CHAPTER 11.

Aquatic Birds, Marine Mammals, and Sea Turtles

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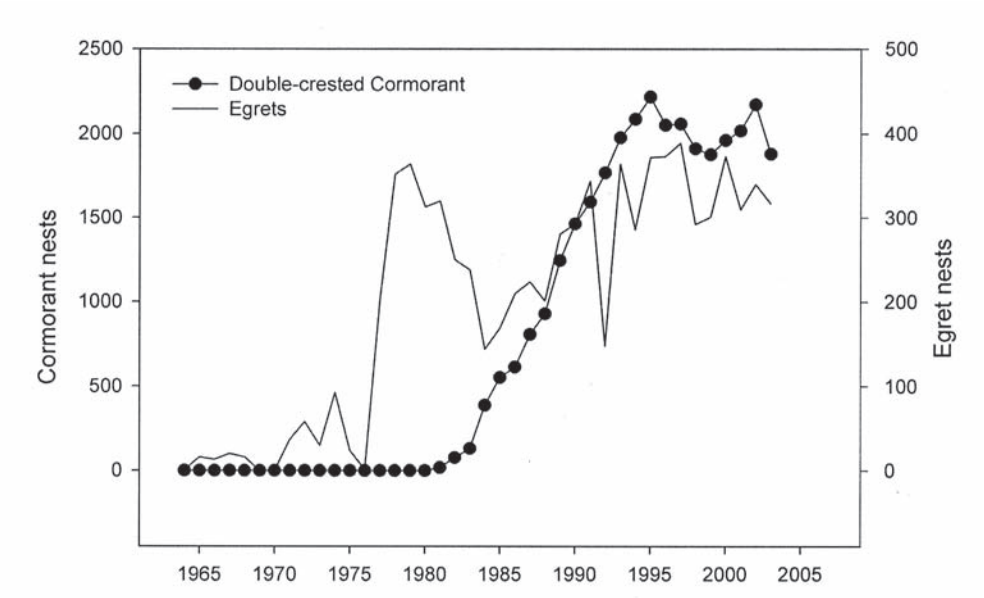

Figure 11.1. Long-term increase in the number of double-crested cormorant and egret (great and snowy egrets combined) nests in Narragansett Bay and Rhode Island. Totals for each year are sums of all the nests at all sites counted by RIDEM.

Figure 11.2. Double-crested cormorants in the waters around Prudence Island, R.I. *Photo from NBNERR photo library.*

Aquatic Birds, Marine Mammals, and Sea Turtles

Aquatic Birds

Narragansett Bay and its associated habitats provide foraging, nesting, and resting habitat for a variety of bird species. According to French et al. (1992), approximately 40 percent of all breeding bird species in Rhode Island, and 57 percent of wintering birds, use coastal habitats along Narragansett Bay for nesting. In all, 187 species of birds are considered to be associated with Narragansett Bay and its coastal habitats (French et al., 1992). Among the more frequent and abundant guilds are waterfowl (geese and ducks); shorebirds (e.g., plovers and sandpipers); wading birds (e.g., herons and egrets); raptors, gulls and terns; and songbirds. Research focusing on the ecology of most of these groups in Narragansett Bay is largely lacking, although Ferren and Myers (1998) and Trocki (2003) provide excellent data for understanding population trends and habitat use of colonial wading and nesting birds, and McKinney (2005) provides some excellent initial data on waterfowl community composition, distribution, and habitat use in Narragansett Bay.

Colonial Nesting Birds

In 1964, Ferren and Myers (1998) began monitoring the number of nests of selected coastal bird species along the entire Rhode Island coast, including Narragansett Bay (see Chapter 6 for NBNERR-specific results from this survey). These species include gulls (primarily herring gull (*Larus argentatus*) and great black-backed gull (*Larus marinus*)), terns (common tern (*Sterna hirundo*) and least tern (*Sterna albifrons*)), waders (great egret (*Casmerodius albus*), snowy egret (*Egretta thula*), cattle egret (*Bubulcus ibis*), little blue heron (*Florida caerulea*), and glossy ibis (*Plegadis falcinellus*)), piping plover (*Charadrius melodus*), double-crested cormorant (*Phalacrocorax auritus*), and American oystercatcher (*Haematopus palliates*). To date, approximately 90 nesting locations have been identified along the Rhode Island coast (see Fig. 6.6, page 62). All of these sites are not necessarily used simultaneously in a given year, however, since the nesting patterns of most species change over time (Ferren and Myers, 1998). Many of the undeveloped Narragansett Bay islands support abundant and sometimes diverse nesting bird communities. In particular, Hope, Rose, and Little Gould islands support rich heronries (mixed-species aggregations of nesting herons and egrets), while gulls/cormorants are abundant on Hope, Dyer, Little Gould, and West islands, among others. The monitoring program initiated by Ferren and Myers (1998) has been critical for documenting the dramatic return and subsequent increase in abundance of formerly displaced species, including cormorants and long-legged waders that responded, in part, to measures taken to directly protect these species and their nesting habitats (Fig 11.1).

