

Ash Creek Beach Enhancement

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SCOPE OF INVESTIGATION

At the request of Ash Creek Conservation Association (ACCA) a review of the plan prepared by the City of Bridgeport for the Ash Creek Beach Enhancement Project was conducted.

The objectives of this review were to:

- 1) Assess the appropriateness of the “restoration concept” by the City to existing conditions (with regard to recent disturbances to the site)
- 2) Assess the implementation of the plan to date of this report
- 3) Provide recommendations as to enhancements to the project plan
- 4) Provide appropriate recommendations as to any future restoration work on the site.

The written material assessed was provided to us on October 5, 2011 and included a 42 page undated report prepared by the City of Bridgeport. Field visits to review implementation of this plan were conducted during the week of October 10, 2011.

SUMMARY

The City of Bridgeport recently proposed and then implemented a restoration project to re-establish a dune environment over time along the “sand spit” at Ash Creek at St. Marys by the Sea. We were asked by the Ash Creek Conservation Association to professionally review the plans and implementation.

There were several design factors identified during the course of our review that were lacking in the plans. These design factors merit consideration. They include:

- The level of disturbance due to recent machinery and storms was greatly larger than the area being restored.
- The site could be enhanced with a better sense of community aesthetics.
- View shed and a realistically sustainable level and pattern of human usage should be considered.

These factors and issues can be addressed without sacrificing environmental values.

Our opinion is that the plans designed by the City represent a good first step towards restoration of that landform. However, the plan could be expanded considerably to create a much more robust restoration and provide substantial ecological uplift to the Ash Creek watershed.

The following pages offer enhancements to that plan that we believe will strongly improve the current restoration project. We also offer a restoration concept master plan in the form of a graphic, intended to stimulate thinking and discussion between stakeholders about what could be done with the site in the future.

Objective 1: The Restoration Concept

1. Introduction to the landform:

The St. Marys “sand spit”, despite its label, is not really a sand spit. Classic sand spits extend from land into large areas of open waters, and are of recent origin. The St. Marys landform, while extending into the open waters of Ash Creek, is better described as an undeveloped remnant of a barrier beach system initially formed over long periods of geologic time but maintained by current conditions.

The landform is comprised of an unconsolidated mixture of gravel, cobbles, and sand. The watersides of the landform are subject to daily tides, and function as shorefront beach. The middle of the landform is bermed above mean high water, and is subject to tides and flooding only during storms. A small portion of the beach portion, at its eastern

end extending northward, is more representative of a classic sand spit. The entire landform is subject to salt spray and drying winds, limiting what can grow to a relatively small group of salt tolerant vegetation.

The major geologic function of the landform is to serve as a protective barrier to the gentler environment of Ash Creek. The landform also provides coastal dune habitat for native species. The landform provides these functions by physically acting as a barrier to the wave and wind energy from Long Island Sound during normal tidal and storm events, and therefore dissipating these energies.

For these functions to continue there needs to be a stable surface for sediments to accumulate – a mixture of dunes and vegetation - to break up the waves and wind associated with high magnitude storm events such as the recent Tropical Storm Irene, and the routine wave impacts associated with the tides.

Sand dunes are naturally occurring coastal features that play an essential role providing the stability needed to maintain the larger landform. Dunes provide a first line of defense against coastal storms. They absorb the energy of storm waves and provide sand to the beach during periods of erosion. The classic dune environment includes three zones; the “fore dune” which is the most seaward side, the “dune crest”, and the “back dune”. In the case of St. Mary’s, the back dune is the sloped area closest to Ash Creek. Vegetative requirements for each of these three zones are slightly different.

The St. Mary’s landform in its entirety is the remnant of a more extensive barrier beach system which was likely permanently separated from Jennings Beach by the installation of a jetty and channel dredging. Despite this significant manipulation, the site still serves an important role as an integral part of the Ash Creek Watershed for the following reasons:

- It protects important intertidal marsh habitat in the creek from Long Island Sound wave and wind action;
- It is a breeding ground for Atlantic horseshoe crabs (*Limulus polyphemus*);
- It is a stopover location and feeding ground for migratory shore birds;
- It stabilizes the shoreline and prevents inland beach erosion;
- It provides sandy intertidal habitat for fish and shellfish; and,
- It has is a resilient population of native coastal plants.

2. Restoration Concept:

On Page 8 of the project plan, the City lays out their restoration concept and main project objective.

