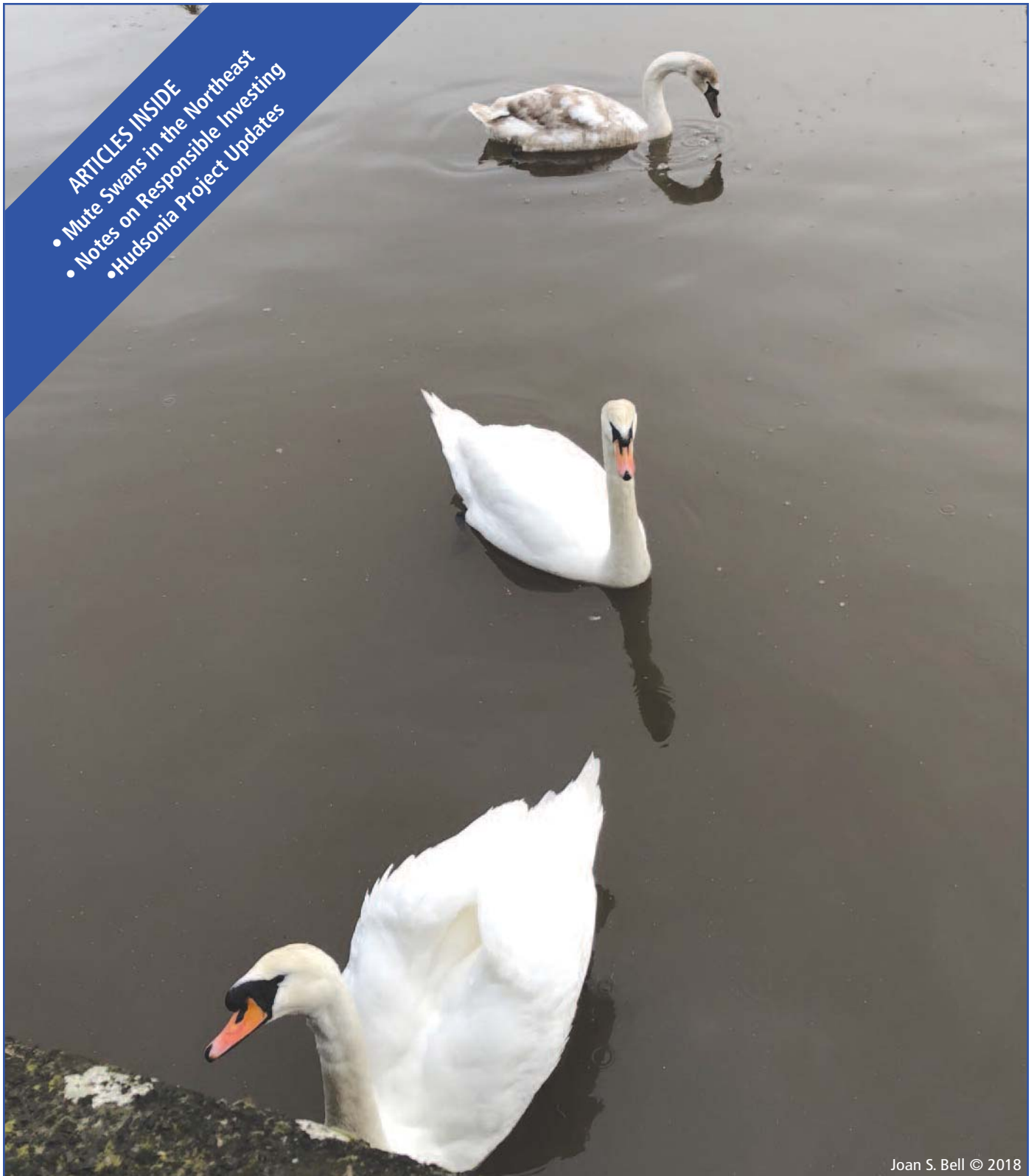


- ARTICLES INSIDE
- Mute Swans in the Northeast
- Notes on Responsible Investing
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# News from Hudsonia

Volume 32, Number 1

Spring 2018



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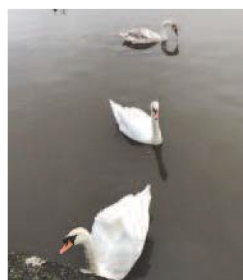
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Cover photo: Two adults and a juvenile mute swan.  
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A journal of natural history and environmental issues

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## MUTE SWANS IN THE NORTHEAST: A Case for Evidence-Based Management

By Kristen B. Travis and Erik Kiviat\*

Mute swans, native to parts of north and central Eurasia, were introduced to the eastern United States in the early 20<sup>th</sup> century to adorn estates. These imposing, 22-lb birds, long noted for their majestic appearance, also have an impressive ability to adapt to life in urban, agricultural, and other human-altered landscapes. Mute swans were bred and raised in captivity—for both meat and ornament—from very early times. In England, mute swan ownership was a symbol of social standing denoted by marking adult birds; any unmarked swans were (and still are) property of the Crown.<sup>16</sup> After being hunted to near extinction in Europe in the early 20<sup>th</sup> century, mute swan populations have rebounded and extended their range in Europe as well as in locations around the world where they have been introduced.<sup>6</sup>