The double-crested cormorant (Fig. 11.2; hereafter cormorant since the great cormorant (*Phalacrocorax carbo*) is generally much less abundant in Narragansett Bay) is now a conspicuous and abundant seasonal component of the estuarine bird fauna in Narragansett Bay. Cormorants are present throughout the year in Narragansett Bay, but are much more common in summer and are especially abundant during the spring and fall migrations (Conway, 1992). Cormorants can be seen foraging and resting throughout most areas of the Bay, including open water, coves, embayments, and marinas. Based on RIDEM surveys, the number of cormorant nests in Narragansett Bay has risen from zero as late as 1980 to 1,880 in 2003, with a peak of 2,217 nests in 1995 (Fig. 11.1) (Ferren and Myers, 1998; Raithel, unpublished data). Abundant nesting colonies are generally found on only a handful of islands, including Little Gould, West, and East islands (all of which are found in the Sakonnet River) and Hope Island in the West Passage. The abundance of cormorants has risen to such a degree that there is now concern about their potential impacts to commercial fishery stocks (e.g., winter flounder, *Pseudopleuronectes americanus*) in Narragansett Bay. To examine this objectively, French McCay and Rowe (2004) conducted a bioenergetic analysis of cormorant feeding in Narragansett Bay, based on cormorant abundance, foraging area, and feeding requirements. They determined that cormorants probably consume less than 10 percent of the winter flounder young-of-the-year annually in Narragansett Bay and suggest—in agreement with similar studies conducted in other locations—that cormorant predation generally has a much lower impact on fishery species than does human fishing.

Wading bird colonies, composed of species such as great egret, snowy egret, cattle egret, little

blue heron, and glossy ibis, are found on a few of Narragansett Bay's islands including Hope, Little Gould, and Rose islands. Hope Island is considered to be one of the most important heronries in the Bay, to the point where the state now restricts human activities on the island throughout the nesting season. The species composition of the Hope Island heronry is variable among years, but can include great egret, snowy egret, black-crowned night heron (*Nycticorax nycticorax*), glossy ibis, cattle egret, and little blue heron—all of which nest among abundant gull and cormorant populations. However, even though Hope and other Bay islands currently support substantial heronries, events recorded by Ferren and Myers (1998) illustrate that this was not always the case, and that other islands that do not currently support heronries may do so in the future. For example, in 1983–84 the heronry on Hope Island was almost completely abandoned. The emigrating birds moved to nest on Big Gould, Dyer, and Rose islands, with Hope remaining mostly unutilized throughout the mid-1980s (Ferren and Myers, 1988). After 1989, the heronry, along with newly returning cormorants, began to reestablish itself on Hope Island. The exact cause of the Hope Island abandonment is unclear, and may be due to bird-inflicted damage to nesting vegetation from guano, as suggested by Ferren and Myers (1988), or possibly to the presence of red fox on the island (Raithel, personal communication). A similar abandonment of the heronry from Little Gould Island in the 1970s illustrates that this was not an isolated incident. These events clearly indicate that the spatially and temporally dynamic nesting patterns of herons, egrets, and associated nesting birds necessitates the protection and preservation of natural habitats on other Narragansett Bay islands. This is true even if a particular island does not currently support a heronry or other nesting birds; if another heronry abandonment occurs in the future, displaced birds will need other islands to colonize and nest.

