To: Supervisor Scott Russell
Members of the Town Board

From: Mark Terry, Principal Planner

Re: Short-Term Work Plan to Assess, Mitigate and Restore the Ecological Function and Values of Goldsmith Inlet

Date: June 15, 2009

Upon request from Supervisor Scott Russell and Councilman Albert Krupski, Town staff proposes the following short-term work plan to assess and restore the degraded wetland functions and values of Goldsmith Inlet (Inlet) (Figure 1).

In April, 2009 a meeting was held with community members to discuss the primary issues affecting quality of life (use) around the Inlet. Numerous issues were discussed, including the affects of dredging on the nearshore and foreshore areas of the Long Island Sound shoreline and Inlet channel. This report proposes assessment, mitigation and restoration tasks that could be accomplished by the Town or with Town assistance that would improve the functions and values of the Inlet by addressing the root causes of the ecological degradation. The data gathered will lead to a long term permanent solution.

The community identified three issues of concern:

1. The build up of sand (shoaling) in the Inlet following the construction of the single jetty in 1964.
2. Loss of use due to degraded water quality attributed to; poor flushing, storm water runoff, wildlife use, beach wrack and potential influence from residential sanitary systems.
3. Loss of littoral habitat due to deposition of beach wrack/debris on indigenous low marsh and high marsh vegetation.
4. Loss of low and high marsh habitat through the encroachment of the invasive species common reed (*phragmite australis*).

This report focuses on assessment and restoration of Inlet water quality and the restoration of the low and high marsh habitats. On May 27, 2009 Town Staff conducted a field survey of Goldsmith Inlet and adjacent roadways to develop a short-term work plan that could be accomplished within a two year period.

1. Land Use

The shoreline of Goldsmith Inlet is residentially zoned. To the west the parcels are zoned R-40, to the south, east and north the properties are zoned R-80. A total of 17 parcels comprise the shoreline of the Pond. Seven of the parcels are protected, by Suffolk County, Peconic Land Trust and the Town of Southold. Eight of the parcels are improved with residential structures. Two parcels are rights-of- way to the pond.

Goldsmith Inlet County Park comprises the most significant parcel along the shoreline comprising 34 acres. The park provides access to the Long Island Sound as well as to Goldsmith Inlet which is owned by the Town. The park has no facilities or services, thus is used almost exclusively for nature walks and surfcasting. The park is accessible from a small, unpaved parking area located to the north of Soundview Road.