In the northeastern US, mute swans occur at the highest densities along East Coast and Great Lakes shorelines and estuaries, but are increasingly common inland in freshwater ponds, rivers, and wetlands,<sup>20</sup> a trend also noted in Ontario and Sweden. At

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\*Kristen Travis is a Hudsonia biologist; Erik Kiviat is Hudsonia's executive director.



some coastal locations in Rhode Island, Connecticut, New York, and adjacent areas, nesting mute swans may have reached the local carrying capacity.<sup>8,20</sup> Breeding Bird Atlas data show a substantial expansion in distribution inland in New York between 1985 and 2005.<sup>20</sup>

Although mute swans are widely admired for their elegant beauty, they are also accused of harassing and harming other nesting waterbirds, depleting aquatic vegetation, attacking humans, posing hazards for aircraft, and polluting waterbodies. In northeastern North America, the human-mute swan relationship is currently strained by a controversy over whether—and how—to check the spread and limit the population size of this charismatic but potentially problematic species. To help inform this ongoing debate in our region, Hudsonia recently synthesized the current state of knowledge in a report, "*Assessing potential ecological effects of mute swan expansion in northeastern North America.*"<sup>23</sup>

***Some of the negative impacts imputed to mute swans are unsubstantiated or anecdotal***

Our analysis of the scientific literature on mute swan ecology and environmental impacts—summarized here—indicates that some of the negative impacts imputed to mute swans are unsubstantiated or anecdotal, whereas others may be of management concern. As with many other organisms introduced to our region, impacts of mute swans have often been assumed rather than documented. Moreover, some research that has been used to justify control programs involves methodological problems, insufficient hard data, and a lack of distinction between short-lived and long-term impacts.

Mute swans nest and overwinter in habitats with shallow, open water and abundant submerged aquatic vegetation (SAV), including



Ownership of mute swans was once a symbol of social standing in England. Joan S. Bell © 2018

saline to freshwater estuaries, wetlands, rivers, lakes, and ponds. They are either year-round residents or short-distance migrants, and breeding territories and both summer and winter flocking sites may be in the same or adjacent areas, or be separated by dozens to hundreds of kilometers.

Pairs often defend their territories, primarily by using threat displays to chase away other birds, but occasionally attacking with wings or bill. Males are generally more aggressive than females, and levels of aggression vary greatly by individual or pair. The pair will usually remain on the territory until food is depleted or water freezes.

Meanwhile, nonbreeding swans congregate in flocks of up to hundreds of birds in areas with abundant food and open water. Molting occurs during summer, and flocks must have access to sufficient SAV during this flightless period. A flock may remain, or disperse to different areas, in late autumn. In New York, most swans in the Long Island and Lake Ontario populations were sedentary year-round, but about half of Hudson River swans were found in winter more than 30 mi (48 km) away from their banding

location; many moved south into New Jersey to avoid harsh winter weather.<sup>20</sup>

One concern about mute swans is their potential to exclude or disrupt other breeding waterbirds. Behavioral data reveal that they do not routinely attack or kill other species, although they occasionally do this in defense of their nesting territory.<sup>23</sup> Nor do they routinely exclude other foraging or nesting waterfowl or other waterbirds from their territories,<sup>7,10</sup> although there are examples of this occurring. Resident Canada geese (a population distinct from migratory Canada geese which are present only in winter) have dramatically increased in the Northeast, and may be competing with mute swans for food or nest sites.

***Mute swans do not routinely attack other species or exclude other birds from their territories***

Most mute swan attacks in the US are directed against Canada geese.<sup>7,20</sup> Trumpeter and tundra swans—both native to North America—are also rapidly expanding in distribution and abundance, and will likely com-



pete with mute swans for breeding territories (trumpeter) and migratory stopover and overwintering resources (both species) in the Northeast in coming decades. Other than isolated accounts (for mallards and Canada geese), there is no evidence to support significant nesting disruption of marsh-nesting birds by mute swans. To our knowledge, however, there have been no species-specific studies of nesting success in relation to mute swan presence and other factors, or analysis of annual bird survey data, to address this question.