Although wading bird nesting areas on Bay islands are well known and many are protected, the factors that affect selection and use of foraging habitats in Narragansett Bay are less clear. Herons and egrets are commonly observed foraging in fringing and meadow salt marshes around Narragansett Bay, and it is generally accepted that marshes provide important foraging habitat for these birds. A recent study (Trocki, 2003) provides some of the first information about how and why wading birds use salt marshes in Narragansett Bay as foraging habitat. Trocki (2003) found that the number of birds foraging in a marsh correlates well with marsh area, but bird density does not (i.e., as marsh area increases, so does the number of foraging birds but not bird density). Trocki (2003) also found that wading birds strongly preferred isolated salt marsh pools as foraging microhabitat within a marsh, and concluded that the lack of marsh pools (often resulting from ditching) is the primary factor limiting the abundance of these birds on a Bay-wide scale (e.g., the number of wading birds nesting in Rhode Island has remained stable in recent years even though not all potential nesting areas are used in any given year (Ferren and Myers, 1998)). Thus, Trocki's study suggests that future marsh restoration should also consider marsh pool creation if increasing wading bird numbers is a primary goal of restoration.

Waterfowl

Narragansett Bay is used extensively by a variety of waterfowl that includes diving and dabbling ducks and swans and geese (Fig. 11.3). While some of these species (e.g., Canada goose (*Branta canadensis*), American black duck (*Anas rubripes*), and mallard (*Anas platyrhynchos*)) utilize Bay waters throughout the year, many others use the Bay primarily for overwintering (Conway, 1992). Based on annual winter surveys conducted from 2002 to 2004, 23 of the 55 native species of North American waterfowl (42 percent) use Narragansett Bay in winter (McKinney, 2005). The most abundant species according to these surveys are scaup (*Aythya* spp.), Canada goose, common goldeneye (*Bucephala clangula*), common eider (*Somateria mollissima*), and brant (*Branta bernicla*) (Table 11.1). Twelve additional waterfowl species were considered to be regular winter inhabitants. Densities of winter waterfowl in Narragansett Bay average 39 birds km^{-1}, which is comparable to nearby Boston Harbor but less than in Chesapeake Bay (36 and 55 birds km^{-1}, respectively) (McKinney, 2005).

Waterfowl species do not appear to be randomly located around Narragansett Bay; instead, these birds may select for specific habitats that have certain landscape characteristics. For example, specific groups of waterfowl in Narragansett Bay were found to be associated with salt marsh–dominated coves or rocky headland habitats near the mouth of the Bay (McKinney, 2005). Waterfowl using salt marsh and shallow cove habitats favored sites that were abutted by forest and residential land-use types. McKinney (2005) suggests that species select these areas within Narragansett Bay because trees and/or houses reduce wind velocity and because hunting is not permitted near residential areas (McKinney also found that waterfowl species richness decreased with increasing hunting activity). By design, McKinney's work was exploratory in nature

Table 11.1. Relative abundance of waterfowl and associated species in winter in Narragansett Bay and around Prudence Island. Data were collected in 2004 and 2005 by volunteers coordinated by the EPA in Narragansett, R.I. All data were provided by Richard McKinney (unpublished).

		Prudence Island		Narragansett Bay	
Species	Common name	2004	2005	2004	2005
Anas americana	American wigeon	0	2	1060	123
Anas platyrhynchos	Mallard	5	4	1320	1478
Anas rubripes	American black duck	139	276	983	1474
Anas strepera	Gadwall	0	3	395	61
Aythya affinis	Lesser scaup	0	0	0	368
Aythya marila	Greater scaup	4	0	3576	7889
Branta bernicla	Brant	60	468	1911	1434
Branta canadensis	Canada goose	53	390	2037	4008
Bucephala albeola	Bufflehead	74	11	718	470
Bucephala clangula	Common goldeneye	695	70	2323	849
Clangula hyemalis	Old-squaw	0	0	0	1
Cygnus olor	Mute swan	7	0	523	677
Gavia immer	Common loon	1	0	47	25
Histrionicus histrionicus	Harlequin duck	0	0	105	66
Larus spp.	Gulls	570	518	4015	3789
Lophodytes cucullatus	Hooded merganser	0	0	33	70
Melanitta deglandi	White-winged scoter	0	3	411	3
Melanitta nigra	Black scoter	0	0	198	99
Melanitta perspicillata	Surf scoter	0	2	3	33
Mergus merganser	Common merganser	0	5	0	23
Mergus serrator	Red-breasted merganser	21	11	824	404
Phalacrocorax spp.	Cormorants	0	1	1	5
Podiceps auritus	Horned grebe	6	0	127	19
Somateria mollissima	Common eider	0	0	941	2465

