

DRAKES ISLAND SELF REGULATING TIDEGATE (SRT) OPERATION AND MAINTENANCE PLAN

1. Introduction

This Operations & Maintenance Plan is intended to specify procedures for (1) normal operational settings and adjustments of the Drakes Island Salt Marsh self-regulating tidegate (SRT) (2) A decision making process for management and adjustment of the SRT (3) maintenance of the SRT (4) emergency procedures to be followed in advance of predicted flooding events or malfunction of the SRT (5) Monitoring of the SRT performance and the ecological conditions in the marsh.

2. Description of installation

The operation and maintenance of the SRT installed under Drakes Island Road is an integral part of water management in the Drakes Island marsh upstream of Drakes Island Road for the benefit of the marsh and the neighboring community. The SRT is owned by the town of Wells and operated by the town in accordance with this plan. This operations and management plan contains basic information concerning calibration, operation, maintenance and emergency operation of the SRT. This plan will be reviewed annually and updated as necessary as the SRT is monitored and fine-tuned, especially during the first year of operation (under warranty). Based on information in the E/Pro Study, the frequency and duration of tidal flows through the culvert will be increased. This will allow a natural restoration of salt marsh species while also providing an improved mechanism for water management in the marsh and adjacent Drakes Island community.

The plan for operation of the SRT is to limit tidal heights within the marsh to the levels reached during normal tidal cycles as specified in the E/Pro Report, (4.2 ft NGVD) The SRT will be adjusted to close whenever downstream tidal levels would result in upstream levels higher than 4.2 feet. This plan is part of the Federal and state permits for installation of the SRT and envisions indefinite maintenance of the SRT operation by the Town of Wells (e.g. no new permit needed for repair or replacement in kind of the SRT)

3. Underlying operational premise

Maximum tidal heights limited to present maximums (4.2 ft NGVD)
Minimum pool levels at the culvert limited to invert elevation of the old culvert (0.10ft NGVD)

4. Goals

Improve exchange of tidewater and sediments – control undesirable plants, especially cattail (*Typha*) and reed (*Phragmites*)

Improve overall drainage of storm water throughout the Drakes Island community; protect marsh and community from flooding events

Reduce ground water levels, in the Drakes Island Marsh

Maintain a positive impact on residential properties from flooding and valuation loss

Manage habitat- enhance tidal marsh values

Maintain or enhance bird habitat (NWR), especially Salt Marsh Sharp Tail Sparrows (NWR)

Enhance fish passage to and from the estuary

Enhance sediment flow onto marsh- increase marsh surface buildup

5. Responsibilities

The Town of Wells installs, owns, operates and maintains (as detailed in Appendix A) the SRT.

The Wells NERR and the Rachel Carson Refuge monitors the marsh hydrology, vegetation and wildlife response to the SRT pursuant to the monitoring plan attached as Appendix B and report results at least annually to the Working Group.

The Working Group reviews the operation, maintenance and environmental impacts of the SRT and recommends any changes to better achieve goals set out in this plan. The Working Group will seek to use a consensus based process of decision making as outlined in Appendix C.

6. Drakes Island Marsh Working Group

The Drakes Island Marsh Working Group consisting of the following parties:

- Town of Wells
- Neighborhood representative or alternate(s)
- Abutter representative or alternate(s)
- Rachel Carson National Wildlife Refuge
- NOAA Fisheries
- Wells National Estuarine Research Reserve

The Working group will have regular meetings twice each year, in second half of May and first half of October or as frequently as necessary upon call of any member, to review the status of operation and the effect of SRT and will recommend to the town

adjustment to the SRT settings and changes in SRT maintenance. The working group will report annually to stakeholders and the community

A quorum of the workgroup shall consist of at least one representative from the Town, neighborhood representative, Wells NERR, Rachel Carson NWR

7. Operation

The SRT will initially be set to close at a upstream tide level of 3.8 feet NGVD and will be adjusted based on observation of performance to the target elevation of 4.2 feet NGVD.

The Refuge and the Reserve will monitor performance of the SRT pursuant to the monitoring plan to achieve the goal of maintaining current maximum tidal heights.

Post construction monitoring will focus on impacts on water levels on the edges of the marsh, impact on Sharp Tail Salt Marsh Sparrow habitat and response of tidal marsh vegetation, cattails and *Phragmites*. Specific monitoring goals and methods are detailed in the monitoring plan.

Monitoring reports will be presented to the Working Group at its spring meeting...