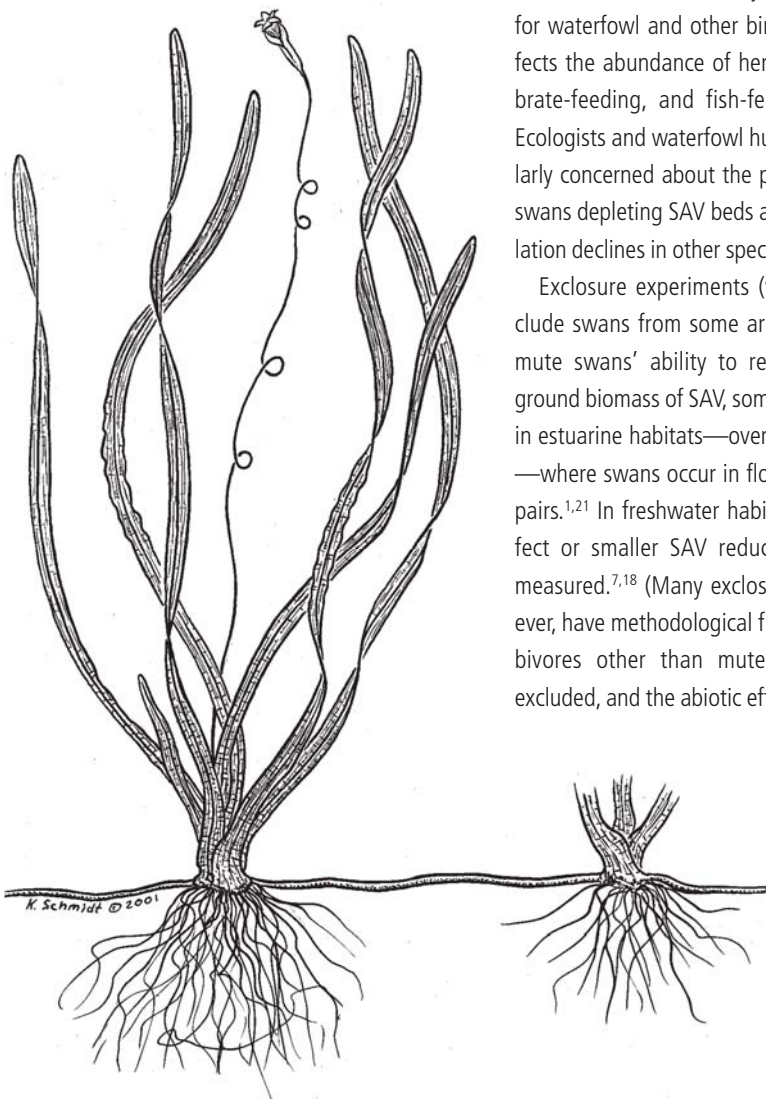
Large summer flocks of mute swans have destroyed nests and caused the abandonment of nesting colonies of some waterbirds—including rare least tern and black skimmer—

that nest on small, sandbar islands. The swans used these sandbars as loafing sites, apparently trampling the waterbird nests unintentionally.<sup>22</sup> A similar problem has the potential to occur with the rare black tern, a marsh bird that nests on floating vegetation or human-constructed platforms, but thus far no disruption has been observed.

Mute swans primarily consume submergent aquatic vegetation (SAV), although they will sometimes eat emergent or terrestrial vegetation or animal matter, and they readily accept human handouts. An adult swan consumes about 8.4 lb (3.8 kg) wet weight of SAV per day, and often uproots more than it eats.

SAV beds are often key nursery habitats for fish and shellfish, and key foraging grounds for waterfowl and other birds. SAV cover affects the abundance of herbivorous, invertebrate-feeding, and fish-feeding waterfowl. Ecologists and waterfowl hunters are particularly concerned about the possibility of mute swans depleting SAV beds and causing population declines in other species, such as ducks.

Exclosure experiments (where fences exclude swans from some areas) demonstrate mute swans' ability to reduce the above-ground biomass of SAV, sometimes drastically, in estuarine habitats—over one or two years—where swans occur in flocks or sometimes pairs.<sup>1,21</sup> In freshwater habitats, either no effect or smaller SAV reductions have been measured.<sup>7,18</sup> (Many exclosure studies, however, have methodological flaws because herbivores other than mute swans may be excluded, and the abiotic effects of exclosures



Water-celery, a submerged aquatic plant and important food for mute swans and several duck species.

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Mute swans overwinter in places with ice-free water and abundant submerged aquatic vegetation. Joan S. Bell © 2018

on the aerial and aquatic environments are not controlled.) It may be that summer swan grazing reduces overall SAV resources for migrating or overwintering waterfowl, but this has not been demonstrated conclusively.

### ***SAV is affected more by turbidity than by mute swan herbivory***

SAV communities are naturally dynamic systems, responding to changes in their environment with alterations in plant community composition and cycles of decline and recovery. As bottom sediments shift with storms or floods, or as water turbidity or currents change, SAV beds may disappear in one place and become established in another.<sup>3,9</sup> Submerged aquatic plants are also adapted to high natural levels of herbivory.<sup>2</sup> With a patchy, shifting resource such as SAV and highly mobile consumers such as swans and other waterfowl, questions of resource use must be addressed at larger spatial and temporal scales.

