Salt marsh revegetation through runnels webinar (Aug 20, 2020)

Presenters: Susan Adamowicz (USFWS), David Burdick (UNH), Wenley Ferguson (Save the Bay RI), Geoff Wilson (Northeast Wetland Restoration)

Questions:

Judith Weis –

- For a runnel to work, there must be some degree of slope so the water can drain off, right?
- ***In practice, runnels will likely have a slope towards the outlet (tidal creek or ditch). However, removal of a barrier that is 20 cm tall will allow 20 cm of drainage even if there is no slope to the runnel. The goal for the runnel is to partially drain water from the pools or saturated marsh. We expect and plan for normal marsh pools that once existed within the footprint of the drained area to reestablish as distinct pools on the marsh that can support normal flora (Ruppia) and fauna (fish and crustaceans). (DB)***

Georgeann Keer-

- Could you ask Susan or David - how would you quantitatively evaluate the soil hydroperiod? What monitoring technique would you use (loggers? Piezometers? wells?) to determine the hydroperiod is altered rather than relying on pools as indicators? ***I would use Piezometers (a water level recorder in a well that reflects the soil water but not the surface water). (DB)*** Susan A Response: I agree with Dave (a water level logger below the ground surface = piezometer). There's additional vertical variability in the ground water level due to tides (this is muted in the peat, but you can still see it) and hydraulic conductivity.
- Please ask Dave to show his last photo and where the runnel is. ***Actually, two runnels for this pool. The one on the western side turned out to be a clogged ditch that continued across most of the widest part of the pool.***

Terra Willi –

- Thank you David - I was wondering what benefits there are to compressing the peat to create the runnels instead of excavating the peat? ***Dave's response - Sometimes it is difficult to get permits to remove peat, even if it is to be used to build microtopographic features to support sparrows. This technique allows drainage for some, but not all, areas of oversaturated marsh. Peat excavation by machine is more appropriate for areas that require longer, wider runnels.***
- Susan A response: We should consider different methods in this way
    - **Observations & Site History** (e.g. site is waterlogged and no longer supports vegetation, there are few, some, lots of ditches, pools on the site are large and are rectangular, amorphous or fit like jigsaw puzzle pieces, etc.)
    - **Diagnosis** (e.g. water is not draining properly although overall elevation and position in tidal frame suggests it could. Conditions indicate a waterlogged subsidence trajectory)
        - **Treatment** (e.g. first step - lower zone of saturation to encourage plant growth)
            - **Tool** (e.g. runnel)
                - **Implementation design** – runnel location, dimensions and other factors that take site condition into account
                - **Implementation technique** (e.g. shovel, weighted wedge, LP vehicle; volunteers, restoration contractor) – *this is where Dave's comments would fit in…the implementation technique is suitable to the design, tool, treatment and diagnosis…also the permitting constraints, budget and other non-marsh constraints*

Judith Wies –

- How is a wide runnel (which we assume is "good") different from an old mosquito ditch (which we have always assumed is "bad")? ***Runnels are <u>shallow</u> features that drain standing water and the root zone of the peat (less than 15 cm) during the long low tides (good). The old mosquito ditch was typically 0.5m or greater in depth, which oxidizes the marsh peat and causes subsidence – even 7 meters away from the ditch. When these ditches are less than 20 meters apart (ours are typically 8 to 16 meters apart), they artificially depress the marsh surface elevation (bad). The new OMWM ditching was better, but typically these shallow features held water within a few cm of the marsh surface (bad) throughout the tide to support fish.***
  Susan A Response: I agree with Dave's response above. In fact, the FWS guidance on OMWM required the systems to be "closed" i.e. not connecting to tidal ditches/channels and therefore holding water on the marsh platform within the rooting zone of plants (and the surface). "Wings"/embankment extensions on ditch plugs also held water on the marsh surface leading to plant death and marsh collapse in that area.

Jenny Sanders –

- Do you have to stabilize runnel trenches? Do you have long term maintenance? For example do runnels collapse? ***We do not know the long-term responses or maintenance requirements of these features. They need to be followed for at least a decade. Wenley Ferguson has a better long-term perspective on these issues than I do.***
  Susan A Response: Runnels don't seem to collapse (per Wenley's examples) but do seem to fill in with debris. We've begun to evaluate somewhat broader and shallower runnel designs in order to dissuade crab activity and to decrease maintenance.

