

Rhode Island Green Golf Course Certification Program

Self-Certification Workbook



January 2021

A Message from the Director

The Rhode Island Green Golf Course Certification Program is an exciting partnership with the Rhode Island Golf Course Superintendents Association (RIGCSA: <https://rigcsa.org/>) and the Golf Course Superintendents Association of America GCSAA: <https://www.gcsaa.org/>) that has been in existence since 2011. This self-certification workbook provides a menu of Best Management Practices (BMPs) covering a wide range of golf course activities, including efficient turf management, water conservation, energy conservation, recycling, and habitat improvements. Participation in the program will significantly reduce a facilities' environmental impact and greatly improve the players experience on the golf course. The Rhode Island Department of Environmental Management encourages your participation and is ready to provide assistance with your efforts to improve our States' environment.

Janet Coit, Director
Rhode Island Department of Environmental Management



A Message from the RIGCSA Director

It is with great pleasure that the Rhode Island Golf Course Superintendents (RIGCSA) are partnering with the Rhode Island Department of Environmental Management and Coastal Resources Management Council (CRMC) on the Green Golf Course Certification initiative. Our mission has always been to advance the art and science of greens keeping while collecting and disseminating practical knowledge of golf course management with the goal of more efficient, economical, and environmentally sound golf courses. This workbook provides a guideline for the entire golf facility; we encourage all managers, club officials, staff and golfers to work together in achieving certification, Golf courses provide a wonderful green space and a recreational environment. By continuing with and enhancing best management practices, we are excited to expand on our environmental stewardship for enjoyment at our facilities and surrounding areas.

Michael Varkonyi, President
RIGCSA



A Message from the CRMC Chairman

The Coastal Resources Management Council (CRMC) is pleased to be part of the Rhode Island Department of Environmental Management Green Golf Course Program, especially since most of the golf courses are located along our state's coastline. Participation by golf courses in this program and implementation of the Best Management Practices (BMPs) contained herein will help to improve our coastal environment, benefit the players enjoyment of the golf course, and assist our regional tourist economy. The RIGCSA is congratulated for their partnership in developing this Certification Program to improve their good stewardship of our natural resources and landscapes of their member golf courses.

Jennifer Cervenka, CRMC Chair



How the Program Works

Step 1

Complete the Self-Certification Checklist by checking off all the initiatives that your facility is currently undertaking. If you need assistance in filling this out, please contact Ann Battersby, RIDEM, Office of Customer and Technical Assistance (OCTA) at 1-401-222-4700 ext. 77284 or ann.battersby@dem.ri.gov. Please visit the RIDEM Green Golf Course Certification Program Webpage at <http://www.dem.ri.gov/programs/customertech/green-cert-programs/green-golf.php>.

Please understand that it is not necessary to complete all the items listed in this checklist to become a certified golf course. The checklist is a comprehensive list of the many different ways to generate points. Employing all of the initiatives in this workbook is unrealistic, so please use the ones that you have not yet implemented as recommendations.

Step 2

Calculate your points on the last page. This fillable document does not tabulate points automatically. Add up all the checked boxes and put your final number in the space provided at the end of each section.

Step 3

Submit the checklist by hitting the “Submit” button on the last page of this checklist. Don’t forget to save a copy of your completed checklist!! You may also email directly to ann.battersby@dem.ri.gov or mail a hard copy to Ann Battersby, Senior Environmental Scientist, RIDEM, Office of Customer and Technical Assistance, 235 Promenade St., Providence, RI 02908.

Step 4

Your workbook will receive a final score upon review. If your business scores **400 points**, you are automatically qualified for certification. In two years, you will need to re-certify and you will need to obtain an additional **75 points** to increase the point total to at least **475**. Use the BMPs that were not used in the first round of certification as recommendations to employ for the future re-certification efforts.

Step 5

Upon the final scoring, you will be awarded with a framed “Certificate of Participation” to display at your facility. You will also be given several window decals and stickers to show your participation in the program. You may use these materials as you wish. Certificates and decals are traditionally used in marketing for your business or placed around the golf course. RIDEM suggests placing your certificate in a main area where it is visible to staff and members.

Step 6

RIDEM personnel will visit your golf course to see your sustainable efforts. This visit is not unannounced and is not an audit. This is done to learn more about the BMPs you are using and to provide technical assistance. The data gathered in these checklists provide the RIDEM with metrics on water use reduction, fertilizer use reduction, and energy reductions. This data provides RIDEM with information on industry trends.

Facility Information

Business Name:

Facility Name (if different):

Address:

Contact Person:

Contact Person Telephone number:

Email address:

Facility Telephone Number (For Certified Facility List):

All clubhouse restaurants should complete the "RIDEM Green Restaurant Checklist" located on the following link: <http://www.dem.ri.gov/programs/customertech/green-cert-programs/green-restaurant.php>

Section 1: Administrative & Recycling & Waste Management

Adopt and Display an Environmental Policy. Attach a copy of the policy. Describe where it is displayed to employees and customers. **(15 points)**

Maintain environmental information (display, brochure, signage) for club members, guests and staff with current information on what your course is doing to reduce environmental impact. Please attach a copy (i.e. copy of brochure or photo of signage) of educational information. Keep the information available in both the club house and on appropriate locations throughout golf course. **(10 points)**

Laser toner and ink cartridges are recycled. **(2 points)**

Printers are set to default to print on both sides. **(2 points)**

Recycling

Please describe the **recycling** procedures at your facility. Recycling is mandatory at any facility with 50 or more employees. Please see the following link to the “Commercial Recycling Regulations” and guidance for recycling: <http://www.dem.ri.gov/programs/wastemanagement/facilities/commercial-recycling.php>. Please contact ann.battersby@dem.ri.gov with technical assistance for recycling.