In climates where mute swans are resident year-round, they are likely to have a greater impact on SAV. In the Northeast, winters cold enough for persistent ice cover result in starvation or short-distance migration for many mute swans, potentially lessening their effect on SAV. Mute

swans do show significant dietary overlap with some other waterfowl. We do not know how much dietary overlap occurs between foraging swans and other herbivores during summer or winter, or whether other waterfowl benefit commensally from SAV uprooted by foraging mute swans; research has suggested both.<sup>10,13</sup> In any case, mute swan herbivory appears to be one of the more minor problems affecting SAV.

### ***Grazing by mute swans and other animals is most harmful where SAV is stressed by other factors***

Widespread SAV decline has been documented in coastal, estuarine, and lacustrine habitats across the globe. The primary factor in most cases is reduced water clarity, either due to inorganic sediment in the water, or to nutrient additions and eutrophication. For example, reduced water clarity is the main factor in declines of eelgrass (*Zostera marina*) in Chesapeake Bay<sup>12</sup> and water-celery (*Vallisneria americana*) in the Hudson River.<sup>9</sup> Reduced water clarity in these two waterbodies and the coastal North Sea have been attributed to inorganic sediment.<sup>4,9,12</sup> Sediment entering the Hudson River during a rain event persists for years to decades, becoming resuspended after subsequent rainstorms.<sup>15</sup> Nonpoint source pollution is the main cause of increasing sediment and nutrient additions. The ubiquitous impermeable surfaces in urban and residential areas across a watershed exponentially increase runoff flows, eroding streambanks. Exposed soils in agricultural fields and construction sites is another prominent contributor. Point sources such as wastewater treatment plants, individual septic systems, and animal feedlots contribute to nutrient pollution. The negative effects of reduced water clarity on plants tend to be exacerbated by warming associated with climate change.<sup>12</sup> Other stresses to SAV include more frequent storms, saltwater intrusions, dredging, use of motorized watercraft, and hardened shorelines. Evidence suggests that herbivory by mute swans (and other animals) is most detrimental to SAV in places where it is severely stressed by one or more of these factors.<sup>11</sup>

Ecological considerations aside, most management actions are taken when an invasive species directly affects humans. Mute swan territorial defense directed against humans can interfere with the use of shores and waterways for recreation, which has led to complaints in many counties in New York. Mute swan attacks on children, adults, elderly adults, and dogs, as well as fatal attacks on domestic waterfowl, have been reported in Rhode Island and Connecticut. In one instance, a man drowned when his boat was reportedly overturned in a mute swan attack. Farmers have reported mute swan damage to cranberry bogs in New Jersey and Massachusetts. In Europe, mute swans sometimes graze croplands or pastures in winter or spring, resulting in economic losses. Mute swans pose collision hazards for aircraft; three such collisions have been reported from JFK Airport in New York despite active man-

agement of swans on the airport property. Swans (as well as geese) can raise fecal coliform levels in waterbodies where they congregate in large flocks.<sup>23</sup>

Although mute swan distribution is expanding in the Northeast, we still do not know the factors controlling population increases and carrying capacity of different habitats in this region.<sup>6</sup> Mute swan mortality is reputedly higher in colder climates; two studies found reduced annual or lifetime reproduction with more severe winter weather.<sup>23</sup> Mute swan populations have been managed using lethal control (culling adult birds via shooting or euthanasia) or “non-lethal” nest destruction, often accomplished by adding (oiling or shaking) eggs, which kills the developing embryos. Population models have shown that nest destruction alone is often insufficient for achieving large population reductions or even maintaining populations at a target level.<sup>8,25</sup> Immigration from nearby, unmanaged areas can more than offset local population reductions.

Additionally, populations in some coastal habitats of New York, Connecticut, and Rhode Island (and possibly elsewhere) have become more stable, and reproductive rates may be density dependent. Wherever this is the case, removing nests or individuals will tend to increase reproductive rates, necessitating a greater control effort.<sup>8</sup> Culling adult birds is predicted to be the most efficient control measure, and achieving the desired population reduction over a shorter time period (compared to a longer time period) would necessitate killing far fewer total birds.<sup>8</sup> Interestingly, regulated hunting (used to manage white-tailed deer) has not been proposed. Whichever methods are used, control efforts aimed at long-established populations are unlikely to be successful without a widespread, intensive, sustained effort that for some agencies may be impossible due to limited personnel or financial resources.

**Removing nests or individuals  
tends to increase swan reproductive rates,  
necessitating a greater control effort**

Mute swan population reductions, if realized, would likely reduce direct conflicts between territorial swans and humans and the potential for coliform contamination and aviation hazards. For protection of rare waterbird nesting habitat, swan presence and density in the habitats used by those species (e.g., sandbar islands) are more important than the regional swan population size. The protection of SAV beds and maintenance of the waterfowl and other species that depend on them is a more complicated issue. Seasonal SAV biomass reductions—and sometimes bed disappearance—can be caused by mute swan grazing, but so far evidence linking swan relationships to SAV declines (of more than two years) or any measure of waterfowl exclusion or reduced reproduction, fitness, or survival is lacking. On the other hand, known threats to long-term SAV survival and health—detailed above—are widespread and numerous.