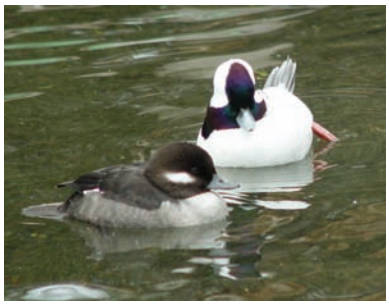

Figure 11.3. Examples of common waterfowl in Narragansett Bay, including bufflehead (*far left*), harlequin duck (*left*), and hooded merganser. *Photos by R. McKinney, EPA.*

and has raised some important questions about winter waterfowl use of microhabitats in Narragansett Bay that should be investigated. In particular, the effects of human disturbance, including coastal development and shoreline modification, hunting, and eutrophication and its resultant biotic changes, need scientific attention.

Marine Mammals

The mammals that use Narragansett Bay and its associated coastal habitats include those that are facultative terrestrial species as well as true marine mammals such as cetaceans and pinnipeds. According to French et al. (1992), at least 33 land-based mammals use Narragansett Bay coastal habitats (including coastal shrublands and forests); approximately half directly use shore-zone areas of the Bay. The Bay's beaches, salt marshes, and other shoreline types provide ample foraging opportunities for species such as white-tailed deer (*Odocoileus virginianus*), coyote (*Canis latrans*), red fox (*Vulpes vulpes)*, raccoon (*Procyon lotor*), American mink (*Mustela vison*), striped skunk (*Mephitis mephitis*), northern river otter (*Lontra canadensis*), Norway rat (*Rattus norvegicus*), muskrat (*Ondatra zibethica*), and multiple species of bats. Mice (white-footed *Peromyscus leucopus*, meadow jumping *Zapus*

hudsonius and house *Mus musculus*), meadow voles (*Microtus pennsylvanicus*), and masked shrews (*Sorex cinereus*) may also nest in the upper portions of salt marshes around the Bay (Nixon, 1982).

Among the marine mammals that are found in Narragansett Bay, the harbor seal (*Phoca vitulina*) is the only regular, abundant species (Fig. 11.4). The most comprehensive research focusing on harbor seals in Narragansett Bay was a study conducted by Schroeder (2000) who examined trends in population size and haul-out use. According to Schroeder (2000), harbor seals typically arrive in Narragansett Bay in late September or early October, increase in numbers through March, and leave the Bay by early May (Fig. 11.5). While they are in Narragansett Bay, harbor seals forage in subtidal areas and use rocky outcrops as haul-out sites for resting. Schroeder (2000) identified 27 sites that are used as haul-outs by harbor seals in Narragansett Bay and on Block Island. Twelve of these were considered primary sites (based on the number of seals and also monitoring effort), and among these, Rome Point in North Kingstown consistently supported some of the highest numbers of seals. Other primary haul-out sites include Brenton Point (off Newport), Citing Rock (off Rose Island), and Cold Spring Rock (north of Rome Point, near Wickford Harbor) (Fig. 11.6). Other sites, including Seal Rock (off Hope Island) and Cormorant Cove (on Block Island) also support large numbers of hauled out seals, but these sites are monitored too infrequently to assess true haul-out patterns, and are thus not considered primary. Over the last 13 years, the number of harbor seal haul-out sites in Narragansett Bay has more than tripled (Schroeder, 2000). This is a direct result of an expanding harbor seal population in Narragansett Bay that has increased by a factor of 10 in the last 40 years, and has quadrupled since 1987 (Schroeder, 2000).

A smaller, unpublished study that examined nocturnal behaviors of harbor seals in the NBNERR was conducted by Norris (2005), then an undergraduate at Roger Williams University in Bristol, R.I. Norris (2005) observed seals in the winter of 2004 at the T-wharf haul-out site on the south end of Prudence Island and found that seals hauled out in similar numbers at this site during the day and at night (average of 22 during the day; 16 at night). She also found that temperature and wind speed had no effect on the numbers of seals that were hauled out and that the number of seals exhibiting scanning behavior depended on the size of the group that was hauled out. Two to four scanners were used when the number of hauled out seals ranged from 10 to 40; however, only one seal scanned if the number hauled out was less than seven. This pattern was the same during the day and at night.

