

**A Concept Plan
for the
Ecological Restoration of Northwest Creek**

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Prepared for the Alliance for the Restoration of Northwest Creek

by

The Terrapin Institute and Research Consortium, Inc.

Marguerite Whilden

mwhilden@comcast.net

410 370 9171

with support from the

Maryland Department of Natural Resources

Restoration Services

Kevin M. Smith

kmsmith@dnr.state.md.us

410 260 8797

The goal of this effort is to restore and maintain the ecology of Northwest Creek.

Preliminary expectations for restoration include:

1. reestablish the tidal interface near previous opening;
2. restore or enhance three miles of tidal shoreline;
3. improve water quality in 100 acres of shallow water; and
4. establish sanctuary for a wide range of species.

Introduction

Residents of Northwest Creek reported a major decline in water quality and quantity in the creek in July 2007. Over the years, from 1986 to 2003, state agency personnel responded to eleven incidents of fish kills in Northwest Creek. Creek levels had fluctuated during drought years resulting in extreme temperatures, algae blooms, and eutrophic conditions. In July 2007, personnel from the Department of Natural Resources and the Department of Environment visited the creek to assess the problem.

Preliminary agency recommendations included five options to restore and recover the creek. (Appendix 1.) On August 28, 2007, before a joint evaluation meeting of State and federal agency personnel, residents of Northwest Creek presented a request to modify and structurally stabilize the tidal interface between Northwest Creek and the Bay. No recorded minutes of the August 2007 meeting are available. However, the position of the Department of Environment was provided in a letter from the Secretary of MDE. (Appendix 2).

Tidal embayments or ponds such as Northwest Creek are important nursery grounds for a wide range of aquatic species. These waterways are sometimes poorly understood and underappreciated. In the interest of restoring vital fisheries habitat and advancing ecological stewardship, the Terrapin Institute offered to explore alternatives to restoring Northwest Creek in cooperation with the residents of Northwest Creek and the Department of Natural Resources. As a means to address the situation in September of 2007, a group of residents convened the Alliance to Restore Northwest Creek with the goal of ecological restoration. The Alliance entered into an agreement with the Terrapin Institute to prepare the concept plan. (Appendix 3).

Beginning in late October 2007 the Terrapin Institute gathered as much additional information and documentation as possible within the time and budget allowed. The Department of Natural Resources provided additional topographic data, soil analysis, and graphics. Herewith are the results of the investigation, the final report, the Concept Plan (Figure 1 and 2), and the hydrographic survey (Figure 17).

Brief History of Northwest Creek

Northwest Creek was once known as Chews Creek and up until the later 1960s was surrounded largely by agricultural activities. It is one of many such tidal creeks or embayments found along the edges of the Chesapeake Bay. At the southern end of Kent Island there are at least ten similar bodies of water. Northwest Creek may be among the largest such creeks on Kent Island, comprising approximately 100 acres of water surface and nearly three miles of shoreline.

A review of maps dating back to 1887 indicates a relatively stable body of water essentially the same in configuration, area and length of shoreline. Unlike other tidal creeks nearby which support larger proportions of tidal or tidal/fresh wetlands, Northwest Creek has retained its open water character and an intermittent connection to the Chesapeake Bay. The most notable difference between the early depictions and present day is the shifting of the land mass at or along the tidal interface (Figure 6).

Nineteenth century map makers depicted an island land mass surrounded by a fringe of tidal wetlands and possibly two outfalls between the Creek and the Bay (Figures 3 and 4). The 1904 U.S. Geologic Survey map (Figure 5) includes two islands on the creek side. According to later and presumably more accurate map products from the U.S. Geologic Survey and other sources, the land mass on the creek side appears to have shifted, eroded or retreated significantly. Based on recent topographic data and natural features onsite, the configuration of fast land closest to the Bay side, i.e. Bay shoreline, appears to have remained relatively constant over the last 100 years.

Other cartographic and photographic evidence would further suggest a continuous tidal influence in Northwest Creek. At times the capacity of the outfall has been severely compromised and during heavy rains, storm conditions or extreme tides, the outfall has been significantly and abruptly breached. The beach strand at the outfall path is restored by accreting sands and the stream follows a consistent course.