To quote (emphasis added): “*For the enhancement of a mixed sandy flat community of cobble and shore berm, in order to re-establish a dune environment over time along the “sand spit” at Ash Creek, the City of Bridgeport proposes the use of a mix of American Beach Grass, Beach Plum, Sand Cherry, and Staghorn Sumac.*”

We are in agreement that a dune environment would be appropriate to the St Mary’s landform.

The strategy of the project plan appears to be that Beach Grass be planted along the lower portions of the planting area in the fore dune area. Beach Plum, Sand Cherry, and Staghorn Sumac is to be planted in the higher areas, towards where the dune crest would be. The latter three shrubs are fast growing and would provide an immediate opportunity for soil to be stabilized, allowing time for the Beach Grass to expand its root system into the interior of the planting area. Meanwhile, future storm events would bring new sources of sediments, which would be trapped by the Beach Grass and deposited around their base, leading to the natural formation of sand dunes over time.

Since the dunes are intended to form over time, grades were not immediately altered in preparation for the planting. Consequently, no significant source of sand was relocated to the site to replace the terrain which was stripped and flattened in many places during the recent disturbance by the City and subsequent storm events.

It is our understanding that the earlier restoration of the site by Fairfield/ACCA (under a permit granted by DEP for the dredging and with cooperation by the City of Bridgeport) a few years back involved the sculpting of the site to meet intended grades, and a significant level of sand was relocated to the site to meet those grades.

Our assessment of this strategy from the perspective of Restoration Ecology is that the strategy is in fact sound, provided the planting plan is implemented correctly. However, we also recognized that there are also major opportunities for improvement of the plan which will greatly increase the possibility for success of the restoration objectives.

We note that this strategy is in contrast to the strategy for restoration of the site implemented several years ago. In our view, both strategies would eventually meet restoration goals. The difference is primarily in terms of time and budget – the proposed strategy will require a longer time period and smaller budget to reach the point of success than if the site was sculpted.

We do note the use of Staghorn Sumac on the plans.

Staghorn Sumac is an easily established, fast growing, sapling sized woody plant. It can grow as high as 10-15 feet. Staghorn Sumac is an excellent supply of food and cover to local wildlife, especially birds. However, we also recognize that one of the stated reasons for the disturbance by the City a few months back was that several vocal members of the community thought the original restoration plantings were “weedy” and desired a more

ornamental aesthetic to the site. If aesthetics are a concern, we believe that there are **additional** native planting materials that can be used to satisfy both conservation and aesthetic objectives simultaneously, such as herbaceous material such as Sea Lavender, Seaside Goldenrod, Switchgrass, and possibly New York Aster. These species have both conservation and aesthetic appeal.

Staghorn Sumac can grow as high as 10-15 feet. While this makes the tree desirable for birds and other wildlife, if the trees do grow that tall, they may screen out the nearly panoramic views that characterize this stretch of landscape. What makes the St. Marys landscape unique is that one can see both the Long Island Sound and the tidal Ash Creek from a variety of angles on the landscape.

It is our recommendation that both aesthetic appeal and viewshed be included as values to be considered with this project. Our experience with conservation projects is that it is always better to tie the projects in with community desires whenever possible to maintain positive support for the endeavor.

We also note the use of Beach Plum and Sand Cherry. In certain areas, the establishment of a Beach Plum and Sand Cherry shrubland may undermine the existing herbaceous perennial native vegetation, which appear to be thriving on the site in the areas that are undisturbed by human foot traffic. It should be noted that the herbaceous plants that still exist on the site are a rarer and therefore more valuable plant community than the proposed shrubland. They could be enhanced at minimal costs. We recommend that the microtopography and existing biogeography of each planting site be closely examined before installing the individual plants.

3. Scope of the Restoration Concept:

The plan (p8) notes that approximately 10,000 square feet will be restored.

However, in reality the City impacted a relatively larger amount of land area during their recent operations, and additional areas were damaged due to the storm as a consequence of the City's initial disturbance. In total, the area of impacted land is the neighborhood of 45,000 square feet (based on aerial photo analysis and field inspection).

The recent impacts from the City included:

- Destruction of important established foredune and backdune habitat;
- Removal of woody debris and stones from the marsh-side of the site;
- Tire ruts bisecting the site; and,
- Destruction of intertidal salt marsh habitat.

The site has also been negatively impacted in the last year by visitors and by the recent storm events.

The scope of the current plan is limited to the smaller area of 10,000 square feet, and as a result does not adequately address correction for the recent impacts.

