stream drainage that flows west of the cliffs, and the juxtaposition of diverse marine habitats around this rocky headland.



Rocky Point as an oasis in a heavily developed region.

Ecologists have long established that for general biodiversity, parcel size and connectedness are among the most important positive factors. This applies to mammals, insects, reptiles, and amphibians, among others. For mobile animals such as birds, however, there is also a phenomenon called the "Central Park effect" or oasis effect where delineated areas of better habitat exhibit increased species diversity because they stand out strongly against a surrounding area of poorer habitat. Compared to the heavily developed surrounding areas, Rocky Point is a relative oasis which may be tending to accumulate animals moving through the area and looking for the best available habitat. As well as Central Park, New York, this phenomenon has also been invoked to account for the particularly good birding in Swan Point Cemetery, Providence. Given bird results, this could well be happening at Rocky Point.

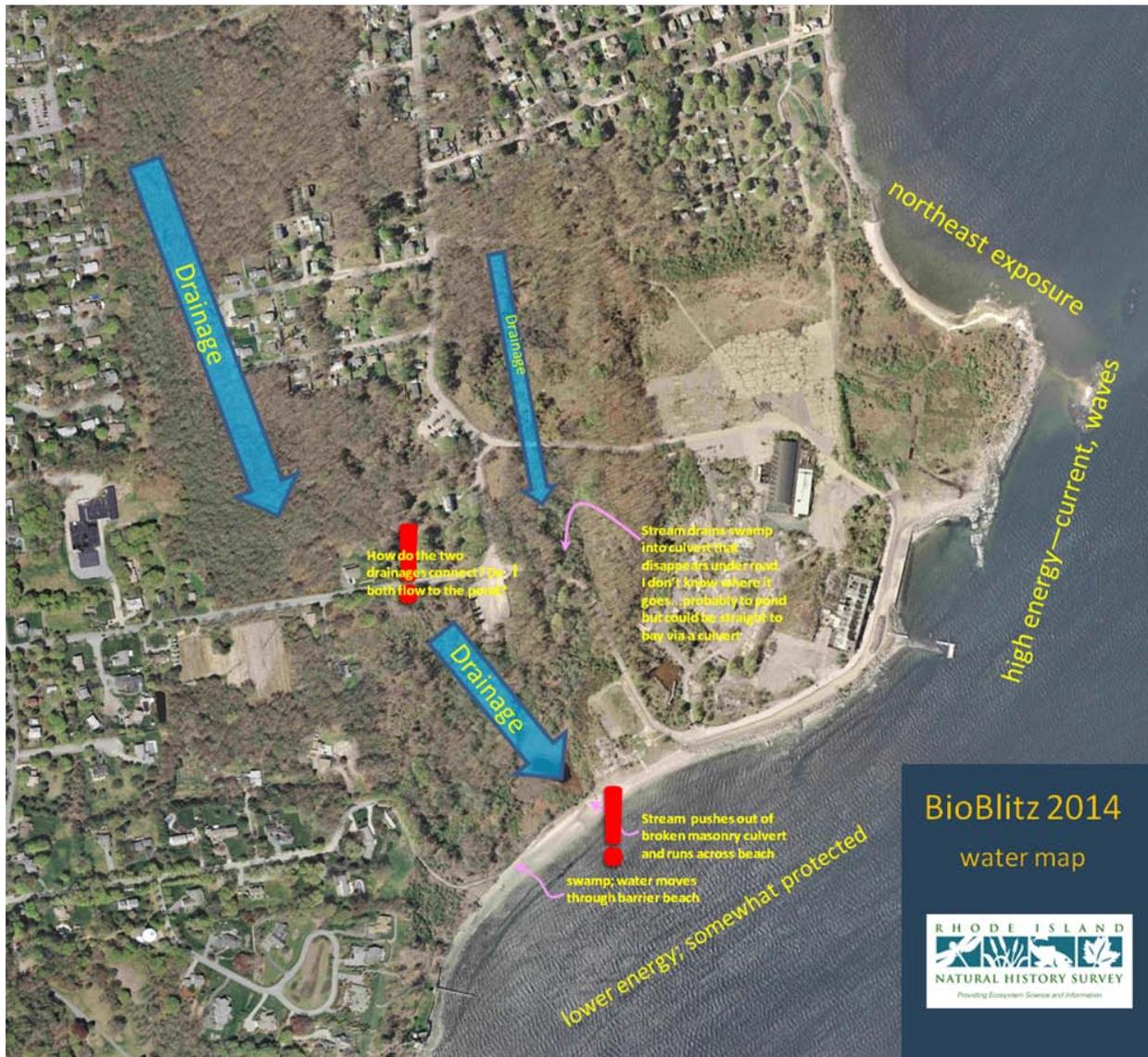
Another factor that could well be contributing to the biodiversity observed at Rocky Point is the swamp/stream/marsh system that flows south west of the ridge, and enters Narragansett Bay

through a small pond and salt marsh located west of the old swimming pool area. The near-shore biodiversity in this location was observed to be good, possibly indicating above average productivity as a result of diverse micro-habitats and the influx of freshwater and nutrients. As interesting as this freshwater stream appears to be, it has several impairments that could be investigated and mitigated.