Paper:

Glass:

Cardboard:

Metal:

Plastic:

Install recycling containers for bottles and cans throughout the course. **(8 points)**

Universal Waste Management

Recycle universal waste according to the RIDEM Universal Waste Rule. Universal waste includes: batteries, lamps, mercury containing equipment, pesticides, and used electronic devices. Please see the following link for more information: <http://www.dem.ri.gov/programs/benviron/assist/pdf/univrul.pdf>. You may also contact ann.battersby@dem.ri.gov for more information for your obligations for managing universal waste. **(15 points)**

Waste Management

All containers that have used solvents, oils, or degreasers are labeled. **(5 points)**

Recycle used tires. **(8 points)**

Use septic systems for domestic waste only. Do not dispose of any process waste-water, hazardous waste or raw chemicals down the drain. These have the potential to pass onto groundwater. **(5 points)**

Removal of cesspools. Please provide a date of removal. **(15 points).**

Please fill the following metrics for the previous year **(15 points)**:

Volume of solid waste to landfill:

Volume of waste recycled:

Section 1 Points Total:

Section 2: Pollinators & Wildlife Habitat

The RIDEM Office of Water Resources – Freshwater Wetlands Program requires a permit application for **proposed alterations** to wetlands. Please see the following link to the regulations (<https://rules.sos.ri.gov/regulations/part/250-150-15-1>).

For a complete list of BMPs for wetlands on golf courses, please see the Wetland BMP Manual at the following link: <http://www.dem.ri.gov/programs/benviron/water/permits/fresh/pdfs/bmpch5.pdf>

Some additional guidance on permit application forms and instruction: <http://www.dem.ri.gov/documents/forms/index.php#wetlands>

Some additional guidance on wetlands restoration and BMPs: <http://www.dem.ri.gov/programs/water/wetlands/>

If you need assistance with filing a wetlands application, please contact Joe.Antonio@dem.ri.gov to set up a pre-application meeting with RIDEM staff. These meetings can be held virtually and in person.

The following Best Management Practices to **promote** and **enhance** wildlife are as follows.

Conduct an inventory of golf course resident wildlife and habitats. **(15 points)**.

Current percentage of golf course providing habitat:

5% to 10% **(5 points)**

11% to 15% **(15 points)**

16% to 20% **(20 points)**

> 20% **(25 points)**

Golf course has an established wildlife improvement plan to protect existing native habitats and to expand habitats. This plan should identify the existing habitat areas and should identify the areas that will be enhanced in the future. Please attach a copy of the plan. **(15 points)**

Wildlife corridors (at least 30 ft wide) are established throughout the course to connect areas of habitat. Corridors enable animals to travel and forage for food. **(10 points)**

Naturalize out of play areas that are currently maintained with mowed grass or that are visually unappealing. **(8 points)**

Increase turf height (8 inches or higher) around existing ponds and streams. Plant trees and shrubs where possible to provide areas of wildlife habitat. **(5 points)**

Construct or modify storage ponds with shallow margins that can be planted with native wetland vegetation, which is utilized by many wildlife species. Buffers of native herbaceous and shrub vegetation can also be planted around the perimeter of the storage ponds to enhance wildlife habitat. **(8 points)**

Remove invasive exotic plants and replace with native plants. **(5 points)**

Construct birdhouses, bat houses, and nesting boxes into the landscape at the course. **(5 points)**

Allow beneficial weeds like “milkweed” to grow and mature in out of play areas. **(5 points)**

For meadows and tall grasses, plant meadows with both short term species and long-term perennial species that take multiple years to establish. **(5 points)**

Mow the “meadow” every 4 to 6 weeks to a height of 4 to 6 inches during the first growing season to control weeds. **(5 points)**

Plant a diversity of flowering pollinator- friendly plants when renovating out of play areas. **(8 points)**

Leave pollinator nesting materials and sites in out of play areas whenever possible. **(5 points)**

Mow natural or pasture areas just once per year – late in the season when plants are dormant to minimize effects on pollinators. **(5 points)**

Provide man-made nesting sites for solitary nesting species. **(8 points)**

Select pesticides with reduced impact on pollinators. Please go to this link to view the “New England BMP Guidebook” for a list of pesticides. **(8 points)**

[https://urldefense.com/v3/_http://www.rigcsa.org_!!KKphUJtCzQ!e3SFDyD1PReQRMVrZP95S5mprJSzMm_1K_AJXMclunPLd5o0PYsE_I9FnBJ9s0cRImFq9A\\$](https://urldefense.com/v3/_http://www.rigcsa.org_!!KKphUJtCzQ!e3SFDyD1PReQRMVrZP95S5mprJSzMm_1K_AJXMclunPLd5o0PYsE_I9FnBJ9s0cRImFq9A$)

Select pesticides that when according to label, have no known effect on endangered species present in the area. **(5 points)**

Select native plants for use on the course that are based on unique contributions to the wildlife benefit, including blooming schedules, bark, fruit, and texture. **(5 points)**

Develop and implement a pollinator protection plan on the golf course. **(15 points)**

Establish commercial beehives on property. **(10 points)**

Establish “pollinator” gardens using native species that attract local pollinators. Please see this link for suggestion on plants: <https://riwps.org/guides-for-sustainable-landscapes>. **(15 points)**

Post signage around pollinator gardens to educate guests and staff about pollinator protection. **(8 points)**

For more information on RIDEM’s Pollinator Working Group, please see the following website: <http://www.dem.ri.gov/programs/agriculture/pollinator-working-group.php>.