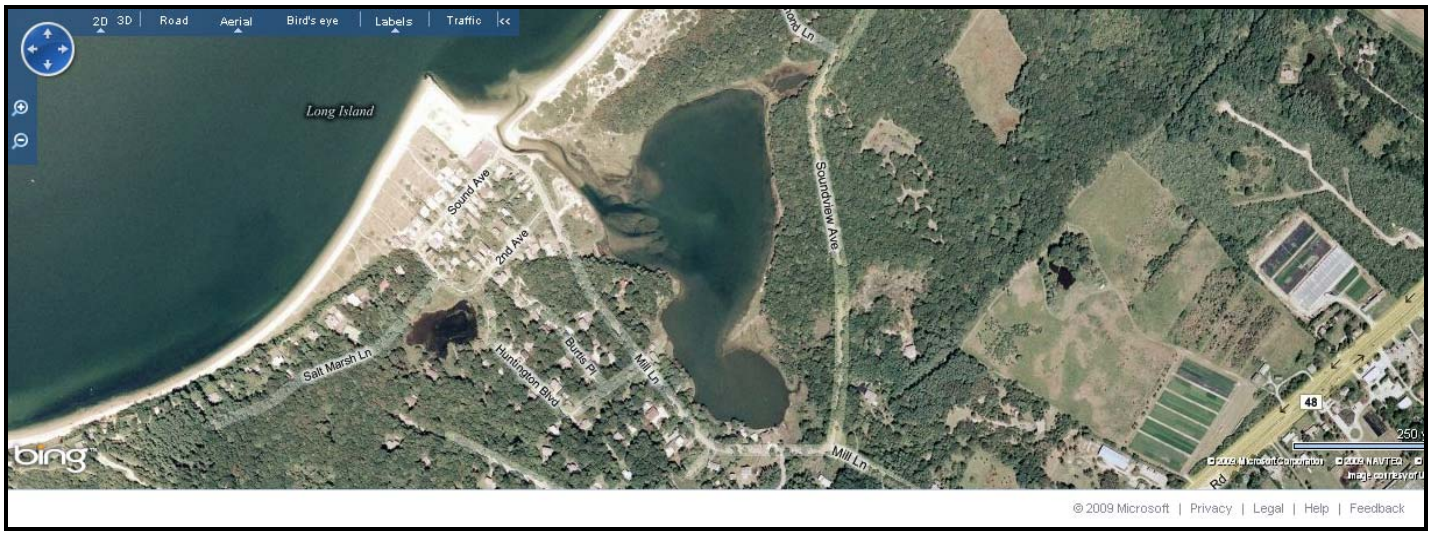

Figure 1. Goldsmith Inlet

2. Water Quality

Historically, Goldsmith Inlet has experienced high levels of pathogens resulting in temporary and now, year - round water quality closure (Figure 2). Water quality closures include areas that have failed to meet the National Shellfish Sanitation Program's (NSSP) standards for open shellfish areas.