Anecdotal accounts from lifelong residents suggest that prior to subdivision Northwest Creek was utilized by local residents for waterfowl hunting, muskrat trapping, carp fishing, and boating. As was typical in the agriculture community, passive and respectful passage over privately owned lands was commonplace and permitted by land owners. Also, Maryland State law declares that the "waters of the State" and all lands lying below such waters are in the public domain. The use of Northwest Creek by the public diminished as surrounding farms were subdivided and sold in smaller parcels.

Brief History of Northwest Creek (continued)

Photographs produced for the U. S. Department of Agriculture proved to be especially useful in tracking historic fluctuations along the Bay shoreline at the subject site. A series of photographs beginning in 1935 to 1978 depicts essentially the same waterway flowing from Northwest Creek through the tidal marsh and ending at the confluence with the Bay. In three out of six photographs the outfall is clearly open and unrestricted; in other photographs the opening to the Bay is not obvious. In the latter group of photographs the water course is impeded by accreting sands and ends at the beach strand.

The lands on the northern shore of Northwest Creek were subdivided in the late 1950s and the first residential units were constructed in 1968. A lifelong resident who worked with the original land developer in 1968 recalls significant man-made alterations to the beach area and in the creek which reportedly closed off the creek from the Bay. None of these modifications were structurally stabilized and the precise point of the alteration or closure cannot be relocated. The same resident reports that four or five years later in 1972 the alterations were reversed and the opening to the Bay was restored. These activities may have contributed to the shift in land mass as noted on the USGS maps of 1937 and 1978 (Figures 6 and 7).

Beginning in the 1980s, the lands along the eastern edge of Northwest Creek were subdivided. Under the new rules of land development, large parcels were left undeveloped in community ownership and management of storm water was required. A significant feature in the Northwest Creek watershed is a storm water management pond. The pond is believed to have been constructed in the early 1980s, may be eleven feet deep, and designed to handle a significant rainfall event. The pond is separated from the creek by an earthen bank five feet above the creek bed. Overflow from pond to creek occurs over land. In 2005, the pond was augmented with a dry hydrant to provide water supply for fire control. For the most part the impact of the pond on the ecology of the creek appears to be benign. However, during periods of drought the pond may intercept up to one fifth of the surface water runoff which originally entered the creek. In response to the 2007 drought the water surface of the pond dropped, but a substantial amount of water remained available for wildlife and fire control.

The lands along the southern shore of Northwest Creek were subdivided in the early 1990s. These lots contain "private tidal wetlands". In contrast to all other lots adjacent to Northwest Creek, private ownership of these particular lots extends beyond the upland or fast land and well into the creek. Ownership of these submerged areas conveys in perpetuity.

Current Conditions

Shorelines

The majority of the creek's shoreline remains in lawn, eroding verticle banks, and intermittent vegetated fringe wetlands. Approximately one third of the creek shoreline has been stablized with varying degrees of separate stone revetments placed at the water's edge by individual private property owners. There are eight piers and two ramps in place at this time. Recreational activities on the creek are limited to property owners. There were no accounts of previous dredging or major structural remedial measures.

Public Access

Currently there are no public lands adjoining Northwest Creek. Except for the land below mean high tide along the outfall waterway path there are no public lands, public access points or public boat ramps on the creek. A communally owned parcel provides property owners in the community of Tower Gardens access to the Bay shoreline, beach and the creek. Access over water would be limited to shallow draft boats and jet skis capable of navigating the tidal outfall when open or crafts that can be launched from surrounding private properties.

Fauna

Accounts differ as to the species found in the creek in recent years. The most comprehensive documentation is the fish kill report prepared by the Department of Environment (MDE) included in Appendix 4. These records began in 1986 and indicate that a range of brackish and fresh water fish species have utilized Northwest Creek.