Conservation and restoration of SAV depends foremost on achieving improvements in water quality through land use practices at the watershed level that result in reduced sediment and nutrient inputs.<sup>14</sup> Maintaining naturally vegetated riparian areas, preserving wetlands, managing agricultural runoff, improving urban stormwater management, updating septic and sewer systems, and improving land use and development planning are a few of the measures crucial for improving water quality in estuaries, rivers, and lakes,<sup>5,17,24</sup> and policies promoting such measures would potentially be of greater value to SAV health than management of mute swans. Considering the large shifts underway in climate, other abundant nonnative species (such as water chestnut and zebra mussel), and land use and wastewater impacts of humans, “... it probably will make sense to manage alien species and other stressors as a group of closely linked problems, rather than as separate problems.”<sup>19</sup> ■

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# SOME NOTES ON RESPONSIBLE INVESTING

By Erik Kiviat\*

It is now relatively easy to invest even small amounts of money in mutual funds that own diverse stocks or bonds, and many investors wish to put their money to use in support of personal principles and of corporations that have environmental and social scruples. Thirty or forty years ago, this often boiled down to “negative screens” which excluded companies specializing in the production of alcohol, tobacco, and firearms, for example. Recently, organizations that assess the responsibilities of companies for investors have broadened their view considerably to include corporate governance; inclusion of women and minority individuals on boards of directors; fair employment practices at home and abroad; carbon or greenhouse gas footprints of supply chains; fossil fuel mining, transport, or use for electricity generation; and many other aspects of the corporate world that investors might be concerned about. The term “ESG” (Environment, Social, and Governance) has become a buzzword for responsible investing. Although I’ve thought about these issues for decades, I am better at asking questions than providing answers. Thus in this article I address just a few salient points from an ecologist’s view of investing.

Fossil fuels (coal, petroleum, natural gas) are an obvious target for negative screening for several reasons: fossil fuels are non-renewable resources; mining them causes extensive environmental damage;<sup>5</sup> transport (e.g., via ships, trains, pipelines<sup>5,6</sup>) is hazardous; and burning these fuels to generate energy pollutes air and releases large amounts of greenhouse gases. The holdings of many mutual funds include some of the hundred-plus gas drilling companies in the US that practice “fracking” (high volume, horizontal, hydraulic fracturing) for natural gas, which threatens water resources and habitats.<sup>5</sup> The top 10 gas drilling companies were profiled in 2011 by ProPublica.<sup>7</sup> Many purportedly ESG mutual funds still hold fossil fuel investments, and many non-fossil fuel securities still have large carbon footprints.<sup>3</sup>

***Screens now include carbon footprints, employment practices, and fossil fuels, along with traditional screens for alcohol, tobacco, and firearms.***

Many socially responsible investors wish to avoid buying stocks in defense companies. Much to my surprise, when Al Gore and David Blood founded an environmentally responsible mutual fund—Generation Investment Management—one of the top holdings was United Technologies, a company with a substantial component of military hardware manufacturing. UT is no longer in the GIM portfolio, but

many of the companies I consider problematic still are;<sup>10</sup> see below.

A strategy that has been long used by socially and environmentally responsible mutual funds is to look at each market sector (e.g., pharmaceuticals or financial companies), and pick the “best of the worst” companies. Of course this results in many funds that hold a large pharmaceutical company and a large financial firm, and these may be the same companies from one fund to the next. (Although a company of any size can be environmentally responsible or not, many larger companies seem more stable and profitable, hence attractive to fund managers.) Some brokers and financial advisors say their firms practice shareholder activism; in other words, they attend the annual meetings of shareholders of selected companies and push for resolutions to improve those companies’ environmental and social practices. This may help with some problems but not others. Widespread divestment from financial institutions that supported development in South Africa helped end apartheid.<sup>16</sup> The University of California and 62 UK universities are among the institutions that have divested from fossil fuel company securities.<sup>4,11</sup> Some brokers are even becoming concerned about the financial future of fossil fuel companies due to worries about the reputation of the companies, potential litigation, and future regulation.<sup>14</sup>

***Sixty-two UK universities have divested from fossil fuel company securities.***

Something I find troubling about most mutual funds, including the ones that style themselves as “green” or ESG, is holdings in huge “tech” companies such as Amazon, Microsoft, Facebook, Google, and Apple. These companies and their owners have indeed done some good things for the environment and human society, such as Apple installing a large solar photovoltaic array to power their servers in Reno,<sup>9</sup> or the Gates Foundation (using Microsoft profits) funding the development of more effective condoms,<sup>8</sup> prevention and treatment of HIV and other infectious diseases, and emergency response to catastrophic events. Although Google accounts for 40% of the carbon footprint of the Internet, they claim to be carbon neutral.<sup>12</sup> But these vast tech empires have a dismaying tendency to bully the world to make more money. Amazon briefly downlisted gay-themed literature, making many books hard to find on their site, and explained that it was a “cataloging error,” when

\* Erik Kiviat is Hudsonia’s executive director.

there was a public outcry.<sup>13,15</sup> Of course readers are familiar with the recently publicized legal and ethical issues at Facebook, including breaches of user privacy.