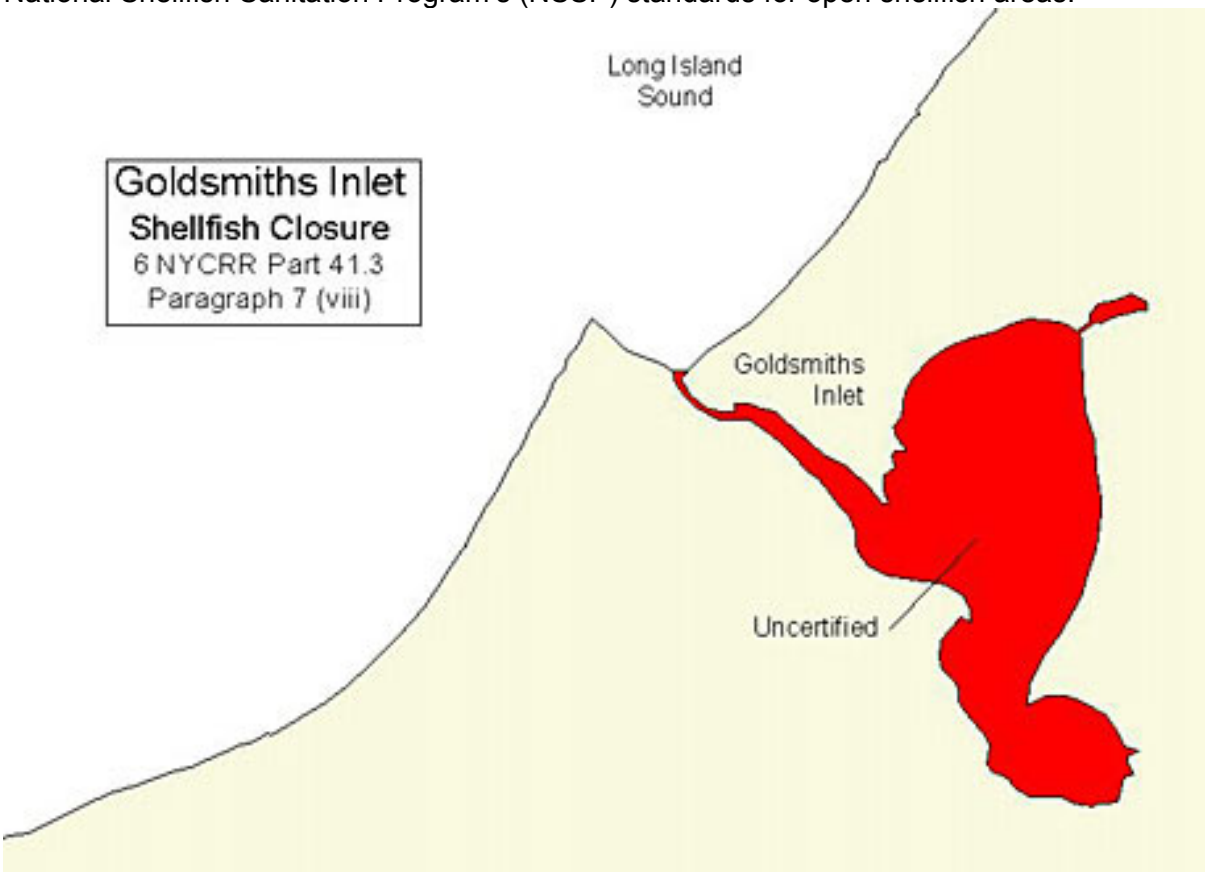

Figure 2. New York Department of Environmental Conservation Shellfish Closure Map; Goldsmith Inlet.

Major generators of the types of pollutant that prompt water quality closures are from nonpoint sources which include:

1. Direct contributions from waterfowl and wildlife to surface waters
2. Domestic pets, livestock, and wildlife wastes on the landscape
3. Failing septic systems

The water quality data for the Inlet indicated fecal coliform exceedances of NSSP standards. Exceedances span from the inside of the inlet to the southeastern head of the lagoon. State stations 67-A1 and 67-B are located on each end of the lagoon and exhibit exceedances that are nearly identical. Therefore, station 67-A1 represents exceedance conditions for the tidal prism model calculation station and 67-A represents offshore fecal coliform concentration. (Final Report for Shellfish Pathogen TMDLs for 27 303(d)-listed Waters Battelle (2007)). Six NYSDEC and one SCDHS stations are located within the Inlet. The NYSDEC has not sampled the Inlet since 2003 due to the "closed" status (Personal Communication, Melissa Albino NYSDEC).

The report identifies the major source of pathogens to the Inlet as Municipal Separate Stormwater Sewer System (MS4) from residential land use (Table 1). Note, however, that a significant source load was identified from domestic pets. The conveyance of pet waste into the water body includes storm water runoff from roadways and lawn areas.

Table 1. Fecal Coliform Sources for Goldsmith Inlet (Battelle, 2007)

SOURCES	Billion FC/year
POINT SOURCES	
Sewage Treatment Plant	0
RESIDENTIAL/URBAN LAND[1,2]	
MS4 Contribution	425,546
Non-MS4 Contribution	0
OTHER NONPOINT SOURCES	
Rural Land	3,504
Forest	224
Waterfowl	248
TOTAL LOAD (Billions)	**429,522**

[1] "Urban land" is a combination of residential land, commercial land, industrial land, and roadways.
[2] This source includes the load from domestic pets of 401,558 billion FC/year.

In 2007 a TMDL was developed for the pathogens entering Goldsmith Inlet, consequently, the water body was delisted for the 2008 Section 303D List. The TMDL requires a 91 percent load reduction in fecal coliform bacteria in the water body (Table 2).

Table 2. TMDL Reduction Table For Goldsmith Inlet (Battelle 2007)

	Condition	Goldsmith Inlet	Load Reduction	Load Reduction (%)
Existing Conditions (billion FC/yr)	**Nonpoint Sources**	**3,976**	-	-
	Permitted Point Source Contributions—STPs	**0**	-	-
	Permitted Point Source Contributions—MS4s	**425,546**	-	-
	Total Existing Loads	**429,522**	-	-
TMDL (billion FC/day)	**LA**	**1**	**10**	**91**
	WLA—STPs	**0**	**0**	**0**
	WLA—MS4s	**105**	**1,061**	**91**
	MOS	-	-	-
	TMDL	**106**	**1,071**	**91**
TMDL (billion FC/yr)	**LA**	**358**	**3,618**	**91**
	WLA—STPs	**0**	**0**	**0**
	WLA—MS4s	**38,299**	**387,247**	**91**
	MOS	-	-	-
	TMDL	**38,657**	**390,865**	**91**