The MDE report includes incidents of prolonged ice cover, algae blooms and a general process of eutrophication within the creek, all of which contributed to the various fish kills. Despite these sporadic episodes, apparently there is sufficient hydrologic exchange within and between the creek and the Bay to support an estuarine ecological system. Agency observers indicate that the tidal connection is fully restored after heavy rains, i.e. water volume increases, leaves the creek through the lowest point in the outfall area and spills into the Bay. Likewise, during high tides, Bay water enters the creek over the beach at the low point in the outfall.

Obviously several important aquatic species reach and use Northwest Creek. As a result, the creek has become a feeding ground for waterfowl, raptors, and shore birds. According to the MDE Fish Kill Reports, the concentration of bird life, or waste from birds, may be contributing to the decline in water quality. The only bacterium specifically identified in the fish recovered from Northwest Creek is *Flexibacter columnaris*, in May 2000.

Another concern is the concentration of carp, a non-native fish species known to affect submerged aquatic vegetation and increase turbidity. Carp may tolerate extremes in temperatures and water quality and as such may be an indicator of ecological imbalance, i.e. increased turbidity or other disturbances. A possible benefit of the 2007 drought and resulting drop in water levels in Northwest Creek is the reduction of the resident carp population.

Substrate

As with these types of waterways there is a constant process of siltation over the years from natural shoreline erosion, agriculture, and land development activities. Soils within the watershed may be becoming more stable as residential lots are developed, shorelines are vegetated, and tree cover is improved. Based on the soil samples, in various sections of the creek there may be as much as three feet of silt deposited in the deepest part of the creek. This is further reported in Figure 18. As demonstrated by the hydrographic survey (Figure 17) the creek bed is relatively flat. Contours within the creek range between zero mean low water (MLW) to one foot above MLW.

Tidal Interface

In a series of recent photographs (Figures 8, 9 and 10) beginning in 1995, an intermittent opening to the Bay or tidal interface is clearly present. The direction of sand transport, accumulation or littoral drift is long shore, both northerly and southerly. A major sand source appears to exist just off shore in a parallel shoal and may be present along the entire stretch of shoreline. Although unconsolidated and unstable, there appears to be a continual source and transport of sand along the subject beach area and tidal outfall point. While these natural dynamics may appear to be an impediment to the health of Northwest Creek, in actual fact they may be a tourniquet for its lifeblood - water.

The hydrology of Northwest Creek relies on fresh water input, i.e. rainfall, groundwater, and natural tidal inflow during high astronomical or storm tides. As indicated in the hydrographic survey (Figure 17), a majority of the creek bed is at or above mean low water vertical datum. Therefore this intermittent but persistent accretion at the tidal outfall may be essential to maintaining adequate water levels in the creek throughout the hydrologic cycle. Otherwise, there may be a continuous flow through the outfall and possibly no reserve of water in the creek except at high tides.

Northwest Creek may also serve another valuable function - a de facto reservoir or natural sanctuary for aquatic plant and animal species. In drought years, albeit shallow and compromised, a volume of water is contained within the boundaries of the creek. Also, during extreme low tide events, the natural obstruction provided at the tidal outfall helps to preserve or stabilize water levels in Northwest Creek. In spite of these sometimes aggressive and unpredictable estuarine dynamics, Northwest Creek has established a rather eloquent equilibrium which is capable of supporting a wide range of flora and fauna.

Assessment of Ecological Impairments and Impacts

2007 Precipitation and Drought

Perhaps the most influential factor on Northwest Creek during 2007 was the drought. According to several residents interviewed during this investigation, the water level in Northwest Creek had dropped in previous years, but no one could recollect conditions worse than those experienced in 2007. Although the affects of the 2007 drought were evident in Northwest Creek, according to the U. S. Drought Monitor, the drought of 2002 was far more severe, if not exceptional, on a regional scale.

Onsite, real-time precipitation data is available from www.wunderground.com. Prior to the 2007 summer season a major rainfall, nearly 2 inches, occurred on April 15, 2007. Precipitation remained average for the remainder of April and during May 2007. The last major rainfall event of the spring (nearly one inch) occurred on June 3, 2007, after which precipitation dropped below normal and did not recover until October 2007. The last major rainfall in early June 2007 occurred over a relatively brief period, may have exceeded natural absorption capacities and caused the creek to leave its banks at various points around the shoreline. Residents in the upper reaches of Northwest Creek observed saturated conditions in areas which are normally dry and stable.