The stream drains southward through the woods west of Palmer Ave., which means it is somewhat buffered from overly-enriched run-off and warming. Then it flows through a culvert under Rocky Point Ave., somewhere joins water from east of Palmer Ave., and then flows along the back of the parking lot. There it is canalized into a straight



strip lined with trap-rock and choked with invasive plants and receiving trash, sediment, and run-off from the back of the parking area. The culvert location and connections should be investigated and opportunities for daylighting the stream explored. The trap-rock section along the parking lot should be re-engineered to create changes in direction and slope, shade, and other beneficial habitat features and to capture and mitigate parking lot run-off. Finally, the stream runs into the small pond behind the old swimming pool and from there into a culvert that used to go under the beach into the sea. This culvert is clogged and broken and the stream flows up and out of it through the beach sand. This culvert should be eliminated and direct, surface flow from the pond to the beach reestablished. All this would support healthy natural biodiversity in the stream and make the wetlands and near-shore waters even more productive.



Freshwater stream and wetland system. Background image: RIGIS

Another area of ecological opportunity is the low-lying south-facing cove/shoreline just north of the old Shore Dining Hall and inshore (West) of the eponymous Rocky Point promontory. This area is composed of fill, covered with poor quality grass, and protected from the sea by rip-rap. It has notably low ecological value as it is but in a scenario of rising sea-level it could be an area for future salt marsh development/shoreline retreat.

In all, the Rocky Point site is notable for having higher habitat and species diversity at the south end of the park, largely because of the diversity of beneficial microhabitats there compared to the dryer, upland and suburban edge habitat at the upper, North end of the property. When considering redevelopment of the park, the stakeholders might consider strategies that minimize disturbance at the current parking location at the end of Rocky Point Ave., which is near the heart of the highest habitat quality area.

In 2000 RINHS inaugurated the Rhode Island BioBlitz at Roger William Park in Providence. The park was not then, and still is not, a place one would seek out for its biodiversity: the park is relatively small, being only 327 acres of dry land and 100 acres of ponds, it is almost entirely the product of Victorian-era landscape design, it is relatively homogeneous ecologically, and what habitats there are were highly degraded by heavy use, polluted runoff, debris, and invasive species, among other problems. All that notwithstanding, volunteers in 24 hours identified 665 species and animals and plants there.

Also, as at Roger Williams Park, the landscape of Rocky Point had been largely reshaped by human activity with the purpose of creating a recreational area for the urban populace of Providence and surrounding communities. The BioBlitz site at Rocky Point is even smaller in acreage. But as with the Roger Williams Park BioBlitz, the Rocky Point BioBlitz nonetheless demonstrated clearly that rich biodiversity and functional habitats can be found in ostensibly unlikely places. Further, the identification of nearly 1,000 species in 24 hours by nearly 200 volunteers shows that Rocky Point continues to have power as a community gathering point. As in its historic past, it remains a place where the community can find a less urbanized landscape with greater connectivity to the natural environment and potentially engage with animals, plants, and natural forces. It is both a biological and social oasis in a largely urban landscape.

Rocky Point

by Patty McAlpine (RI BioBlitz 2014 Creative Writing Team)

Amid ruins of an amusement park nature abounds.
A house finch perched atop the derelict dining hall
sings a welcome song.
Behind a fence memories of childhood—
rollercoaster rides and family fun;
music from a carousel echoes from the past
blends with the sound of laughter;
children collect shells and crabs awash in salt and sand.
Walk along the shore, new amusements to share.
Rocky Point Park thus remains a natural treasure
for all to take pleasure!

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THANK YOU



15th Annual Rhode Island BioBlitz 2014 **Rocky Point, Warwick**

THANKS to the Local Hosts:

- City of Warwick
- Rocky Point Foundation
- RI Dept. of Environmental Management

THANKS to the Sponsors:

- Roger Williams Park Zoo
- Buckeye Brook Coalition
- Largess Forestry



Largess Forestry, Inc.



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