Section 2 Point Total:

Section 3: Integrated Pest Management

Eliminate pesticides used in the in ornamental gardens. **(10 points)**

Use native plants to reduce use of pesticides. **(8 points)**

Develop a facility -specific written IPM plan. Attach a copy of plan. **(10 points)**

Select turfgrass cultivars and species recommended for use in the environmental conditions of the site as to avoid using pesticides. **(5 points)**

Correct the soil's physical and chemical properties that may impact turfgrass health and its ability to resist pests. **(8 points)**

Evaluate the potential impact of the timing of cultural practices and nutrient applications on the incidence of pest problems. **(3 points)**

Use a defined pesticide selection process to select the most effective pesticide with the lowest toxicity and least potential for off-target movement. **(8 points)**

Document all IPM related activities, including non-chemical control methods and pesticide usage. **(5 points)**

Monitor prevailing environmental conditions for their potential impact on pest problems. **(5 points)**

Train personnel how to regularly monitor pests by scouting or trapping. **(5 points)**

Identify alternative hosts and overwhelming sites for key pests. **(5 points)**

Assess pest damage when it occurs, noting particular problem areas, such as the edges of fairways , shady areas, or poorly drained areas. **(5 points)**

Document when pest damage occurs. Note the time of day, date, and flowering stages of nearby plants. **(5 points)**

Map pest outbreak locations to identify patterns and susceptible areas for future target applications. **(8 points)**

Identify key pests in your IPM plan. **(5 points)**

Determine the pests life cycle and know which life stage to target (i.e. for insects identify whether its an egg, larva, nymph, pupa, or adult). **(5 points)**

Identify pests accurately by sending samples to a plant tissue diagnostic laboratory. **(5 points)**

Implement proper cultural, irrigation, and turf management practices to reduce stress and pressure of pest establishment. **(5 points)**

Maintain a proper fertilization schedule to improve turf density and quality and reduce pest populations. **(3 points)**

Make sure materials, such as topdressing, are pest free. **(3 points)**

Address damage from turfgrass pests such as diseases, insects, nematodes, and animals to prevent density/canopy loss to broadleaf weeds. **(5 points)**

Divert traffic away from areas that are stressed by insects, nematodes, diseases, or weeds. **(3 points)**

When nematode activity is suspected, an assay of soil and turfgrass roots is recommended to determine the extent of the problem. **(5 points)**

Release insect-parasitic nematodes to naturally suppress insect pests such as white grubs. **(8 points)**

Identify areas on the golf course that can be modified to attract natural predators, provide habitat for them and protect them from pesticide applications. **(8 points)**

Install flowering plants that can provide parasitoids with nectar or sucking insects (aphids, mealybugs, and soft scales) with honeydew source. **(8 points)**

Avoid applying pesticides to roughs, driving ranges, or other low use areas to provide a refuge for beneficial organisms. **(8 points)**

Evaluate the use of reduced risk pesticides and biopesticides to treat the problem. **(8 points)**

Remove grass clippings during periods of weed seed production, to reduce disease spread to eliminate potential smothering of turfgrass plants from excessive clipping volume, or when clippings interfere with functional use of turf. **(3 points)**

Section 3 Point Total:

Section 4: Chemical Safety and Storage

Please provide the name and **license number** for all employees applying pesticides **(3 points)**:

Select the least toxic pesticides with the lowest exposure rates for use on the course. **(10 points)** Use "Reduced Risk Pesticides" when appropriate. See the following link for more information:

<https://www.epa.gov/pesticide-registration/reduced-risk-and-organophosphate-alternative-decisions-conventional>

Restrict staff and golfer access to pesticide treated areas for at least one hour following application. **(3 points)**

Buy fertilizers and pesticides in limited quantities and do not store large volumes of chemicals on site. **(3 points)**

Provide impervious surfaces in chemical mixing areas. **(3 points)**

Dispose of all pesticides according to the Rhode Island "Universal Waste Rule" . Please see the link for more information. <http://www.dem.ri.gov/programs/benviron/assist/pdf/univrul.pdf>. Please contact ann.battersby@dem.ri.gov for technical assistance regarding appropriate pesticide disposal. **(8 points)**

Locate all pesticide and fertilizer mixing areas at least 200 ft away from all water resources, high groundwater tables areas, and drinking water wells. **(5 points)**

Pesticide mixing, fertilizer mixing, and hazardous material storage areas should be located separately from one another so no confusion regarding chemicals occurs. **(5 points)**

Keep an organized binder of all Safety Data Sheets for all chemicals on site for all staff to access. **(3 points)**

Register a site plan with the local fire marshal indicating the locations of all chemical storage areas. **(3 points)**

Lock doors and prevent access to chemical storage areas. **(3 points)**

Provide secondary containment for pesticide, fertilizer, and hazardous materials storage areas. **(3 points)**

Keep a containment boom and absorbent material in all chemical storage areas in case of spills. **(3 points)**

Shelving for chemicals should be sturdy and not made of wood. **(3 points)**

Provide emergency wash areas for staff and PPE in chemical storage and mixing areas. **(3 points)**

Adopt a first in first out policy for using the oldest products first to ensure that the product shelf life doesn't expire. **(3 points)**

Ensure all labels are affixed to chemical containers. **(3 points)**

Control the temperature in chemical storage areas to avoid extreme heat or cold. **(3 points)**

Treat any rinse water used to rinse containers and for mixing as a pesticide since it is contaminated with chemicals. **(3 points)**

Prominently display important contact information such as CHEMTREC for emergency information in case of spills. **(3 points)**

Develop a golf course emergency response plan that includes procedures to control, contain, collect, and store spilled materials. **(8 points)**

Dispose of absorbent material used to clean up spilled pesticides as a hazardous material. Do not throw in trash. **(5 points)**

Post warning signs in chemical storage buildings. **(3 points)**

Vehicles & Fueling & Paint

Purchase low VOC paint. The VOC content for indoor paint should not exceed 50 grams per liter. The outdoor paint should not exceed 100 grams per liter. **(3 points)**