On-site sewage treatment systems and water supply

An assessment of sewage treatment in the Northwest Creek watershed is beyond the scope of this investigation. In correspondence from the Department of Environment, Northwest Creek communities' representatives are advised to address contaminant issues presented by onsite sewage treatment systems in the watershed. Despite efforts to acquire documentation supporting the contaminant concern, to date no such data have been made available. No specific water quality data were provided by government agencies. Apparently the only detailed information regarding water quality is from the fish kill responses and reports conducted by the Department of Environment. No data were discovered or made available which would indicate contamination or failure of individual residential water supply wells.

Shoreline Alterations

An estimated one third of the shoreline within the creek has been altered primarily with stone revetment. Other man-made alterations or encroachments such as piers, ramps, and outfall pipes are comparatively minor. Some riparian buffer remains in the upper reaches and along those lots owned in common.

Sedimentation

Deposition of sediments is a natural process and among several ecological functions allows for sustained wetlands, shorelines, and riparian buffers. Sedimentation is accelerated with agriculture and residential development activities. The gradient of Northwest Creek, which once may have facilitated a more thorough hydrologic exchange, has been diminished by an excessive rate of sediment deposits. The overall volume and hydrologic capacity of Northwest Creek has been reduced by an abundance of displaced land based soils.

While the vertical elevation in the outer most reaches of the creek may be at or above mean low water there is not sufficient gradient to facilitate adequate drainage. The creek bed appears to be uniformly flat with little relief except for the submerged area adjacent to the tidal interface. The creek can no longer drain by gravity alone and exchange between the creek and the Bay is compromised.

Man-Made Alterations

According to anecdotal information over the years there have been several attempts by residents to either maintain an opening at the tidal interface or keep Northwest Creek separate from the Bay. Neighbors have disagreed over what the natural character of the creek was or should be. Some residents have taken matters into their own hands and endeavored to preserve and restore the area. Despite the various efforts over the last twenty years, apparently none have been authorized or structurally stabilized.

Despite human intervention, extreme tides and storms, the tidal interface and the stream path to the outfall remains essentially unchanged. Further evidence is in the aftermath of Hurricane Isabel of 2003. Receding flood waters escaped the confines of the creek and followed low lying areas for the shortest route back to the Bay. According to photographs taken after the storm, the entire land mass separating the creek from the Bay was inundated yet remained intact. The stream path through that land mass was littered with storm debris and further constricted. Several logs remain in the waterway.

The most recent man-made alteration may have occurred in the late spring of 2007 when apparently intense rainfall overburdened the creek's capacity. According to reports from residents, sometime in late May or early June 2007, as a means to reduce water surface elevations within the creek, the outfall to the Bay was mechanically opened. Apparently once water began to flow through the altered channel, the unconsolidated sands quickly gave way and the outfall widened and deepened in excess of previous dimensions. Reportedly water velocities at the outfall were significant and drainage of the creek was abrupt. Over the next 24 hour period water surface elevations within the creek reportedly dropped two feet. Since the alteration was not calculated, gradual or stabilized it may have allowed too much water to drain and caused a loss in the creek's reserve water supply. If rainfall had been normal over the remainder of June and July 2007, water volumes in the creek may have recovered sooner.

Possible Remedies for Ecological Recovery

Five options for recovery have been prepared by the Department of Natural Resources and were presented to the Department of Environment (MDE) for preliminary review (Appendix 1). The MDE responded with further suggestions (Appendix 2). The purpose of this subsequent investigation is to devise additional or alternative remedies which all residents of Northwest Creek watershed can support, implement and sustain (Appendix 3). It is imperative that these additional options or suggestions be compatible with state and federal policies, most of which require authorization from either State or federal authorities. Furthermore, if financial assistance is expected the selected options must demonstrate a sustained public benefit. Ecological enhancement is considered a public benefit and therefore is the focus of this report and concept plan (Figure 1 and 2). Enhancement of Northwest Creek is designed in two phases, Shoreline and Riparian Enhancement (Figure 1) and Shallow Water Enhancement (Figure 2). Local residents are expected to take ownership of this effort, provide stewardship to secure the success of the selected proposal, and sustain the restoration over the long term.