It is recommended that the plan be expanded to address the full scope of the recent impacts. There are areas such as the tire ruts and other areas to the north of the planting zone that have not been adequately addressed in the plan. Furthermore, there is also ample room on the site for additional mitigation to offset some of the anticipated destruction of the intertidal zone that will likely occur if the City continues to open the beach area up to recreation under a multiple use philosophy.

Objective 2: Plan Implementation

We note the following concerns regarding the implementation of the plan (as observed during the field visit early in the week of October 10, 2011).

1. Plant Spacing:

The plans (p18) specified 18 inch spacing for planting Beach Grass on moderate non windy sites, 12 inch spacing for windy sites, and 24 inch spacing for very stable non windy sites.

It appeared that plant spacing on the site exceeded 36 inches in many places. At this spacing, without additional plantings, density would be insufficient to meet restoration objectives.

Based upon our own experiences in restoration, we would recommend two consecutive winter plantings of beach grass spaced at 18 inches on center. Ideally, plants would be installed multi-year – i.e. any gaps that occur after planting due to later site conditions would be filled as a matter of yearly routine.

We also believe that the extent of the planting zone should be larger than what was specified on the plans (as discussed in the previous section) – but also note that it appeared that the scope of the plan was implemented in approximation of what was actually specified.

2. Fence:

The purpose of a fence is to demarcate the planting area for future monitoring, and to direct foot traffic away from the planting site.

Two types of fencing were used to separate the planting zone from the rest of the site – Construction fence and silt fence. Neither of those fence types are of a material sound enough to withstand the windy conditions that are expected to occur on this site. The fence materials also lack aesthetics, and as such may express a message towards the general public that is at cross purposes to what is intended.

The current fencing is therefore not suitable to meet its intended purposes. It is recommended that a more durable and more ornamentally suitable material be used, and that this fence be anchored more securely into the substrate. We recommend using the

same type of dune fencing that is commonly found throughout the eastern seaboard (wooden pickets with thin wire mesh) to enclose the planting area.

3. Planting depth

Planting depth was specified in the plans at 8 inches deep. It appeared during the site visit that the planting depth was adequate.

4. Plugs per hole

Two to three culms (plugs) were specified per hole for the Beach Grass. It appeared that less were planted per hole. However, it is unknown how much the plant materials had been grazed upon by wildlife (if any) between implementation and our field visit. We recommend at least 2 plugs per hole, and that follow up installation occur to meet that goal.

Objectives 3 & 4: Enhancements to the Current Plan and Future Recommendations

It is our opinion that any ecological restoration activities at the site should contextually fit within the ecology of the Ash Creek watershed, as well as to account for the reality of some public use of the site in the future.

The current restoration plan, though conceptually sound for the small area it is intended for, does not fit in with the site. Nor does it balance public use of the site with environmental protection in a manner adequate to prevent future degradation of the site.

Our concern is that if the site is not adequately restored to a level to protect it from the more obviously anticipated natural or human forces, there is a legitimate risk that in the future, there may not be significant levels of ecological function or even a physical site left to protect.

The following list of recommended options can be implemented in order to address our concerns.

From a holistic perspective, these options collectively constitute an overall ecological master plan for the site, which can be implemented over time. The implementation of these recommendations will allow public use, improve local ecology, provide neighborhood beautification, and allow the site to serve as an educational resource to the community.

Recommendations:

1. *Establish a dense Beach Grass population over more of the site.* American Beach Grass is excellent at promoting shoreline stabilization. A multi-year planting schedule is recommended that uses healthy, local genotype plugs to quickly colonize the site. A multi year planting schedule would entail Beach Grass to be planted each winter as needed, and spring or fall plantings for other species.
2. *Establish back dune meadow grasses in the rear of the site.* In addition to Beach Grass, several types of native coastal herbaceous material should be established to create a meadow in the northern half of the Site. These plants will establish a biodiverse vegetative community that will increase habitat quality for birds, butterflies, dragon and damsel flies, and to bring more beauty into the area. Plants that would be recommended in this area include Sea Lavender, Seaside Goldenrod, Switchgrass, Saltmeadow Cordgrass, and possibly New York Aster.
3. *Plant additional trees where there are already trees.* Additional coastal species of trees could be planted by the existing pine trees to improve bird habitat. Trees may include Pitch Pine, Eastern Red Cedar and Serviceberry.
4. *Restore intertidal marsh.* The north side of the site is capable of supporting a healthy cordgrass population that would stabilize the shoreline and improve intertidal habitat. This could qualify for mitigation for anticipated impacts due to increased human activity at the site. It would also improve the overall ecological integrity of existing spartina marsh within the larger watershed.
5. *Install beach fencing and establish clear lines for pedestrian circulation.* Picket and wire beach fencing should be placed to demarcate paths so pedestrians and dogs do not damage native plant zones. These fences are inexpensive but still aesthetically pleasing. Walkway zones could be encouraged by default by the careful placement of the fence, or designed through further study.
6. *Remove invasive species.* Invasive species pose a serious threat to any native landscape. Routing monitoring and, where necessary, removal of invasive species should be performed to ensure the success of the native plant community. Current plans lack stipulation for a monitoring and removal plan for invasives.