Minimize stockpiling of old paint. **(3 points)**

Dispose of paint responsibly according to “Paint Stewardship Programs”. Please see the following website for more details **(8 points)**: <https://www.paintcare.org/paintcare-states/rhode-island/#/everyone>

Locate fueling facilities away from surface waters and drinking water wells. **(8 points)**

Fueling of vehicles should only be conducted on “concrete only” surfaces. **(8 points)**

Eliminate floor drains in fueling areas. **(5 points)**

Equipment washing areas must drain to oil water separator and from there to a sanitary sewer or holding tank. **(8 points)**

Store and maintain vehicles on covered, sealed, impervious surfaces only. **(5 points)**

Brush or blow off accumulated clippings from equipment using compressed air before washing. **(3 points)**

Wash equipment on a concrete pad that collects water. After material is dried, collect it and dispose of it properly. **(3 points)**

Ensure that all fueling stations have spill prevention kits. **(3 points)**

Submit annual monitoring report for all ASTs. **(3 points)**

Vehicle Washing

Do not wash pesticide application equipment on pads with oil water separators. **(3 points)**

Use non contaminated wash water for irrigation. **(3 points)**

Do not discharge non contaminated wastewater during or immediately after a rainstorm since the added flow may exceed the permitted storage volume of the stormwater system. **(8 points)**

Do not discharge wash water to surface water or groundwater, or directly to stormwater drainage systems. **(8 points)**

Solvents and degreasers should be used only over a collection basin or pad that collects used material. **(5 points)**

Section 4 Point Total:

Section 5: Water Conservation

Develop a water budget for the course. Use the GCSAA Water Budget Calculator found at this link:

https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_037305.xls. **(8 points)**

Control invasive plants that use excessive water. **(5 points)**

Water tees and greens only. **(8 points)**

Please provide the following metrics **(10 points)**:

Current acreage of turfgrass watered currently.

Current acre-feet of water per irrigated turfgrass acre annually.

Develop a plan to reduce irrigated acreage and /or quantity of water per irrigated acre. **(8 points)**

Determine irrigation rates based on evapotranspiration rates, rainfall, soil conditions, and Distribution Uniformity. **(3 points)**

Perform leak detection on a regular basis several times a year, including in the spring at the start of the irrigation season and the end of the season to ensure the proper closure of the system. **(3 points)**.

Install water meters in critical locations throughout the irrigation system. For example, metering should be done at the original source(s) (wells, streams) and between and storage ponds and the distribution system. **(3 points)**

When developing new water sources, incorporate surface storage (lined ponds) with wellhead withdrawals to conserve water by conservation of rainfall, site drainage, and runoff as a supplemental water source. **(3 points)**

Maintain records of new well construction and modifications to existing wells. **(3 points)**

Surround new wellheads with bollards or a physical barrier to prevent damage. **(3 points)**

Inspect wellheads and casings annually for cracks and damage. **(3 points)**

Use backflow prevention devices at the wellhead, on hoses, and at the pesticide mix/load station to prevent contamination of the water source. Adhere to various state cross-connection regulations. **(3 points)**

Use isolation valves before all main lines and major laterals to be able to quickly shut off leaking areas before turf is damaged and water is lost. **(3 points)**

Obtain a copy of the well log for each well to determine the local geology and well depth. **(3 points)**

Use an onsite weather station combined with an automated sprinkler system governed by atmospheric conditions. The computer system should be easily programmed to accommodate expected weather conditions and expected turf water requirements. **(8 points)**

Use long and medium range forecasts to schedule irrigation to reduce the risk of runoff and leaching during large rainfall events. **(3 points)**

Use computerized irrigation management system equipped with flow management to increase irrigation efficiency. **(3 points)**

Rain shutoff switches should be installed on all new and existing irrigation systems to avoid over-watering following significant rainfall. **(5 points)**

Designate 50% to 70% of the non-play area to remain in natural cover according to “right plant right place” principle of plant selection that favors limited supplemental irrigation and on-site practices. **(8 points)**

Select and use turf grass varieties that require less irrigation, such as velvet bent grass, maintain at least 0.25 inch height cut on all greens. **(8 points)**

Designate areas that can be naturalized for lower maintenance, thus less water use. **(8 points)**

Leave non-play areas in a natural state. **(8 points)**

Provide adequate and balanced levels of nutrients to the turf. Avoid excessive amounts of nitrogen & phosphorus and apply nutrients based upon turf species and cultivar nutrient requirements, level of use, and soil type. **(3 points)**

Use soil cultivation techniques such as spiking, slicing and core aeration to improve water infiltration and minimize runoff during irrigation or rainfall events. **(3 points)**

Use environmentally safe wetting agents to improve water infiltration. **(5 points)**

Make sure wetting agents are watered in to be effective. **(3 points)**

To reduce evaporation losses, irrigate in the early morning or evening hours when evaporation and winds are at their lowest. **(3 points)**

Vary the irrigation amount and rates in accordance with different soil types, degree of slope and slope aspect, drainage patterns, and microclimates. **(3 points)**

Irrigation systems should be designed and installed so that the putting surface, slopes, and surrounding areas can be watered independently. **(3 points)**

Install part circle heads to conserve water and reduce unnecessary stress to greens and surrounds. **(3 points)**

Avoid using a global setting for irrigation systems. Make adjustments to watering times per head based on turf species and soil and slope characteristics. **(3 points)**

Base water times on actual site conditions for each head and zone. **(3 points)**

Visually monitor for localized dry conditions or hot spots to identify poor irrigation efficiency or a failed system device. **(3 points)**

Install wireless moisture sensors in the rootzone and use in conjunction with handheld moisture meters for each irrigation zone to enhance scheduled timer-based run times. **(3 points)**