Staff identified a total of six storm water outfalls in the field directly or indirectly contributing storm water to the Inlet: They include:

SFO1 - Sheet flow runoff from Soundview Avenue
O1 - Direct runoff outfall pipe from Soundview Avenue
UCP1 - Under the road conveyance pipe dewatering Soundview Avenue and private property,
O2 - Outfall from Mill Lane
O3 - Mill Lane direct conveyance
O4 - Pipe delivering storm water from the Autumn Pond and watershed

Photographs of each outfall is included as figures 4-13.

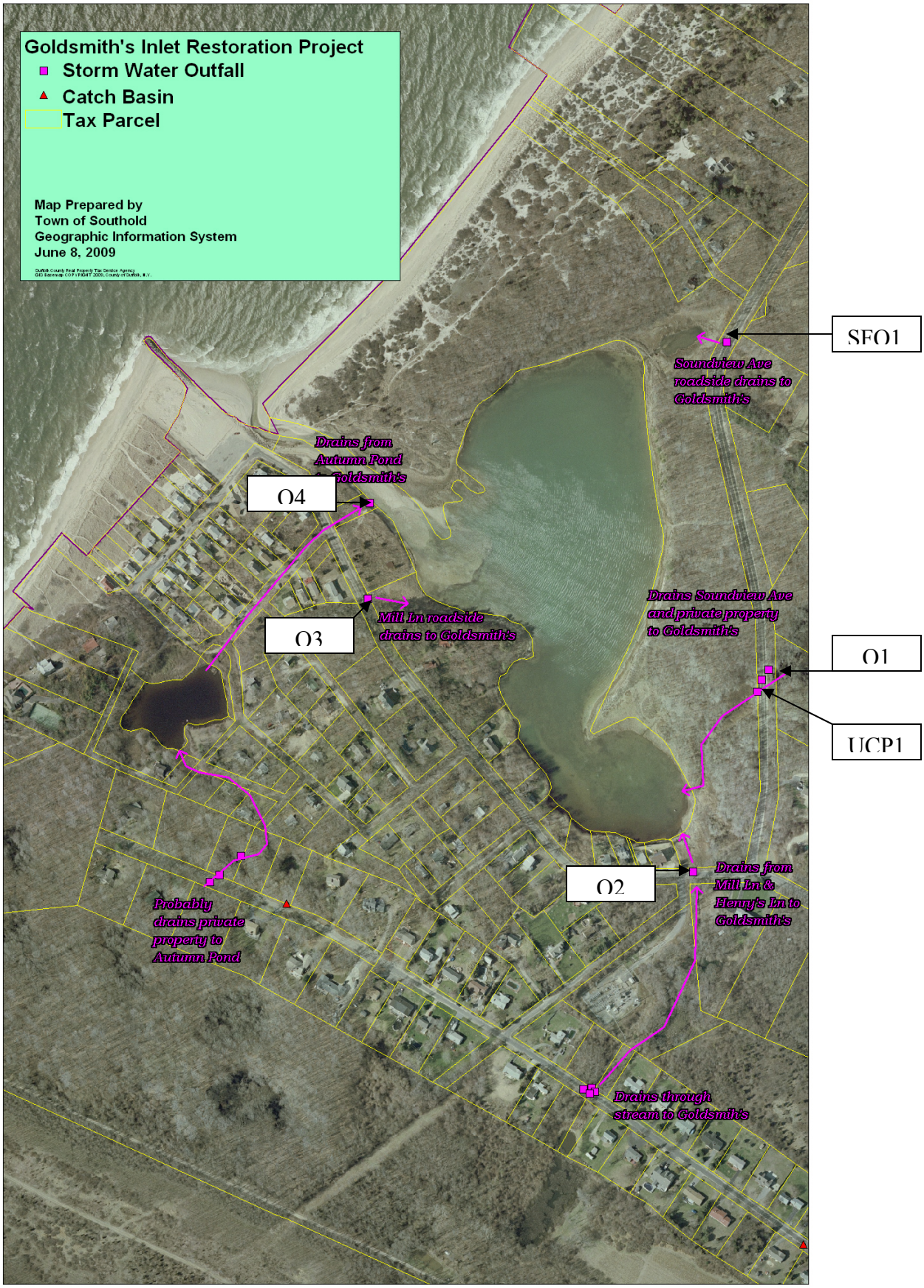

Figure 3. Goldsmith Inlet contributing outfall map.

Figure 4. Storm water conveyance (SFO1). Sheet flow runoff from Soundview Avenue.

Figure 5. Storm water outfall pipe 1 (O1); Direct runoff (North of Soundview Avenue).

Figure 6. Underground conveyance pipe (UCP1); Northwest of Soundview Avenue

Figure 7. Underground conveyance pipe (UCP1); West of Soundview Avenue

Figure 8. Underground conveyance pipe (UCP1); Southeast of Soundview Avenue

Figure 9. Storm water Outfall 1 (O2); Northeast of Mill Lane. Note the common reed.

Figure 10. Storm water Outfall 1 (O2); Northeast of Mill Lane; close up.

Figure 11. Mill Lane direct conveyance (O3).

Figure 12. Storm water outfall pipe (O4). Connects the Autumn Pond watershed.

Figure 13. Storm water outfall pipe (O4, close-up photo).

2.1. Water Quality Assessment

The most effective way to manage the water quality of the Inlet is to identify, then reduce or eliminate the contributing sources by focusing on both reducing pathogen wastes itself and reducing storm water volumes that reach the surface waters carting other pollutants. To adequately address pathogen contributors it is important to identify the sources relative to input (storm water conveyance, leaching septic systems) and output (tidal flushing).

The identification of the pathogen hosts can be achieved through coliform DNA source tracking, a recommended approach to target host species and areas which contribute the highest levels of coliform bacteria. Once contributing species or areas are identified, the conveyance of the pathogens can be addressed through storm-water management techniques coupled with improved tidal flow.

2.1.1 DNA Source Tracking Analysis