Beach Strand Habitat Enhancement

Beach strand habitat in the Chesapeake Bay is one of the least understood and appreciated. While most restorative emphasis has been directed towards vegetated habitats as natural filtering functions, we have only begun to document the advantages of beach strand and dune habitat. Northwest Creek provides several opportunities for beach strand habitat enhancement. The areas of proposed placements (Figure 1) were strategically selected to make the most of the configuration of the creek in relation to the Bay and wind patterns. More importantly, restoration efforts of any type should replicate the natural resource and landscape in which it is being recovered, i.e. beach strand should be restored to areas where beach strand may have actually existed. Recovery efforts fail if native habitats are forced into restoration plans without consideration of the ecological forensics. The existing natural beach along the Bay at the entrance to Northwest Creek is one of the most stable beach and dune systems in the area.

Channel Clearance and Maintenance at the Tidal Interface

Considering the numerous and heroic efforts over the years to maintain a more defined and permanent opening between the creek and the Bay, it may prove to be more economical and effective to simply periodically clear the existing channel. Over the long term the expense of such maintenance can be comfortably distributed and absorbed by home owner fees paid by residents. The area proposed to be cleared and maintained is depicted on the Shallow Water Enhancement Phase of the Concept Plan (Figure 2) and includes the roughly 800 feet of channel leading to the tidal outfall. Any such maintenance should be carefully calculated and staged at times when creek levels are low. The concern is that a more permanent structure would have to be considerably larger, complicated and expensive than previously estimated. Stabilizing the tidal outfall is a simple engineering effort; keeping water levels in the creek at sustainable depths may prove to be more involved.

As demonstrated when the outfall was mechanically opened in the spring of 2007, without a check valve or tide gate at the opening, the creek may release too much water during low tide or sustained westerly/northwesterly winds. It is possible that a wider permanent tidal interface can be constructed for Northwest Creek; however, based on the data and anecdotal information collected, such alteration would not be authentic restoration. In order for Northwest Creek to become a tidal cove, i.e. one that ebbs and flows with daily tides, it is estimated that the entire creek bed would have to be extensively dredged, maybe to at least a minus 1.5 feet below mean low water. Based on available maps and photographs, Northwest Creek has been an intermittently obstructed tidal pond for well over 100 years. The species and age of the trees in the tidal interface area do not support the notion that this area was recently open water or tidal wetlands. The vertical elevations in this area are among the highest in the Northwest Creek watershed. The hydrologic exchange through the existing channel may have been more frequent when the creek was deeper and held a greater volume of water. However, Northwest Creek does not appear to be a former tidal cove that has been recently closed off by accreting sands.

Estuarine Wetland Restoration

Estuarine wetlands, i.e. both brackish water and freshwater wetlands, are fundamental in most hydrologic restoration proposals for the Bay region. Northwest Creek offers unique opportunities to revert ecological impairments towards recovery and preservation of wetlands. In the Northwest Creek context wetland restoration is the essential component in the dredge spoil placement, reforestation, shoreline enhancement, and comprehensive phragmites control. A list of the wetland plant materials, which may be incorporated in the Northwest Creek ecological restoration effort, is provided in Figure 20.

Dredging and Spoil Disposal

A large part of the success of this proposal is believed to be the restoration of the creek's hydrologic capacity or volume. As described herein the ability of the creek to contain water may have been reduced significantly by sedimentation. In the process, water depths have been compromised; water temperatures are no longer compatible to native fish species, turbidity has increased, and submerged aquatic vegetation has been completely lost.