Wireless soil moisture sensors should be installed to avoid damage from aeration. **(5 points)**

Observe and map areas of high seasonal water tables where irrigation demands may be less, due to capillary movement of water into the root zone from a shallow water table. Late winter and early spring are usually good times to observe. **(8 points)**

Observe runoff producing zones under typical winter/spring storms and summer thunderstorms. Avoid over irrigation and use precautions in fertilizer/pesticide applications in these runoff zones, especially during early spring and late fall. **(8 points)**

Observe and map areas that have different water use patterns based on turf response to dry periods. Use the maps to plan and operate the irrigation systems. **(8 points)**

Choose sprinkler heads that do not exceed the lowest infiltration rate of specific soil. **(3 points)**

Use drip irrigation in landscape areas to apply water only to plants that need it. Use mulches in shrub and flowerbeds to reduce water evaporation losses. **(3 points)**

Consider use of polymers as a means of increasing water retention and reducing water loss to evaporation.**(3 points)**

Use xeriscape landscaping or native drought tolerant plants where feasible around buildings, parking areas, or other appropriate places. Gravel pathways or borders that permit infiltration but have low evaporation potential are one example of xeriscape landscaping. **(8 points)**

Replenish groundwater by constructing rain gardens, green roofs, and bioswales as part of the course design. **(15 points).**

Plant native vegetation wherever feasible. **(8 points)**

Reduce irrigation rates in secondary rough areas and, where possible eliminate irrigation of non- play areas. **(10 points)**

Develop a drought emergency plan to balance the most critical golf course water demands during times of water use restrictions. This plan should be based on the USDA Drought Plan Template that includes all aspects of facility management. See this link for template. **(10 points)**

<https://www.usda.gov/topics/disaster/drought/usda-drought-programs-and-assistance>

Use hand watering when feasible in place of activating the irrigation system. **(3 points)**

Use recycled water on the golf course. This may require a specific permit from DEM. Contact ann.battersby@dem.ri.gov for assistance. **(15 points)**

Test reclaimed water regularly for dissolved salt content.**(5 points)**

Routinely monitor the groundwater from wells or saltwater intrusion and contamination of heavy metals, pesticides, and fertilizers. **(8 points)**

Amend sodic water systems appropriately with gypsum or an appropriate ion to minimize sodium buildup in soil. **(3 points)**

Monitor sodium and bicarbonate buildup in the soil using salinity sensors or routine tests. **(3 points)**

Account for the nutrients in the effluent (reuse/reclaimed) water when making fertilizer calculations. **(8 points)**

Utilize deficit irrigation methods and strategies. **(3 points)**

For more information on BMPs for irrigation system design, installation, maintenance, and performance criteria please see the following link to the GCSAA New England BMP Guidebook:

https://urldefense.com/v3/https://www.gcsaa.org/environment/best-management-practices_!!KKphUJtCzQ!a4p1mz9YmFJrM-6TsxY9mORev004XaXQmFpEjqmrt75_ySkIEXo-OEiouPeLuGt_xkumYAS

Section 5 Point Total:

Section 6: Water Quality Management & Fertilization

Develop an existing condition plan and site plan that includes the following (40 points):

- Drought emergency plan to balance the most critical golf course water demands during times of water use restrictions.
- Existing contours, direction of drainage, surface water resources, wetland boundaries, floodplains and the type and function of all affected wetland areas (vernal pools, intermittent streams, marshes' etc.) located on the course and neighboring properties offsite.
- Soil maps with identification of steep slopes and erodible soils
- Location of existing or potential drinking water sources, including reservoir watersheds, public wells and private well areas.
- Existing land cover (i.e. forest, meadow, old field...ect.)
- Natural Diversity Data Maps and flora and fauna inventory.
- Location of existing and proposed buildings, roads, parking lots, storm drainage, water supply ponds, sewers, septic systems, stream crossings, and other permanent structures and their proximity to surface waters and wetlands
- Locations of all facilities, structures, treatments and measures used for soil erosion and sedimentation control and long-term stormwater management
- Location of existing and proposed site vegetation and the extent of proposed or existing buffer areas
- Locations of pesticide/fertilizer storage and mix/load sites
- Locations of fueling and chemical storage areas
- Identification of areas of active erosion (i.e. stream banks, exposed slopes, drainage channels)
- Identification of upstream and downstream land uses
- Location of groundwater locations in relation to the surface of the course particularly in any areas that have a seasonally high-water table (<24") or shallow bedrock (<4')
- Locations of saturated source areas that become seasonal runoff producing zones (these areas can be determined by field observations after high rainfalls in both early spring and in late summer and will vary seasonally within the landscape due to the variation in water tables and amount of recent evapotranspiration).
- Identification of impaired waters on site and immediately downstream

Nutrient Management Metrics. Please report the following in lbs. / 1000 sq. ft **(20 points)**:

Please provide current use of nitrogen (N):

Please provide current use of phosphate (P₂O₅):

Please provide current use of Potash (K₂O):

Conduct soil testing in the rough since the greatest amount of phosphate and potash are applied to the rough. Based on test results, determine phosphorus and potassium needs. **(10 points)**.

Develop a nutrient management plan. Please attach a copy of plan. **(10 points)**.

Use organic amendments as part of the overall nutrient management plan. List the organic amendments used and their purpose **(15 points)**:

Return clippings to turf when possible and account for nutrients they contribute to the fertilization program. **(8 points)**.

Increase mowing height and roll greens routinely (i.e. every other day) to maintain ball roll distance and turf health. **(5 points)**.

Where necessary, maintain 2-4 inches of organic mulch over the surface of soil, applied a few inches from the base of trees and plants, to keep soil moist and minimize weeds. **(8 points)**

Protect and maintain existing woody vegetation as natural buffers, to the maximum extent possible, during the design and construction of new courses or during course maintenance. **(15 points)**.