Although the conveyance of pathogens have been identified to certain levels and a TMDL has been established for the Inlet, the potential host species have not. The DNA Source Tracking Analysis studies often determine the detectable differences in DNA for coliform bacteria which originate from different host species.

By running coliform bacteria samples through a DNA library, it can be determined if the sample likely originated from humans or other potential sources such as birds, domestic animals, or other wildlife. In some cases, even the host species (e.g. Canada Goose) can be identified. Once the potential source of the bacteria is identified, it makes the task of remediating the waterbody significantly easier. Cornell Cooperative Extension of Suffolk County (CCE) has created a fecal coliform DNA library which is specific to Long Island.

2.1.2 Flushing Rates Analysis

Historical data shows that the installation of a single jetty in 1964 resulting in shoaling in the inlet which could be contributing to poor flushing rates. In addition to identification of the fecal coliform hosts and conveyance, the rate of flushing of the inlet, is an important factor in the managing the water quality. Sand and silt has settled within the Inlet thereby potentially decreasing the amount of flushing to the waterbody. The accretion of sand appears to have accelerated since the gradual loss of the eastern jetty. The reduced flushing could serve to decrease the water quality of the waterbody since input pollutants (e.g. storm water runoff, septic systems, wildlife) may be less effectively diluted and flushed out. However, the Town does not have data on flushing rates.

An effective way to verify if the Inlet is subject to restricted tidal flow is to conduct a tidal prism study. Automated water level logging devices (leveloggers) can be deployed on both sides of the channel to determine if there are any restrictions. If the channel is restricting flow, the levelogger inside a waterbody will demonstrate decreased tidal amplitude and/or have a different temporal pattern of high levels (associated with high tides). It should be noted that although this methodology will determine the presence and relative severity of a restriction, it will not quantify the extant of the restriction. In order to determine how much bigger an inlet would have to be to eliminate a restriction, a more detailed hydrologic analysis will need to be conducted.