As depicted on the Concept Plan, Northwest Creek offers unique opportunities to utilize the dredged materials to reclaim lost land, (i.e. the land mass that once existed at the tidal interface) and restore estuarine wetlands, beach strand, and other shoreline features. Vertical elevations are greatest in the area nearest the Bay (Figure 17) which may render this segment of the creek particularly suited to the placement of contained dredge spoil. Methods include using GeoTubes, BioTubes, or *coir* fiber logs to enclose the spoil disposal area within the submerged portion and a dredging process that would reduce the number of steps between sediment removal and land reclamation. GeoTubes may be particularly interesting as these products provide means to contain the dredge spoil, dewater the dredge spoil, and enclose the spoil disposal area all within the confines of the project site.

Dredging may be staged in phases beginning with the main stem from which the greatest amounts of spoil may be removed to the areas along the shores. These shoreline areas are expected to require less removal of sediments. Based on the soils analysis, the dredged material may not be suitable for use in shoreline enhancements; however, such material may be used as core fill after it's been dewatered and/or cured.

Other areas for possible spoil sites include the stormwater management pond and upland areas on the community properties. If all dredge materials can be used to build back the landmass at the tidal interface, use of these inland areas will not be necessary. Any areas used for dredge disposal should be vegetated as soon as possible after placement.

Riparian Forest Buffer

Along the south shore of Northwest Creek are some of the most beautiful mature trees in the area. Also the land mass closest to the tidal interface supports a stand of mature hard woods. Riparian forest buffers are important for shading and cooling shallow waters along the shoreline. Branches and fallen trees provide structure necessary for fish reproduction. The Concept Plan identifies areas on which reforestation is proposed.

Living Shoreline Enhancements

Areas proposed for shoreline enhancement are broadly identified on Figure 1. It was determined that the more specific designs contributed by individual residents would be best handled at the next phase of this process after consensus is reached.

Phragmites Control

Areas where major stands of phragmites are present are depicted on Figure 1. Although the State has a standard procedure for controlling this noxious weed, any control efforts utilized within Northwest Creek should definitely include removal of any stalks and an immediate plan for replanting with appropriate native plant species. Many control efforts fail because there is no long-term follow up, maintenance and replanting effort. As the experts know, phragmites is difficult to eradicate. When control areas are left barren, rhizomes and seeds may simply reestablish if left in place. However, with proper handling of all phragmites components and prolonged attention, it may be possible to restore these effected areas completely with native species.

Structural Proposal

Over the summer of 2007 property owners on Northwest Creek devised a proposal to restore water to the creek. No design drawings are available, but the essence of the proposal involved mechanical dredging and a permanent and structurally sustained breach in the tidal interface in order to allow tides to flow unobstructed into the creek on a daily basis. The proposed breach would include dredging of the outfall and construction of stone jetties or groins perpendicular to the Bay shoreline near the current opening/outfall. However, considering existing and historical information it was determined that the construction of a stabilized opening would not merit inclusion in a concept plan intended for ecological restoration.

Typically jetties or groins are used to impede, alter, or redirect naturally occurring movement of sand or soil material. At Northwest Creek, the prevailing littoral drift is not clearly predictable, i.e. photographs depict movement of near-shore sediments, both northerly and southerly, and possibly onshore/westerly sand movements. There is no record of an evaluation of impacts on adjacent properties that could occur from the jetty construction.

In August 2007, five estimates were prepared for and provided to Margo French, Tower Gardens Improvement Association c/o Margo French, and/or Glenn Ankenbrand. The least expensive of the proposals includes dredging at the interface and stream channel. Other proposals include construction of jetties and rock stabilization along the stream channel. Copies of estimates are included as Figure 19 and range from \$50,474 to \$1,095,520.

A legal description of the property (on which the proposal was planned) or a sketch of the proposed dredging and construction are not available. The location of the current outfall may be on property owned by the Tower Gardens Improvement Association or may straddle two separate properties, i.e. land belonging to Tower Gardens Association and to the private individual to the south. The land lying beneath the creek may be considered Private Wetland or State Wetland.