Plant grasses, other herbaceous vegetation and woody vegetation in buffer strips where existing vegetation is lacking. Plants should be only be native plants. **(10 points)**.

Locate new vegetated buffers between water bodies, wetlands, and wellheads and any potential pollution sources such as fertilized areas or runoff producing areas such as impervious surfaces and seasonally saturated soils. **(10 points)**

Design buffer widths to vary in accordance with landscape position and amount of runoff and potential pollutants entering the buffer at a specific location. Minimum buffer widths will vary with the intended buffer function and the specific site conditions including hydrogeology, slope, vegetation, soil type, presence of wetlands, and the type of nutrient or pollutant to be removed. **(10 points)**.

Where a desired buffer width cannot be met due to course layout, prevent runoff from entering the water body at that location by diverting it to adjacent areas where adequately wide buffers can be

developed and maintained. Methods of diversion can include shallow swales, low berms, and grading of fairway slopes away from stream banks. **(10 points)**

Maintain wider temporary buffers for sediment control during construction periods. **(8 points)**.

Maintain appropriate vegetation on steep or highly erodible stream banks at all times to prevent stream bank erosion. Dense woody vegetation such as willow shrubs and saplings (*Salix* sp.) are often best at resisting and reducing high stream velocities that can easily erode stream banks. Mature hardwood trees may impede development of a dense ground cover due to shading. This makes mature trees less effective than dense shrubs in preventing streambank erosion. **(10 points)**

Vary the width, height, and type of vegetation to meet the specific functions of the buffer and growing conditions at the specific location. Use a combination of native trees, shrubs, and grasses along or around the wetland, watercourse, or water body to meet objectives for pollutant control and to provide a variety of habitat at each location. **(10 points)**

Select some woody vegetation to provide shade, especially along the south side of wide sections of a watercourse or water body, to provide shading, cool water temperatures and to maintain suitable dissolved oxygen levels. **(10 points)**

Mow grass buffers infrequently, (i.e. 1 to 2 times a year), to preserve the functions of the buffer while controlling woody vegetation. Remove clippings after mowing the grass buffer zones to help reduce the cycling of nutrients back into the buffer zone and ultimately to a water resource. **(8 points)**

Do not dispose of grass clippings or pruning's in buffer areas. **(5 points)**.

Practice IPM in the buffer areas using appropriate pruning and cutting when necessary. **(5 points)**

Protect woody vegetation from root damage caused by machinery. **(5 points)**

Prevent placement of fill within the drip line of woody vegetation (where the water runs off the tree canopy). **(5 points)**

Control foot traffic in buffer areas through signs and fencing. **(10 points)**

Maintain a pesticide free zone adjacent to buffers. **(10 points)**

Waterbodies that are experiencing issues with plants (including duckweed) or algae that are treated with herbicides or algicides, should follow the requirements of DEM's Division of Agriculture aquatic pesticide application program. **(8 points)**.

Leave roughs in natural condition but keep vegetation height at about 1 foot to allow raptors access to mice and voles and for tick control. **(10 points)**

Design detention ponds with a continuous wide band of tall emergent plants around the edges and in the shallow water to discourage geese. **(8 points)**

Inspect buffers several times each year, particularly after runoff events, to assure that sheet flow is occurring across vegetative buffers. Where channelized flow is developing, re-grade as necessary

and use flow spreaders to encourage lateral flow of runoff along the outer edge of the buffer. **(8 points)**

Use a qualified professional to perform a watershed analysis to estimate the amount of runoff that could be captured using different sizes, shapes, and locations of storage ponds. Conduct this analysis in conjunction with the drainage planning for the course. **(10 points)**

Construct storage ponds to increase water supply during peak irrigation times. **(10 points)**

Direct drainage from natural slopes and impervious surfaces through areas with vegetative cover, such as swales and diversions, and into storage ponds to maximize the collection of runoff from local storm events. **(10 points)**

Use high flow diversions or pumping to fill the storage ponds during flood flows. **(5 points)**.

Plan new ponds and the enlargement of existing ponds in upland areas to avoid disturbing wetlands and watercourses. **(10 points)**

Line excavated ponds based on an evaluation of potential seepage losses from the pond, especially in sandy soils or coarse geologic deposit such as stratified drift. **(5 points)**.

Construct ponds with irregular shorelines and bottom contours to enhance wildlife habitat. **(10 points)**.

If possible, construct ponds in a series or "train to treat" stormwater/site runoff. The first pond will catch the first flush, the second will provide additional filtering, and the third will filter and serve as a primary withdrawal pond for irrigation. **(15 points)**.

Design constructed ponds with an impervious lining to prevent loss of water to ground. **(5 points)**

Ensure proper calibration of fertilizers application equipment. **(5 points)**

Use spot treatment of fertilizer when near sensitive areas. **(8 points)**

Apply slow release fertilizers when the soil is saturated, when heavy rains are imminent, and during high winds. **(5 points)**

Apply slow release fertilizers on established turf, steep slopes, and in environmentally sensitive areas. **(5 points)**

Fertigate with soluble fertilizers frequently at low application rates. **(5 points)**

When applying granular fertilizer with rotary spreader near waterways, cart paths, or other non-target areas, always use a deflector shield to prevent inappropriate fertilizer distribution. **(8 points)**

If using granular fertilizer, irrigate with $\frac{1}{4}$ in water and incorporate it into the soil while minimizing runoff and volatilization. **(5 points)**

Eliminate fertilizers in gardens and landscaped areas. **(10 points)**

Apply fertilizer to tees and greens only. **(15 points)**

Use a no-phosphorus fertilizer on established turf. Apply phosphorus only when soil test indicates it is needed. This would mean applying phosphorus on soil that has a concentration of between 6-11 ppm. Testing laboratory should use the Morgan/Melich extraction method for phosphorus in soil. **(10 points)**

Apply no more than 1lb / 1000 sq. ft. of phosphorus in a single application to newly seeded areas until turf is established. Only apply phosphorus fertilizer to newly seeded areas when a soil test indicates that phosphorus concentration is less than 45ppm. **(10 points)**.