Perhaps most interesting to me as a scientist who uses habitat as an entrée into ecology and conservation is that the green companies and mutual funds never mention how they conserve or manage habitat on their own lands. There are bad examples, unfortunately, such as Celestial Seasonings that was briefly boycotted when caught poisoning prairie dogs at its headquarters.<sup>2</sup> That occurrence may be an extreme, but the problem of local impacts has led me to issue a challenge to several financial people: take me to the headquarters of any company and let me walk the property outside the buildings and see how the land is managed and what is being done to promote high quality habitats or protect rare plants and animals. As yet no one has taken me up on this.

What should an individual investor do? Some of the ESG mutual funds have low carbon footprints, relatively clean holdings, and good financial records. Start with something simple like looking for funds that don't have holdings in gas drilling companies and also score well on the carbon calculator.<sup>2</sup> Also check if a company you are interested in is certified as a B Corp, which indicates a high level of environmental and social responsibility.<sup>1</sup> Maybe you'll find a company that has developed a better technology for processing wastes or reducing water use without taking a big gamble on an untested product; this is a holy grail of ecological investing. And if you do, let me know! ■

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## AWARD

On 30 June 2018, Erik Kiviat will accept the **Franklin and Eleanor Roosevelt Hudson Valley Vision Award** on behalf of Hudsonia, to be presented by the Trustees of the Franklin D. Roosevelt Presidential Library and Museum in Hyde Park.

*Mute Swans* continued from page 5

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(Hudsonia's mute swan study was funded by Grant & Lyons LLP, the Pegasus Foundation, and the Pettus Crowe Foundation.)

# HUDSONIA PROJECT UPDATES, 2018

## *Biological Assessments*

**Overmountain Conservation Area.** This year we are collaborating with the Hawthorne Valley Farmscape Ecology Program (FEP) on biological surveys for the southern part of this 1560-acre (630 ha) property—formerly called Scotland Farm—recently acquired by the Columbia Land Conservancy. Surveys include plants, butterflies, dragonflies, damselflies, moths, reptiles, amphibians, and bats, along with incidental observations of other mammals and birds, and ants, hoverflies, and ground beetles at strategic locations. FEP will also expand the land use history that was begun earlier. The purpose is to provide information that will help the CLC with planning for land management, ecological research, and public uses. Funded by the Columbia Land Conservancy.

**Mountain Top Arboretum.** We are collaborating with other scientists on surveys of natural resources at the Mountain Top Arboretum, a 178-acre property in Tannersville (Greene County). The investigations include geology (Bob and Johanna Titus), land use history (Michael Kudish), breeding birds (Larry Federman), reptiles, amphibians (Jason Tesauro), butterflies, moths, odonates, and bees (Hawthorne Valley Farmscape Ecology Program), and plants and plant communities (Hudsonia). The findings will help the Mountain Top Arboretum with their planning for land management and public uses of the site. Funded by the Mountain Top Arboretum.



Intermittent woodland pool, Saw Kill site, Town of Red Hook.  
Elise Heffernan © 2018

**Saw Kill.** We have begun field surveys of habitats, plants, reptiles and amphibians, and breeding birds at a 350-acre site of interest to the Winnakee Land Trust in the Town of Red Hook (Dutchess County). Our findings will help Winnakee plan future land management, trail alignments, and other public uses at the site. Funded by the Winnakee Land Trust.

## *Natural Resource Inventories & Conservation Priorities*

This year we are completing Natural Resources Inventories for 1) **Columbia County**, in collaboration with the Columbia County Environmental Management Council and the Columbia Land Conservancy; 2) **Greene County**, in collaboration with the Greene Land Trust and the Cornell Cooperative Extension; and 3) the **Town of Dover** (Dutchess County), as part of their larger Climate Smart Community initiative. These documents illustrate and describe many of the natural resources of those areas (e.g., soils, water, plants, animals, habitats, scenic areas, recreational resources), and explain their importance to local ecosystems and the human community and how to identify priorities for conservation. All three projects are funded by the NYS Environmental Protection Fund—the Columbia and Greene county projects through grants to the Columbia Land Conservancy and the Greene Land Trust from the Hudson River Estuary Program, and the Dover project through a Climate Smart Communities grant from NYSDEC. We are also completing a project for the **Woodstock Land Conservancy** (Ulster County) to help them further incorporate climate change into their assessments of conservation priorities for the WLC service area.