8. SRT Flood Control Event Operation

The SRT should be manually closed for flood control purposes in advance of the following specific weather events where the threat of coastal flooding is anticipated:

- Any storm for which the National Weather Service (NWS) has issued a Coastal Flood Warning or Hurricane Warning.
- Any significant rain event predicted to exceed 5.0 inches in 24 hours (approximately equivalent to a 25-year storm).

When the weather conditions listed above are predicted by the National Weather Service, the SRT shall be manually set to exclude high water before the predicted event. Normal operation of the SRT may be resumed 24 hours after the NWS warning has been cancelled or has expired and water in the marsh has dropped below the normal high set point level.

9. Situation Response

If any abnormal condition of the SRT is observed such as high marsh water level, malfunction of the SRT such as obstruction by debris or breakage the following actions should be taken by the observer or concerned party

a. EMERGENCY SITUATION

1. Immediately report the situation to one of the following persons. If at all possible, do not leave a voice mail message; speak directly to someone
 - a. Wells Public Safety Dispatch (207-646-9354)

A responsible agent responds to emergency in timely and appropriate manner according to Operations and Maintenance Plan and instructions from SRT manufacturer where appropriate (800-xxx-xxxx)

2. SRT shall be restored to normal operation as soon as possible
3. The Working Group shall confer about the response and may arrange a meeting within 2 weeks to review and evaluate the emergency response.

b. CHRONIC OR NON-EMERGENCY SITUATION

1. Contact Wells Town Manager to have concern placed on Workgroup biennial meeting agenda
2. Workgroup reviews potential adaptive management responses and concerned party's desired outcome in light of overall project goals
 - a. Recommend and implement appropriate adaptive management actions
3. If concerned party's desired outcome not achieved, return to Step 2
OR:
4. If not possible to achieve concerned party's desired outcome
 - a. Provide concerned party with documentation of site conditions for pre and post project implementation
 - b. Concerned party has ability to pursue issues further through mediation or other action.

During the initial 6-12 months of SRT operation, the Town, Refuge and Reserve expects to adjust the SRT to optimize its performance to achieve the goals stated in this plan. The Working Group and any interested stakeholders will be advised of significant adjustments by e-mail.

Appendix A

Manufacturer's suggested SRT Maintenance Program

Weekly:

Visual Inspection:

Simple inspections looking for build up of any objects that could affect the function of the SRT. Common problems include, but are not limited to: 2x4s stuck in the gate, vandalism and trash build up. Because the gate is somewhat self-cleaning, it is rare to see 2x4s and trash build up, but it does occur and can affect the closing and opening of the gate.

Bi-Monthly:

Hands on Inspection:

Do all that is included in the weekly inspection plus the following: Check all bolts for rusting or pitting. Check all moving parts to be sure nothing binds or locks in place. Watch the gate through one tide cycle to be certain of closure elevations and proper calibration.

6-Month Inspection: May & October/Nov

Hands on Inspection:

Do all that is included in the weekly and bi-monthly inspection plus the following: Using a 2" putty knife, scrape off barnacles on vertical floats and any that have attached to the side flap seats and front door seat. Check for barnacle build up on the door and stub tube. Remove barnacle if possible. Inspect "important" welds. If the door is aluminum, inspect all welds for signs of deterioration or cracking. Inspect the welds on the float ball arms and bracket for signs of cracking or splitting.

Pull up door float restraining rods to be sure they can be pulled easily in the event of a storm. Remove door float and remove all barnacles. Restraining rods should be cleaned of any barnacle grown. The front door float should be easily removable in case of emergency. Check for build up of rocks and other debris in front of the door. If the tide does not allow a visual inspection for large rocks, someone is going to have to wade out in front of the gate to feel for rocks. Large rocks in front of the gate will keep the gate shut and not allow proper flow. All large rocks that are blocking the gate opening should be removed.

Yearly Inspection: October/Nov

Full inspection including watching the gate cycle through two tide cycles. Re-calibrate the front door float and well as both vertical floats if necessary. Field touch up paint if required. Remove both vertical floats and clean completely. Remove all barnacles and touch up paint where needed. Check cotter pins and other vertical float hardware to insure there is no rusting or pitting present.

Check the hinge points on both side flaps. Be sure the side flap gates can swing freely on both sides. Any binding occurring on these side flaps will retard drainage and may cause a flooding event.

Check hinge points on the front door. Manually open and close the gate on low tide and feel for any binding or rubbing. The front door should swing freely at the hinge point and there should be little or no rubbing. Excessive rubbing can be a sign of problems with either the closure or opening of the gate.