Leveloggers can also measure additional parameters such as temperature and salinity. This information can be used to help assess flushing issues or to examine the impacts of rainfall events on a waterbody. All data (water level, temperature, salinity) is logged and periodically downloaded. The instruments can be deployed long term in order to assess seasonal or storm related changes.

2.1.3 Storm Water Volume Reduction

The reduction in non point storm water pollutants, including pathogens, can be achieved through the effective storm water management techniques. To accomplish such a reduction both Town and citizen participation is necessary.

Town responsibilities include managing all storm water conveyance structures form public roads. Three public roads contribute storm water to the Inlet; Soundview Avenue and Mill Lane directly and indirectly from Henry's Lane. A total of three (3) storm water conveyance points occur on Soundview Avenue and two (2) on Mill Lane; Figures 4 and Figure 7. All locations deliver road runoff into vegetated areas adjacent to the Inlet.

It is recommended a series of shallow, retention (wetlands) basins be considered to capture, retain and naturally treat storm water prior to entering the water body. Additionally it is recommended to:

- Protect or establish a buffer (100 meters wide, if possible) around all creeks, ponds, and bays.
- Minimize impervious surfaces on properties. Remove unused portions of driveway and outdoor concrete and replace them with shrubs and trees.
- Disconnect impervious surface conduits. For example, a downspout from a roof leading to a driveway sends stormwater directly to the road and a storm drain. Move downspouts a few inches to lawns or a rain garden and allow stormwater to infiltrate naturally.
- Create rain gardens. Rain gardens are designed to collect and infiltrate stormwater with moisture tolerant native plantings.
- Pick up pet waste, and dispose of it in the trash.
- Not feed waterfowl or create unnatural conditions where they congregate (e.g., lawns that extend to the water's edge).
- Keep curbsides clean and free of leaves, grass clippings, sand, and litter that will wind up in catch basins or surface waters.

2.1.4 Littoral Zone Restoration

2.1.4.1 Debris and Beach Wrack Removal

A net loss of the low marsh vegetation smooth cordgrass (*Spartina alterniflora)* and *Spartina patens* has resulted from the significant deposition of beach wrack/ debris within the littoral zone. The debris consists of pieces of large wood, household garbage (plastic) and beach wrack (Figures 14-16).

In addition to the physical loss of low and high marsh vegetation, the decomposition of the debris can contribute to the degradation of water quality. Recent studies have shown that wrack mats can harbor bacterial populations and can also provide environments for growth and redistribution of bacteria. In a recent analysis of several embayments in Peconic Bay, Horsely and Witten (2003) reported a general lack of information on wrack deposition rates; however, they surmised that this could be an important source of bacteria. Therefore, more analysis is required to establish the spatial and temporal contributions of beach wrack as a source of bacteria in the study area water bodies.

Figure 14. Goldsmith Inlet looking west showing beach wrack and debris deposition in the littoral zone.

Figure 15. Goldsmith Inlet looking east showing beach wrack and debris deposition in the littoral zone. Note the encroachment of the invasive species common reed.

Figure 16. Goldsmith Inlet looking east from Mill Lane showing significant debris deposition.

2.1.4.2 Exotic Species Removal

Common reed *(Phragmite australis*) is one of the most invasive and damaging plant species to coastal wetlands in the Long Island marine environment. Hundreds of acres of salt marsh vegetation have been lost due to the plants robust growth habit and broad tolerance. Few plants can out-compete common reed. Once it has established, it spreads rapidly by long underground stolons throughout the ecosystem.

Common reed has begun to encroach into the littoral zone of the Inlet in numerous locations. The extent of the area in which the species occupies is currently unknown. However, the loss of low marsh vegetation is evident due to encroachment (see figures above). If the species is left unmanaged the low and high marsh vegetation will be replaced and a monoculture will form, resulting in a net loss of high quality low and high marsh habitat.