## *Conservation Education*

So far this year we have held three outdoor workshops in Columbia, Dutchess, and Rensselaer counties on **Recognizing Habitats**, evaluating their condition, and the implications for land uses. Other upcoming events from Hudsonia's Biodiversity Resources Center include a two-day course on **Habitat and Water Resource Assessment for Land Use Planners** (New Paltz, September), and a one-day workshop on **Inventories to Action**, to help towns take the next steps after completing a Natural Resource Inventory or an Open Space Inventory. These programs are conducted in collaboration with staff of the Cornell Department of Natural Resources, in partnership with the Hudson River Estuary Program, and are funded by the NYS Environmental Protection Fund. For more details, see page 11.

We are completing a project for the **Cragmoor Conservancy** to provide information on Cragmoor ecology, and guidance for landowners on land management to protect sensitive habitats, plants, wildlife, and water resources. (Cragmoor is a hamlet in the Shawangunk hills.)



Funded by a grant to the Cragmoor Conservancy from the Land Trust Alliance.

### **Habitat Mapping**

We have completed the habitat map and report for the **City of Poughkeepsie** (Dutchess County). It will be a part of the Natural Resources Inventory for the city, being prepared under the direction of the Environmental Cooperative at Vassar Barns. The map shows the natural habitats and other greenspaces throughout the city, and the report describes some aspects of their ecology and offers ideas for conserving and enhancing their values for biodiversity and for quality of life for city residents, workers, and visitors. Funded by the NYS Environmental Protection Fund through a grant from the NYSDEC Hudson River Estuary Program to the Environmental Cooperative.



Spring beauty, Town of Pound Ridge.  
Chris Graham © 2018

This spring and summer we are completing the habitat maps and reports for the **Town of Dover** (Dutchess County) and the **Town of Pound Ridge** (Westchester County). These documents provide information about habitats, plants, and animals of conservation concern, and will help landowners, municipal agencies, and others better understand how to protect biodiversity, water resources, and the natural systems that support the human community. Both projects will contribute to larger Natural Resource Inventories being prepared for these municipalities. Completion of the Dover project is funded by an anonymous donor through the Dutchess Land Conservancy; the Pound Ridge project is funded by the Westchester Community Foundation, and by the NYS Environmental Protection Fund through a grant to the town from the NYSDEC Hudson River Estuary Program.

We are also conducting field work to help the Conservation Advisory Council of the **Town of Ancram** (Columbia County), and the Open Space Committee of the **Town of Somers** (Westchester County) complete the habitat maps that those agencies have been working on for several years. Funded by the towns of Ancram and Somers.

### **Technical Assistance**

**Solar Energy.** We consulted on biodiversity protection for a two-acre (0.8 ha) community solar energy project in Rhinebeck (Dutchess County) for Hudson Solar. We have also begun biodiversity assessments at the site of a proposed utility-scale solar photovoltaic installation in Greene County.

These studies address habitats, herpetofauna, plants, birds of prey, and other elements, and the results will help in designing the development of these sites and planning habitat management after solar panels are installed.

**Land Development.** This spring we conducted a field assessment on the site of a large proposed commercial development project in Putnam County. We are also reviewing management planning for a landscape designer on a private estate in Putnam.

**Saw Kill Dams.** We continue to advise Bard College on the biota of the lower Saw Kill (Dutchess County) in relationship to micro-hydropower development or dam removal. This work is funded by a grant from the New York State Energy Research and Development Authority (NYSERDA) to Bard.

### **Urban Biodiversity**

**Conservation of Urban Biodiversity.** Hudsonia studies of the habitats and species and their conservation in urban and industrial areas continue. Our findings are presented in a book manuscript under review by a publisher, as well as a draft paper about human uses of the urban-nature interface. While the New Jersey Meadowlands are our primary urban study area, we are also working in Poughkeepsie (see above) and making short term observations in several cities around the continent. Supported by a grant from the Geoffrey C. Hughes Foundation.

**Newtown Creek.** We are continuing the plant and butterfly surveys at Newtown Creek, an urban and industrial estuarine tributary of the East River between Queens and Brooklyn, NY. With the help of 34 volunteer citizen scientists, we have found over 100 plant species



Newtown Creek. Elise Heffernan © 2018

along the creek and will be continuing our surveys throughout the summer. We are collaborating with the Newtown Creek Alliance, the North Brooklyn Boat Club, St. Francis University, Harbor Lab, and Bard High School Early College in Queens. Funded by the Hudson River Foundation Newtown Creek Fund.