Completely inspect float ball arm units. Remove the whole float ball arm unit from the gate frame and inspect all welds and hardware. If any cracking is seen in the welds, replace the complete float arm unit immediately. Check for rust on all hardware and replace it if necessary.

Emergency closing and opening instructions

In the event of forecast storm surge or heavy rainfall, the door float shall be released on its cables so that the SRT excludes incoming high water until the emergency has passed. See manufacturer's instructions for detailed procedures.

Appendix B

MONITORING PLAN FOR DRAKES ISLAND RESTORATION PROJECT

Rachel Carson Wildlife Refuge
Wells National Estuarine Research Reserve
Draft Date: January 7, 2004

General

Marsh monitoring tasks are required as part of the Drakes Island SRT installation project to track the performance of the SRT and to evaluate the outcome of restoration activities. The tasks identified in this plan should be conducted on an annual basis for five years. Personnel from the Wells National Estuarine Research Reserve and the Rachel Carson Wildlife Refuge will share joint responsibility for the monitoring aspects of the project. Unless noted otherwise, monitoring activities will be conducted according to the specifications of Regional Standards to Identify and Evaluate Tidal Wetland Restoration on the Gulf of Maine (GPAC: Global Programme of Action Coalition for the Gulf of Maine). All sampling stations will be mapped using a global positioning system (GPS) accurate to the sub-meter level, clearly marked in the field, and included on a site map. Following each field season, data from monitoring activities will be entered into a computer spreadsheet program, summarized and shared among project participants. The working group will review the data and use it in management of the marsh restoration.

1. Tidal Signal

Automatic water level recorders are to be installed and operated simultaneously upstream and downstream of the culvert for a minimum duration of two weeks per year (including neap and spring tide cycles). Elevations of the recorders are also to be measured, using standard survey devices, and referenced to NGVD (National Geodetic Vertical Datum). At least one clearly visible staff gauge will be installed upstream of the culvert, so that it can be read from Drakes Island Road, surveyed as to NGVD elevation, and GPS-ed

2. Soil Salinity

Five salinity stations are to be established at upstream and downstream sites for sampling soil salinity. For each site, stations are set along a main channel 1) near the culvert, 2) near head of tide and 3-5) perpendicular to a channel in the middle. Soil salinities are measured at low tide for six collection dates per year (every two weeks June – August). Soil water is collected in either 40-cm PVC drilled pipes or metal tubes fitted to accommodate a “sipper” syringe, depending on available materials. Salinities are measured on site with an optical refractometer (+/- 2 ppt).

3. Vegetation

Marsh plant communities and species of concern (*Phragmites australis*, *Typha*, *Lythrum salicaria*) are to be sampled using 1 m² quadrats along permanent transect lines. Transects are sited upstream and downstream of the culvert, and cross the main tidal channel at perpendicular angles (upland to upland). Four upstream and four downstream transects will be identified at random distances along the centerline of the main channel. Transect locations will be identified

by GPS and included on the site map. Quadrats along transects are spaced at regular intervals of starting at a random distance from one upland end. The quadrat interval will be determined based on the vegetation sampling method adopted: the visual percent cover method uses an interval of 15m; the point-intercept method uses a longer interval so as to generate a total of 25 quadrats for each upstream or downstream site (as *per*: Field Methods Manual: US Fish and Wildlife Service (Region 5) Salt Marsh Study, James-Pirri et al. 2002; available at <http://science.nature.nps.gov/im/monitor/protocoldb.cfm>). Measurements of the height of the tallest three individuals of each species of concern will also be recorded for each plot. All sampling is to be done around the time of maximum standing biomass (August through mid September).

4. Groundwater

Twelve groundwater wells are to be established at upstream and downstream sites for measuring changes in subsurface water levels. Wells are sited near selected vegetation plots (James-Pirri et al. 2002). Measurements are made in capped 50 cm PVC drilled pipes as the distance from the marsh surface to the top of the soil water level. Groundwater is measured at low tide for six collection dates per year (every two weeks June – August).

5. Birds

Bird monitoring will consist of point count surveys to detect sharptailed sparrow use and nest searching to document actual nesting in the marsh.

Bird monitoring will follow the protocol established in 1997 by Rachel Carson National Wildlife Refuge and Maine Department of Inland Fisheries and Wildlife. Birds utilizing the salt marsh will be surveyed during the breeding season, continuing the Rachel Carson NWR/Maine DIFW long-term monitoring project.