It is recommended that exotic species removal plan be developed to restore native species assemblage in the low and high marsh areas. The plan should include the following tasks:

a. Gain permission from Suffolk County Parks and Peconic Land Trust to map, eradicate and monitor common reed on the properties.
b. Create a base map of common reed monocultures using GPS.
c. Apply for permits to perform work to the NYSDEC and Town of Southold Board of Trustees.
d. Manually treat common reed through manual wicking plants with an application of Glyphosate (AquaPro or Touchdown Pro; a systemic herbicide; also under the brand name Rodeo), followed by manual cutting and removal.
e. Monitor treated areas for re-emergence of plants for a three year period.

3.1 Goldsmith Inlet Work-Plan Summary of Tasks (Two Year Time Frame)

Task 1. Water Quality Assessment and TMDL Reduction

1.1 Request that water quality sampling be re-instated: Draft letter to NYSDEC (Melissa Albino) to request the re-instatement of the water quality sampling program due to the improved flushing resulting from the dredging of the Inlet.

1.2 Develop a proposal for the drafting of the Goldsmith Inlet Sub-watershed Management Plan and submit the document to funding opportunities. The request shall include costs to conduct:

a. DNA Source Tracking Analysis
b. Hydrologic Analysis: Flushing Rate Analysis (Tidal Prism)
c. Bathymetric Survey

1.3 Feasibility study to replace the eastern jetty of Goldsmith Inlet.

Task 2. Storm Water Volume Reduction

2.1 Develop a Storm Water Management Program (SWMP) to reduce the discharge of pollutants to the maximum extent practicable to protect water quality and to satisfy the appropriate water quality requirements of the Environmental Conservation Law and the Clean Water Act. To comply with the future pending MS4 requirements the SWMP must describe the BMP's for each of the minimum control measures:

2.1.1 Public education and outreach program to inform the public about the impacts of the storm water on the receiving water quality.

2.1.2 Public involvement and participation.

2.1.2.1 In April of 2009 a meeting was held between Goldsmith Inlet users and adjacent property owners to discuss the concerns the community has with the "health" of the Inlet. Supervisor Russell and Councilman Krupski requested that a work-plan be developed to address the concerns.

2.1.3 Illicit discharge detection and elimination.

2.1.3.1 The Town is in the process of mapping the illicit discharge points. A field reconnaissance to locate the structures was conducted on May 27, 2009.

2.1.4 Construction site storm water runoff control program for sites disturbing one or more acres.

2.1.5 Post-construction runoff control program for new development and redevelopment sites disturbing one or more acres.

2.1.6 Pollution prevention and good housekeeping operation and maintenance program

Task 3. Littoral Zone Restoration

3.1. Debris and Beach Wrack Removal

3.1.1 Enter a cooperative agreement with Coastal Steward Adopt-A-Beach Program or community groups to remove beach wrack and debris from littoral zone of the Pond, following the removal, allow the areas to re-naturally re-establish with indigenous, low marsh vegetation.

3.2. Exotic Species Removal

3.2.1 Develop an exotic species removal and maintenance and monitoring plan for the common reed (*Phragmite australis*) along the shoreline of the pond for all protected parcels.

This shall include the following tasks:

3.2.1.1.1 Gain permission from Suffolk County Parks and Peconic Land Trust to map, eradicate and monitor common reed on the properties.
3.2.1.1.2 Create a base map of common reed monocultures using GPS.
3.2.1.1.3 Apply for permits to perform work to the NYSDEC and Town of Southold Board of Trustees
3.2.1.1.4 Manually treat common reed through manual wicking plants with an application of Glyphosate (AquaPro or Touchdown Pro; a systemic herbicide; also under the brand name Rodeo), followed by manual cutting and removal
3.2.1.1.5 Monitor treated areas for re-emergence of plants for a three year period.