7. *Create maintenance and monitoring plan.* Restoration projects must almost always be managed and monitored in order to be successful. A well developed maintenance and monitoring plan will establish a clear methodology for the success of the restoration. A typical maintenance and monitoring plan should have the following components a) the establishment of a set of criteria to define success; b) a monitoring protocol; c) a maintenance schedule; d) responsible parties.
8. *Improve and define public picnic area and pathways.* By defining the public picnic area and trails, conflicts between people and the site's native vegetation will be reduced. Because of its waterfront location, the site is an important public amenity within the Ash Creek Watershed. A well thought out pedestrian circulation system that is complimented by a formalized picnic area with trash receptacles, which would benefit both people and their environment.
9. *Install environmental education signage.* If restored, this site could provide an important educational resource to the community where people of all ages could visit and learn about coastal ecology through interpretive signage. Signage would also inform site users about the fragile nature of native plant communities, thereby discouraging littering and straying from footpaths.
10. *Temporarily close area during horseshoe crab breeding times.* Horseshoe crabs breed on sandy shores during spring and early summer full and new moon high tides. This is a conflict with the existing pedestrian circulation on the site. It is recommended that the site be temporarily closed by fencing and temporary signage to protect newly laid eggs.
11. *Future use of the site by residents should be integrated with the goals and objectives of any future park master planning.* From an environmental planning perspective, it makes no sense to encourage swimming if the water currents make this activity unsafe. Nor does it make sense to encourage additional picnicking or passive recreation throughout a sensitive site such as this if adequate areas are already suitable within the walking distance in the neighborhood. Future study of this is needed. If picnicking is allowed, it would make the most sense to limit this activity to the raised area adjacent to the road, with a view of the water and a biologically diverse native landscape. We would recommend an area of 2000-3000 square feet for the picnic tables to be located in, subject to further study.

Thank you for the opportunity to comment.
Respectfully submitted,

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About the authors

Steven Danzer Ph.D.

Dr. Danzer is principal of *Steven Danzer Ph.D. and Associates LLC*, offices located in Stamford, Connecticut. *Steven Danzer Ph.D. and Associates LLC* is a locally based consulting firm which specializes in environmental impact analysis, natural resource planning, and the interface of hydrology and ecology. The firm was established in 1999.

Dr. Danzer has been actively involved in the Natural Resources Management field since 1991. He received his B.A. in 1987 from Cornell University, and holds a PhD from the University of Arizona in Natural Resource Studies. Dr. Danzer is a listed soil scientist, a credentialed Professional Wetland Scientist, an erosion control specialist, and a consulting arborist. He has held a variety of regulatory and private sector positions involving science, administration, and regional regulatory policy. In addition to serving the private sector, Dr. Danzer often consults for land trusts, conservation associations, and watershed planning groups, and is currently working on a watershed plan for the Byram River in Greenwich, CT and Westchester County, New York.

Bryan Quinn

Mr. Quinn is a landscape architect and manages the New York office of *Applied Ecological Services, Inc.* *AES* is a national ecological consulting company with over 30 years of experience in restoration. *AES* offers consulting, construction, and nursery production services throughout the United States.

Mr. Quinn has worked extensively on public landscapes of ecological importance. He specializes in finding creative, cost-efficient design solutions that restore degraded landscapes. Prior to working in the private sector, Mr. Quinn managed environmental projects for the New York City Department of Parks and Recreation. He holds a Masters in Landscape Architecture from the Rhode Island School of Design, is a Returned Peace Corps Volunteer, and has worked at various ecological field stations throughout North America.

APPENDICES

APPENDIX I Attachment

Graphic – Possible Concept Restoration Plan

APPENDIX II Attachment

Three photos of the site taken on 10/11/2011

APPENDIX I

Potential St. Mary's by the Sea Ecological Restoration Plan
*concept only, not for construction



Appendix II