Breeding surveys are conducted using a point-count survey technique. Four points have been actively surveyed at Drakes Island marsh; an additional point is proposed to provide greater statistical power for comparing this area to a nearby control site. The Drakes Island Restoration Site will consist of WESM 45-48. A new point for 2004 will be added and named WESM 49. Four existing points and one new point downstream of the culvert will be used as a reference. Control points consist of WESM41-44. The new point in the control site will be called WESM 50.

Each “point” consists of a center and the surrounding area within a 100m radius. Location of birds observed within either the 0-50 meter or 50-100 meter radius will be indicated for a 10 minute point count time. Dr. Shriver’s statistical power analysis in 2003 indicates that for Saltmarsh Sparrows the 50 meter radius has both a high proportion of species detected and a low coefficient of variation; thus, we will focus on data collected at the 0-50 m radius... For Nelson’s Sharptailed Sparrows this provides a conservative, but adequate approach. Given a 50 meter sample radius we will ensure point centers are spaced such that they are separated by a minimum of 170 meters. Ideal point location would ensure a minimum of 200 meter separation of points. However, some of the previously established points in Drakes are separated by 170 meters. Points will not be located within 50 meters of a road or an upland edge.

While standing at the center point, all birds seen or heard in the marsh within a 100 meter radius will be identified with their location within either the 0-50 meter or 50-100 meter radius recorded. The amount of time a bird is detected within the 10 minute monitoring period (0-3 minutes, 3-5 minutes, and 5-10 minutes) will be recorded. An individual bird will be tallied only once even if it remains in the survey area for more than one time interval or moves to a new location within the point radius.

These surveys will be replicated 3 times during the breeding season. Replicates will be spaced a minimum of two weeks apart. Observations are only to be conducted between sunrise and 11 am EDT, June 1 through August 15. Surveys are not to be conducted during adverse weather conditions (strong winds or heavy rain). Data will be used to determine occupancy, relative abundance and estimate density.

To document density of sharp-tailed sparrow nests we will conduct a minimum of 3 walk-through sweeps in both the Drakes Island marsh and in the control (downstream) marsh. A minimum of one sweep is to take place during each of the three estimated nesting time frames (May 19 – June 19, June 19 – July 19, July 19-August 19). These sweeps will consist of a minimum of 5 field staff that will walk slowly through the marsh at low tide. When nests are located, they will be marked with a small wire pin flag, a small tide stick and GPS-ed.

Vegetation in the vicinity of the observation point will be determined using a 50 m line transect. A 50m tape will be extended from the point center toward the edge of the point on the pre-determined random bearing. Along the tape the number of meters (to cm) of each vegetation type will be recorded.

Additional procedure protocols are available through Kate O'Brien at the Rachel Carson National Wildlife Refuge (207-646-9226).

If staffing and budget allow, additional monitoring is proposed to determine nesting success at the Drakes Island and the control marshes.

6. Nekton

Fish and decapod crustaceans are to be sampled by using 1 m² enclosure (throw) traps (or comparable method) at 20 random locations in the impact and control areas. For enclosure trap sampling, nekton will be removed using a tightly fitting dip net, identified to species, measured, and tallied. Only the first 15 individuals of each species or category (adult *Fundulus heteroclitus* are sexed) will be measured (length or carapace width as appropriate). Enclosure traps are cleared with the dip net until 3 consecutive scoops are empty. Nekton sampling shall be conducted twice a year (late July – early August and late August-early September) during low tide. Both impact and control sites are to be sampled at the same time. It is permissible for sampling period to extend over 2 or more days, but it is NOT acceptable for the first and last sample days to be more than a week apart.

7. *Sediment*

Every effort should be made to coordinate with the Jackson Laboratory, NH (Dr. David Burdick) in order to support their on-going efforts at monitoring marsh elevation and sediment flux up- and down-stream of the proposed SRT location. SET readings should be taken annually or as otherwise indicated in standard operating protocol.

Appendix C

Decision Making Process

The Working Group will continue to operate by consensus, meaning that there must be no dissent by any member in order for the Committee to be considered to have achieved consensus. Thus, no member can be outvoted.

Members should not block or withhold consensus unless they have serious reservations with the approach or solution that is proposed for consensus. All consensus agreements reached during the Group's meetings are assumed to be tentative agreements until members of the Group agree to make them final agreements.

Situations, activities, or issues may arise that were not addressed in this Plan that affect the Drake Island Marsh. Successful resolution of such eventualities requires communication and coordination. The Working Group will continue to support this Plan after installation of the culvert and utilize the mechanisms set forth in the Plan to identify and resolve any eventualities that may arise.