Harbor seal populations have been increasing throughout much of the northwest Atlantic (Waring et al., 2004), including in Narragansett Bay, where a steadily increasing population uses an increasing number of haul-out sites. Higher numbers of seals have prompted concern over the resultant effects on commercially important fish stocks in the region (Baraff and Loughlin, 2000). However, recent research shows that these concerns may be largely unwarranted in Narragansett Bay. Nicotri and Webb (unpublished data) have used bioenergenic models to estimate that the winter seal population in the Bay consumes only 0.15 to 0.40 percent of the total commercial landing for all species, which suggests that the effects of seal foraging on fish stocks is minimal, at least in Narragansett Bay.

Other than harbor seals, Narragansett Bay is not commonly frequented by marine mammals. As such, published scientific accounts or marine mammal sighting lists specific to Narragansett Bay are rare. The best available information is a list of strandings and live sightings of marine mammals in Narragansett Bay and along coastal Rhode Island (Robert Kenney, personal communication). This list includes 15 additional species of marine mammals sighted (dead or alive) at some point in Narragansett Bay or along the south shore of Rhode Island. These species include the gray seal (*Halichoerus grypus*), harp seal (*Pagophilus groenlandicus*), hooded seal (*Cystophora cristata*), North Atlantic right whale (*Eubalaena glacialis*), humpback whale (*Megaptera novaeangliae*), fin whale (*Balaenoptera physalus*), northern minke whale (*Balaenoptera acutorostrata*), dwarf sperm whale (*Kogia sima*), long-finned pilot whale *(Globicephala melas*), Risso's dolphin (*Grampus griseus*), Atlantic white-sided dolphin (*Lagenorhynchus acutus*), bottlenose dolphin (*Tursiops truncates*), striped dolphin (*Stenella coeruleoalba*), harbor porpoise (*Phocoena phocoena*), and West Indian manatee (*Trichechus manatus*).

Figure 11.4. A harbor seal in Narragansett Bay. *Photo from NOAA's Estuarine Research Reserve Collection.*