Luke Stuntz –

- What influences decisions on the overall shape of the runnels (e.g. straight vs curving vs a single bend)? ***The size and geomorphology of the pool/over-saturated area of the marsh and the receiving body (creek or ditch) need to be considered. We want to avoid 'firehosing' the pool contents into an open embayment and we prefer a longer drainage route than a shorter. If you have a project in mind, please seek guidance from experienced practitioners.***
  Susan A Response: I agree with Dave. Runnel location, design, shape and length are custom-made to each mega-pool/oversaturated area.

Georgeann Keer –

- Wenley what technique did you use to monitor changes in waterlogging?
  Susan A Response: Beth Watson (Drexel University) has conducted monitoring at runnel sites in RI. I believe she used water level loggers. Other measures might include fresh (wet) vs dry weight. But not all project partners have capacity for this type of monitoring.

Allison Bowden –

- How many acres in the region have been treated to restore hydrology, and how many acres are needed to prevent the sparrows from the crash coming in 10 years? ***Excellent questions. Working with the USFWS, Trustees and Mass Fish and Wildlife, we have begun to treat over***

100 acres with a holistic, long-term 'SMARTeams' approach to restoring sparrow habitat. We have 400 acres in various stages of fund-raising and permitting.

- This is from an email from Geoff Wilson:

  To paraphrase the management strategy:
  If we can apply that training and execution strategy to an area like the Great Marsh:

  - Five property managers account for fifty percent of a 25,500 acre estuary.
  - If all five property managers are able to complete a 100ac 4Tier Design project in priority locations for Saltmarsh Sparrows every two seasons, that would account for the restoration of 2,500 acres in the 10 years remaining before the 18.6 year Metonic tidal cycle begins to raise the average height of each daily high tide.
  - 2,500 acres in the estuary that accounts for 50% of the total Massachusetts population of 6,000 Saltmarsh Sparrows will support approximately 3,000 sparrows.
  - More or less, that effort would account for the management of 5% of the total population of 60,000 Saltmarsh Sparrows.

- Wenley, can you please explain why you choose 12 inches as a max runnel depth?

Wenley's response: Runnels are not as deep as ditches, ditches in our region extended 2 to 3 feet dependent upon the tidal range. We do not need to stabilize the runnels. We are digging into peat that had been formerly vegetated and the former roots help stabilize the sediment. Runnels will fill with unconsolidated sediments and need to be maintained but I would not say that they collapse.

Bri Benvenuti -

- How do you assess the marsh slope/tilt to determine if a runnel will be appropriate? ***As you know marshes are relatively flat, so slopes across the marsh are small. Observation of flooding and draining during spring tides can provide insight to marsh slopes, but for short runnels, this should not be an issue.***

Stefanie Giallongo -

- Do you find these projects are difficult to permit? Or how are they typically permitted? ***We are working with permitting agencies in Massachusetts and Rhode Island to build up the necessary scientific basis for the restoration work. Ditch remediation using hay and compression runneling are less difficult to permit because there is no earth excavation or heavy equipment on the marsh.***
  From Susan A: Permitting intensity varies from state to state. MA is perhaps the most stringent. Successful projects are the ones that invite the permitters to the table EARLY AND OFTEN. In MA, the Great Marsh Field Team has had regular meetings with permitters and has provided extensive explanations of the new approach to marsh restoration (under the SMARTeams 4-Tiered Approach).

Woody Woodrow -

- Great approach! Nearly real-time adaptive management.

ALAN ANACHEKA-NASEMANN

- Will you be able to furnish all slide shows, as well as certificates of attendance to give credit toward Professional Wetland Scientist credentials?
  From Susan A: We have the presentation on YouTube.
  https://www.youtube.com/watch?v=VnJ138SmyDE
  We're currently in the process of developing a curriculum not just for CE credits, but to provide tangible skills.

Gina Purtell -

- I am wondering if permitting is an issue in MA. I've heard that our regs are very protective of salt marsh manipulation. ***Yes, it is difficult to obtain permits for sediment excavation or sediment additions to salt marshes in Massachusetts.***
  See comments above.

Ellen K Hartig -

- Thank you all for this inspiring set of presentations! Best, Ellen Hartig, New York City