Employ tissue testing to facilitate the effective management of nutrients. The sufficiency tissue N concentration can vary from a low 1.5% to a high of 5.5% depending on the grass species. The sufficiency tissue phosphorus ranges from 0.15% - 0.50%. **(10 points)**.

Keep tissue test results from prior years so that changes can be documented over time. Make sure you follow the correct sampling methods for plant tissue when preparing for sample. **(5 points)**

Apply no more than ½ lb. of water-soluble N per 1000 sq. ft. in a single application to sand – modified putting greens. Double allowable amounts if using slow release fertilizer. Apply no more than 4 lbs. of N per 1000 sq. ft. to greens annually. **(8 points)**.

Apply no more than ½ lb. of water-soluble N per 1000 sq. ft. or 1 lb. of slow-release N to Par 4 and Par 5 tees in a single application. For Par 3 tees, apply no more than 1 lb. of soluble N per 1000 sq. ft. or 2lb. slow release N. Apply no more than 3 lbs. of N per 1000 sq/ ft to tees annually. **(8 points)**.

Apply no more than ½ lb. of water-soluble N per 1000 sq. ft. or 1 lb. slow release of N to fairways. Apply no more than 2.5 lbs. of N per 1000 sq. ft. on fairways annually. **(8 points)**

Apply no more than 1 lb. of N per 1000 sq. ft. to roughs annually. **(8 points)**

Preserve 10-25 ft wide buffers along 100% of linear footage of waterbody and wetland shorelines. The buffer must be at a minimum consist of turf mowed at 3 inches. **(10 points)**

Preserve 25-50ft naturalized woody buffer along 75% of linear footage of waterbody and wetland shorelines. Preserve a minimum of 10 ft buffer along remaining footage. **(10 points)**

Preserve applicable vegetated buffers of coastal and freshwater wetlands, ponds, and perennial and intermittent streams along 75% of jurisdiction wetland edges, per RI CRMC and RIDEM Regulations. Preserve a minimum of 50ft buffers along the remaining footage. **(20 points)**

Narrow fairways by planting margins with native vegetation or allowing the margins to naturalize while controlling for the establishment of invasive plants. **(10 points)**

Design tees so that only maintained turf is on the tee top and slopes. Plant native grasses around teeing grounds. **(10 points)**

Reduce the area planted in turfgrass. Garden plants, shrubbery, ground covers, and native plants address the aesthetic needs, but require no fertilization. **(10 points)**

Maintain a soil pH range of 6 to 7 to optimize phosphorus availability, increase soil retention, reduce leaching, and increase rooting density and depth. **(5 points)**

Develop a BMP plan for stormwater, which addresses the containment of runoff, adequate buffer zones, and filtration techniques in the design and construction process to achieve acceptable water quality. Stormwater BMPs must be properly maintained. **(8 points)**

Minimize impervious areas and maximize sheet flow where possible. Use pervious pavers for walkways, paths and parking lots and minimize the use of curbing on parking areas. Use pervious overflow parking to accommodate seasonal parking. **(10 points)**

Minimize directly connected impervious areas to the extent practical. **(8 points)**

Disconnect runoff from gutters and roof drains from impervious areas, so that it flows onto permeable areas that allow water to infiltrate near the point of generation. **(15 points)**

Maximize use of permeable pavers (pervious pavement) wherever feasible. **(10 points)**

Monitor waterbodies for DO content and establish DO thresholds to prevent fish kills, which occur at 2-3 mg/L. **(10 points)**

To reduce risk of DO depletion, use an algaecide containing hydrogen peroxide instead of one with copper or endothall. Please refer to the Division of Agriculture's requirements for the application of aquatic pesticides. See this link for more information. **(8 points)**

<http://www.dem.ri.gov/programs/agriculture/pesticides-regulatory.php>.

Design and install measures such as catch basin inserts, swirl concentrators, or oil particle separators to treat the runoff from high use parking lots and service areas to minimize the discharge of hydrocarbons and sediment. **(8 points)**

All stormwater BMPs must be designed by an engineer and must be included in the Rhode Island Stormwater Design and Installation Standards Manuals List of BMPs Acceptable for Water Quality.

All stormwater BMPs must meet the manual's Minimum Design Criteria for BMPs

<https://rules.sos.ri.gov/regulations/part/250-150-10-8> **(15 points)**.

Eliminate all direct discharges of stormwater runoff from parking lots, service areas, the clubhouse, and other buildings, roadways underdrains, swales, or areas of concentrated surface flow, directly into wetlands and watercourses by constructing stormwater BMPs. **(15 points)**

Construct stormwater BMPs to treat runoff from intensively managed areas such as tees and greens to help reduce the movement of nutrients and pesticides into wetlands and watercourses.