On August 29, 2007 Margo King representing the Tower Gardens Improvement Association and Glenn Ankenbrand, representing the Cross Winds Property Owners appeared before the Joint Evaluation Committee and presented a proposal to restore water to Northwest Creek. The proposal from the residents' representatives appears to be for a permanent and structurally sustained breach in the tidal interface, which would allow tides to flow unobstructed into the creek on a daily basis. Based on early historic mapping, residents believe there was a significant opening between the creek and the bay that remained constant and allowed full exchange of daily tides and surface waters. There may have been a more frequent exchange of tidal waters in the 1800's and possibly even up to the early 1900's. Aerial photographs taken by the USDA's Soil Conservation Service (now the Natural Resource Conservation Service) in the mid 1930's do not depict a clearly open channel to the Bay. This "pathway" or channel is at times open to the Bay and at times closed to the Bay. What is clear is that water from the Creek outlets to the Bay via a "pathway" or channel that has been consistent in form and function from the mid 1930's.

Above all, a stabilized outfall would not represent authentic ecological restoration and may create a range of liabilities in the long-term. For the following additional reasons a proposal for jetty construction is not included.

1. The near-shore area where an opening may be constructed is subject to significant shoaling. In order to maintain an opening to the Creek, jetties would need to be constructed perhaps as much as 500 ft. out into the Bay and be maintained;
2. Beach areas to the north and south of the proposed opening are very stable and are of significant habitat value. The impact of a large jetty system and opening on the adjacent properties would be difficult to determine in the long-term;
3. The establishment of a new pathway or channel to Northwest Creek would require the excavation of existing State and Private wetland areas. It would also require significant armoring and stabilization and may change the hydraulic nature of the area in ways that are difficult to assess;
4. The existing “pathway” has functioned as the channel for tidal inflow and surface water outfall for at least 70 years. The path of the channel appears stable in location and function. Maintaining the existing channel may be sufficient for tidal exchange;
5. Opportunities for public funding would be very limited if possible at all;
6. There has not been a clear identifiable property survey, owner, or permit applicant. It is unclear as to whose property would be impacted by the construction of a stabilized opening and who would be responsible for mitigation requirements;
7. It would likely be very difficult to obtain permits from the Maryland Department of the Environment or the Army Corps of Engineers to excavate and stabilize a new opening and channel of this nature; and
8. It would be irresponsible to include options in the Concept Plan that would not be considered viable.

Funding Strategies, Techniques, and Sources for Implementation

A major incentive behind the development of this Concept Plan is to demonstrate the public benefits of ecological restoration. Despite the lack of public access to Northwest Creek, the restoration effort would be an important contribution to Maryland's initiative for Chesapeake Bay recovery. The fact that surrounding land is held privately may ensure the success of this effort over the long term, particularly if property owners take on more of the stewardship responsibilities. As the human population increases, land held in public ownership is used for a wider range of purposes. From an ecological perspective, restoration of private lands is proving to be the better public investment.

Policies for the allocation of public funds have evolved considerably over the last thirty years. The State of Maryland adopted a procedure under which landowners could establish special districts, levy taxes, and implement community-owned projects. The Shore Erosion Control District is one such program and requires only a 75% majority of property owners to become established.

Raising private funds may be the more direct means of implementation, but a project of this nature deserves consideration for public funding. In this age of heightened ecological awareness, the public funding potential from special allocations or appropriations has widened. No reasonable proposal should be discounted. The Maryland legislature provides a means by which the State will provide 50% of the funds if the funding recipient can raise the other 50%. The County government receives allocations for special projects which may be appropriate for the Northwest Creek effort. Long standing federal programs such as those under the Department of Agriculture are expanding into residential and developed areas. Once the design of the Northwest Creek effort is refined and there is consensus among residents it will be easier to narrow in on potential sources of funds.

The following programs and agencies have funded similar efforts and are possible sources for financing the restoration of Northwest Creek.

Chesapeake Bay Trust
U.S. Army Corps of Engineers
Mitigation Fund, MDE

Small Watershed Grants, MDE
Program Open Space, DNR
Natural Resource Conservation Service, USDA

Appendix

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