Red-spotted newts, Town of Dover. Chris Graham © 2018

### Other Projects

**Turtles.** After two decades of studying **Blanding's turtle** and habitat responses to a Dutchess County wetland restoration project, we are preparing a paper integrating all the data. We are also advising the Wetlands Trust regarding management of a Blanding's turtle preserve elsewhere in Dutchess County. Findings from our habitat restoration have been applied widely to Blanding's turtle conservation efforts in other states. This is year four of our radio-tracking study of **painted turtles** in Tivoli North Bay (Dutchess County), a 350-acre freshwater tidal marsh on the Hudson River estuary, with Bard College graduate Virginia Caponera supported by a Hudson River Foundation Polgar Fellowship. Unlike many painted turtle populations that have been studied in non-tidal wetlands, North Bay turtles move long distances within the marsh and are present in small numbers. For the first time this past winter, (with the help of Bard graduate Patrick Baker), we were able to radio-locate three turtles in their overwintering habitats. The Blanding's turtle and painted turtle studies are funded by the Lillian Goldman Charitable Trust.

Hudsonia has begun a general study of the relationships of freshwater turtles to agriculture. This year we are studying **wood turtles** in the lower Esopus Creek at the Farm Hub in Hurley (Ulster County). Field work for these projects is being carried out by collaborator Jason Tesauro, and is part of a larger project funded by the NoVo Foundation



Blue flag, Saw Kill site. Elise Heffernan © 2018

through the Hawthorne Valley Farmscape Ecology Program. Our modeling analysis of habitat connectivity for the **bog turtle** has been published in the journal *Herpetological Conservation and Biology* (online), and a second paper about bog turtle response to habitat management is close to publication.

**Invasive plants.** Hudsonia's research on invasive plants continues with the preparation of papers reviewing potential biological control of common reed (*Phragmites*), and comparing organisms associated with reed on three continents. We are also compiling and analyzing some 15 years of observations about knotweed (*Fallopia japonica*) natural history.

**Wetland imagery in fiction.** In a departure from Hudsonia's more usual subject matter, we are analyzing the ways in which wetlands are represented in American novels from 1869 to the present. This study provides insights into the ecological and cultural relationships of people to wetlands and will help conservationists understand our society's ambivalence towards these environments. Erik presented a paper to an enthusiastic audience at the annual meeting of the Society of Wetland Scientists in June. This project is seeking funding! ■



Round-leaved sundew and *Sphagnum*, Town of Dover. Chris Graham © 2018

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**Julianna Zdunich**, for designing our fundraising appeals and managing the Hudsonia website.

## WISH LIST

**Office copier**

**Color printer** (good quality)

**Steel or wood cabinets for 4 x 6 inch file cards**

**GPS units**

**Binoculars** (lightweight, good quality)

**Natural history and conservation science books, periodicals, maps**

**Novels with wetland imagery**

(For technical equipment, we are interested only in items less than 5 years old and in good working condition. For all items, please inquire first)

## UPCOMING EDUCATIONAL EVENTS

### Habitat and Water Resource Assessment for Land Use Planning

NYSDEC Region 3 Office, New Paltz (Ulster County)

Friday – Saturday, 14-15 September 2018

This two-day short course on recognizing and protecting significant habitats and water resources is especially designed for members of planning boards, town boards, and environmental commissions, and staffs of land trusts and other conservation organizations involved in land use decisions. In indoor and outdoor sessions we will address 1) finding existing information, 2) using maps and other resources to identify important areas, 3) reviewing site plans and subdivision plats, and 4) applying conservation principles to land use planning and policy, environmental reviews, and design of conservation easements.

### Inventories to Action

Old VFW Hall, Cold Spring (Putnam County)

Saturday, 22 September 2018

Conducted in collaboration with the Hudson Highlands Land Trust, this is a one-day workshop for representatives of communities that have completed (or are preparing) Natural Resource Inventories or Open Space Plans. We will discuss how to use those documents for comprehensive planning, revising a zoning ordinance or other local legislation, conducting reviews of site plans or subdivision plats, and designing conservation easements.

Both programs are conducted in partnership with the NYSDEC Hudson River Estuary Program and funded by the NYS Environmental Protection Fund. To register, contact Lea Stickle at [lstickle@bard.edu](mailto:lstickle@bard.edu) or 845-758-7053.

To be notified about other Hudsonia educational events, join the email list at <http://hudsonia.org/maillinglist/> or check back at <http://hudsonia.org/events/>.

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(Inquire for details.)

Original artwork by Ralph Della-Volpe,  
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(Listed here are donations received between 2 December 2017 and 14 June 2018.)

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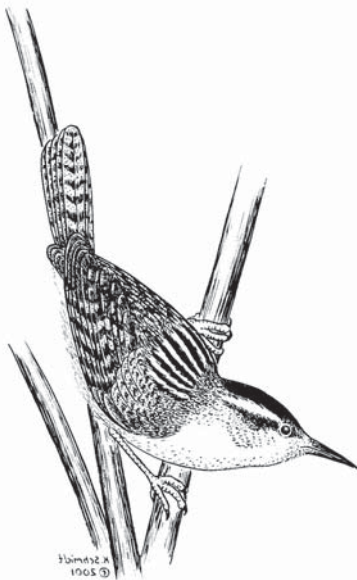


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