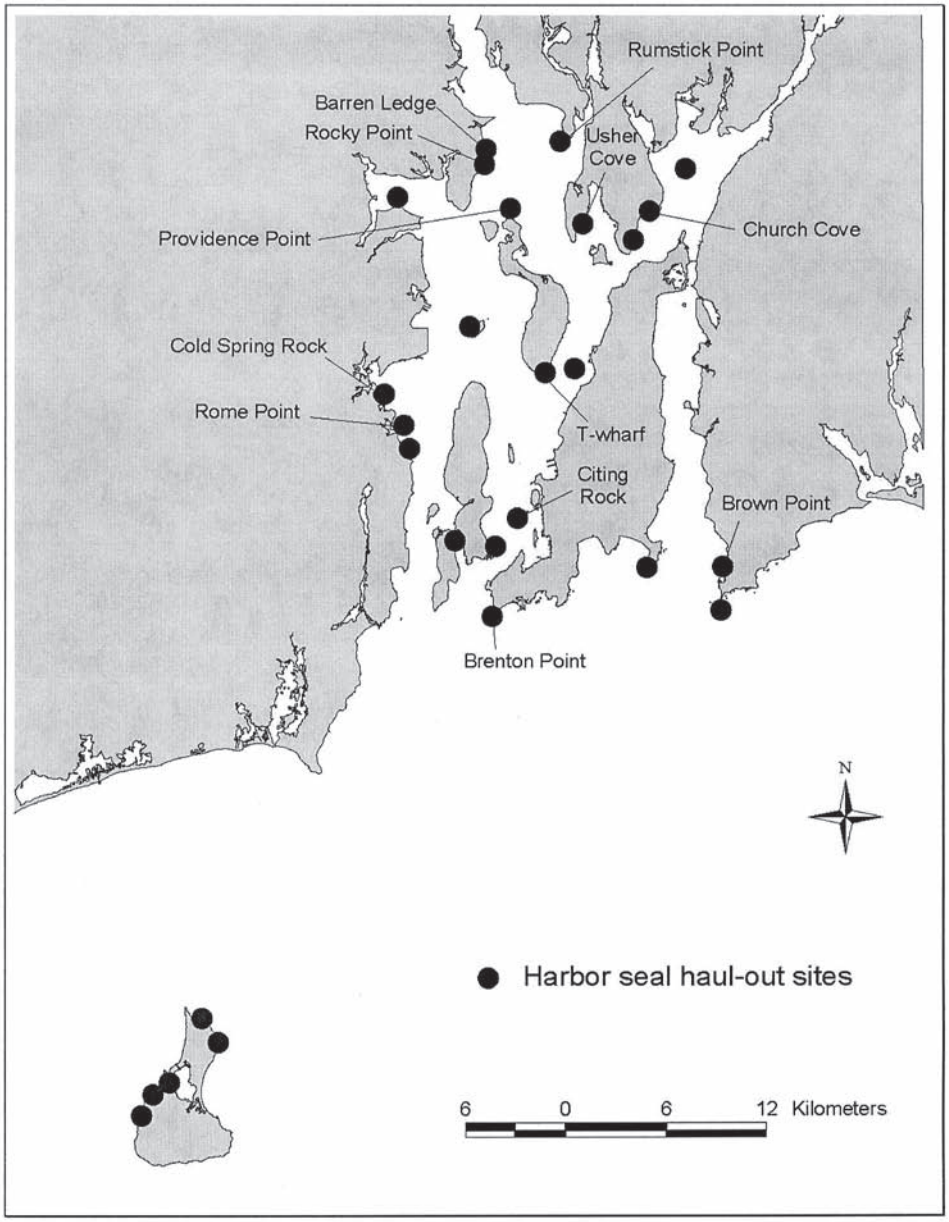

Figure 11.6. Locations of seal haul-out sites in Narragansett Bay and on Block Island, according to Schroeder (2000). Locations that are considered as primary haul-out sites by Schroeder are labeled.

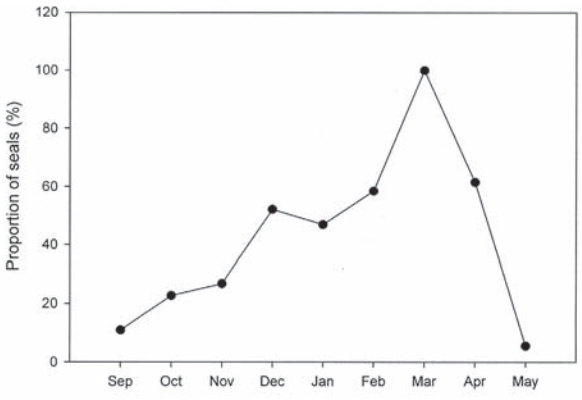

Figure 11.5. The relative abundance of harbor seals observed from September through May, expressed as a percentage of maximum abundance in March. Data are from 1993 to 2002, and were derived from monitoring efforts coordinated by Save The Bay and Schroeder (2000).

Sea Turtles

While not often thought of as local residents, sea turtles are regular summer visitors to Rhode Island waters—some making their way into Narragansett Bay. They are sighted in state waters from late June through October, when they migrate south to their wintering grounds. Data from NOAA's Sea Turtle Stranding and Salvage Network (STSSN) and from the newly created R.I. Sea Turtle Disentanglement Network (RISTDN) document the occurrence of leatherback (*Dermochelys coriacea*), loggerhead (*Caretta caretta*), and Kemp's ridley (*Lepidochelys kempi*) sea turtles in the Bay (Schwartz and Beutel, 2006; Wynne and Schwartz,

1999; H. Medic, personal communication). The leatherback is highly pelagic, traversing Rhode Island Sound but not usually venturing into the Bay farther north than its mouth. Nevertheless, in 2007, a leatherback was successfully disentangled from a buoy line off Hope Island, part of the NBNERR (M. Schwartz, personal communication) (Fig. 11.7). The loggerhead and Kemp's ridley sea turtles have been sighted (dead and alive) in the Bay around Conanicut and Aquidneck islands and likely make their way to the NBNERR as well (Schwartz and Beutel, 2006; Schwartz, personal communication; Medic, personal communication).

Figure 11.7. A leatherback sea turtle was successfully disentangled from a buoy line near Hope Island, part of the NBNERR. *Photo courtesy RISTDN.*

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