Alternately direct any surface flow from greens into bunkers to provide for the treatment of runoff. **(10 points)**

Direct surface water runoff from the higher surrounding ground away from all greens and tees. **(8 points)**

Where structural BMPs are not feasible, discharge or divert surface runoff into wide, relatively flat vegetated areas to promote infiltration and ground water recharge, instead of channelizing flow. **(8 points)**

Eliminate all illicit connections to storm drains found at existing facilities. Confirm that all wastewater discharges are properly connected and disposed. **(8 points)**

Prevent stormwater contact with all waste and raw material storage areas and divert clean stormwater away from these areas. Locate compost piles away from surface water, wetlands, floodplains, steep slopes, and areas with high water tables. **(8 points)**

Develop a water quality sampling plan that identifies the parameters to be sampled, the sampling frequency, sampling locations, sampling weather conditions, and quality control for sample collection. The sampling plan should also specify the duration of the monitoring program. **(20 points).**

At a minimum sample for total phosphorus and total N as well as any parameters potentially associate with golf course activities that are identified in a TMDL associated with a nearby waterbody. **(8 points)**

Identify all catchments within the golf course that discharges via stream or swales to adjacent waterbodies and wetlands. For each of the identified catchments, locate a sampling station down gradient of all potential contamination associated with golf course activities and immediately up-gradient of final discharge points for the containment (such as treatment ponds, and property lines). **(15 points).**

Use monitoring results to help measure the success of BMPs, adapt changes to BMPs, for better efficiency, or determine whether additional BMPs are needed. Develop a response plan that outlines a plan of action to be undertaken if a problem is detected, not responding to treatment, or increasing over time. **(10 points)**

Section 6 Point Total:

Section 7: Energy Use

Provide the following metrics for a baseline of energy use **(10 points)** :

Annual kilowatt hours of electricity used at existing conditions:

Annual cubic feet of natural gas used at existing conditions:

Annual gallons of gasoline/diesel used at existing conditions

Develop an energy reduction plan. Please attach a copy of the plan. **(15 points)**

Installation of LED exit signs **(3 points).**

Substitute natural light for electric light or use daytime dimming sensors **(3 points).**

Use solar panels for a hot water system or for pumping irrigation wells **(8 points).**

Use alternative fuels for golf course operations (lawn mowers, tractors ec.t). please state the type of fuel used. **(8 points)**

Use hybrid mowing vehicles. **(5 points)**

Pick LED lights that come with a three- year warranty and consult third party listing like the Design Lights Consortium to evaluate options. **(3 points)**

Conduct an energy audit by certified energy auditing firm such as RISE Engineering. RISE Engineering works directly with National Grid and has several small business assistance programs for energy use reduction. **(15 points)**. Please see the following link:

https://www.riseengineering.com/?utm_campaign=general-branded&utm_medium=paid-search&utm_source=adwords&utm_content=bmm&gclid=Cj0KCQiA5bz-BRD-ARIsABJT4nhSSrpdRvm5RbotPdDVrIX4GgiaH6k6jXWl3KHRPDN-q9kbk_UHtA4aAnNYEALw_wcB

Use motion and occupancy sensors on lights. **(3 points)**

Utilize translucent wall panels to provide natural light in areas such as equipment maintenance/storage and irrigation pump houses. **(3 points)**

Use solar energy on the course and other renewable energy sources. **(15 points)**.

Use programmable thermostats in conditioned spaces to reduce heating and cooling costs during periods of low use. **(3 points)**

Change HVAC filters in a regular basis typically every one to three months. **(3 points)**

Have HVAC technicians perform regular check ups to ensure the HVAC equipment is working properly. **(3 points)**

Properly seal heating and cooling ducts and ensure the ducts are insulated. **(3 points)**

Consider adding advanced digital economizer controls to an existing rooftop HVAC unit. These controls bring in ventilation only when needed, reducing the overall energy consumption of the HVAC unit. **(5 points)**

Consider use of a geothermal or water source heat pump for heating and cooling. A qualified HVAC technician can inform course managers if this technology is applicable for the golf course buildings. **(10 points)**

Use high efficiency pool heater and consider the use of a solar pool heating system. **(5 points)**

Maintain appropriate water temperature when the pool is in use and turn down the pool heater when not in use. **(3 points)**

Use a pool cover to decrease evaporation when pool is not in use. **(3 points)**

Add windbreaks such as trees shrubs and fencing around the pool to further reduce evaporation. **(3 points)**

Use energy star equipment in the office at the maintenance shop. **(5 points)**

Install energy efficient vending machines and retrofit older vending machines with a “vending misers” to shut off when not in use. **(3 points)**

Consider switching golf cart charging to off peak hours. If not, stagger the charging to minimize the amount of carts being charged during peak hours. New national standards for battery charge efficiency took effect in 2018. **(3 points)**

Use solar-charged golf carts. These carts work by using solar panel on the roof of the cart and reduce electricity consumption of cart charging by 50% to 75%. **(10 points)**

Use propane or compressed natural gas as a fuel for carts. **(3 points)**

Use biodiesel as a fuel for carts. **(8 points)**

Installation of energy efficient lighting or development of a schedule for replacement with energy efficient lighting in all maintenance and operations buildings. **(8 points)**.

Wind turbines used on the property to generate energy. **(15 points)**.

Where motion sensors are not workable, train staff to turn off lights when not in use. **(3 points)**

Install low flow toilets and faucets at the maintenance and operations buildings. **(3 points)**.

Install water free urinals. **(3 points)**.

Charge golf carts during off hours.**(3 points)**.

Institute an employee training program for energy conservation. **(8 points)**.

Section 7 Point Total:

Section 8: Environmental Education

Certified golf course under the Audubon Certification program. **(10 points)**.

Certified golf course in the Groundwater Guardians Green Site Program **(10 points)**.

Please add any other additional Certifications or programs here: **(points negotiable)**

Section 8 Point Total:

Section 9: Negotiable Points.

Please add any BMPS you are currently employing at your course that were not listed in this checklist. We will consider these BMPs and provide negotiable points.

**Thank you for completing a RIDEM Green
Golf Course Program Checklist!**

References

- Rhode Island Department of Environmental Management Green Golf Course Certification Workbook. Rhode Island Department of Environmental Management. April 2010.**
- Best Management Practices for New England Golf Courses. GCSAA. February 2020.**
- Best Management Practices for Lawn and Landscape Turf. University of Massachusetts. Version 1.51. 2016.**