Alley Creek Watershed Management and Habitat Restoration Plan
2015

Prepared by: NYC Parks Natural Resources Group

NYC Parks

City of New York Parks & Recreations
Forestry, Horticulture, and Natural Resources
Bill de Blasio, Mayor,
Mitchell J. Silver, FAICP, Commissioner

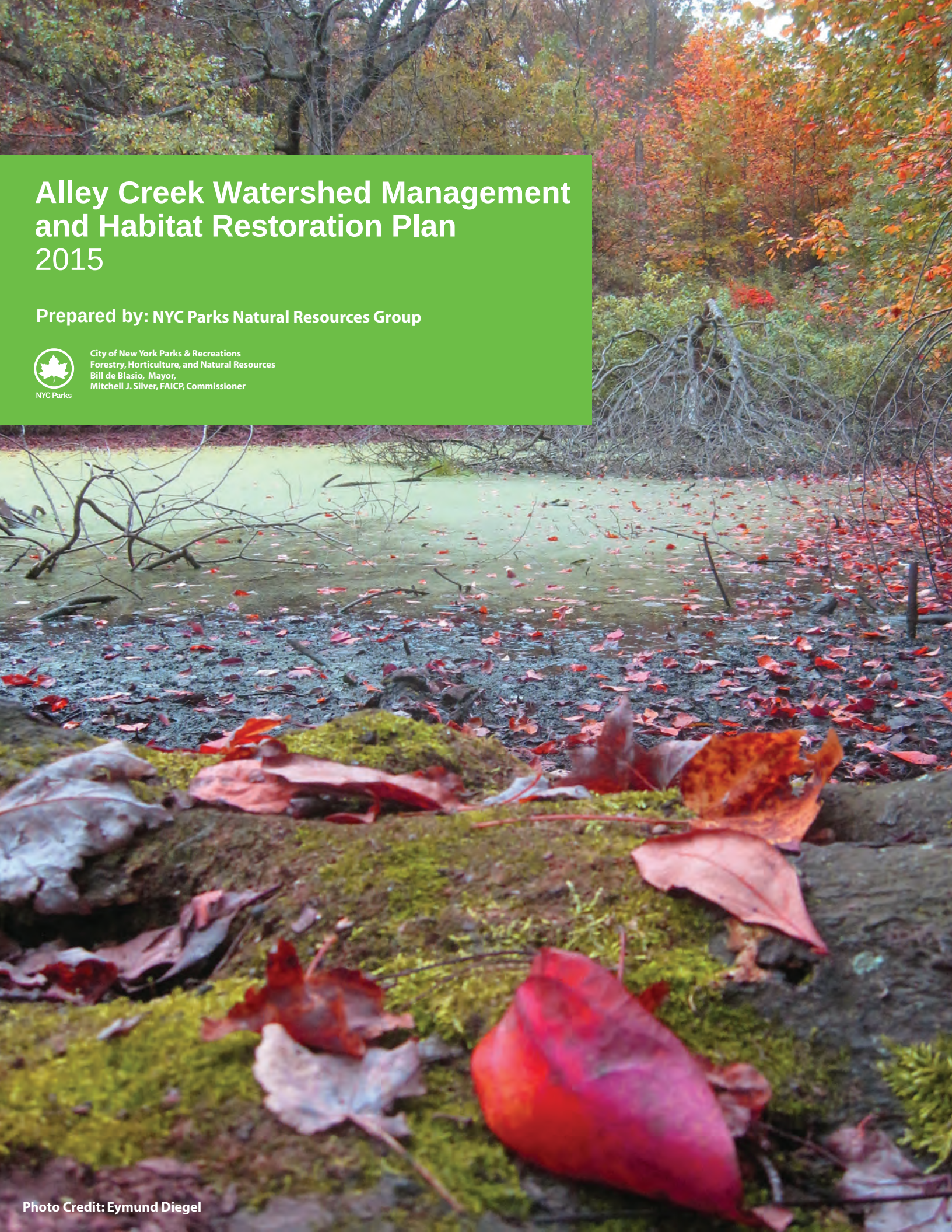

Photo Credit: Eymund Diegel

Executive Summary

The Alley Creek-Little Neck Bay watershed, in northeastern Queens, is a developed urban/sub-urban landscape with considerable natural features that make it an important ecological system and a valuable resource for the many people who live and visit there. Most of the contiguous natural area in the watershed falls within Alley Pond Park. This 645 acre park includes forest, a riparian stream corridor, ponds and freshwater wetlands, and a tidal wetland and salt marsh complex at the confluence of Alley Creek and Little Neck Bay the at western end of Long Island Sound Estuary. The bay, the waterfront, and the parks in the watershed are cherished by the community for the opportunities they provide: the beautiful views, hiking, bird-watching, botanizing, fishing, exercising, environmental education, stewardship, and a cool reprieve from heat in the summer.

Purpose of the Plan and Vision for the Watershed

The purpose of the Alley Creek and Little Neck Bay Watershed Management and Habitat Restoration Plan (the Plan) is to protect and restore the resources of the watershed by characterizing the existing conditions, identifying threats, articulating goals, and suggesting comprehensive management strategies and specific actions to address issues of concern. The plan is intended as a road map for ongoing responsive management, advocacy, stewardship and restoration actions by agencies, community groups, and other stakeholders that will lead to a healthier watershed. The Plan has been developed by the New York City Department of Parks & Recreation (NYC Parks) with input from the community, including an initial meeting during which the following vision statement was agreed upon:

> *The Alley Creek Watershed is an ecologically healthy urban system where clean water, wetlands, fish, water birds, and other native species are valued and protected from the headwaters to the bay. It is a place where water-sensitive practices, policies, and environmental stewardship help maintain and improve water quality and diverse native habitat, as well as public health, recreation, and a high quality of life for local and adjacent communities.*

To serve as a tool to help achieve this vision, the Plan is laid out in two main sections. The first section describes the existing physical, ecological and social characteristics and conditions in the watershed, including the current values and threats to these values. The second section identifies goals for a healthy watershed, as well as strategies and recommendations to help meet these goals.

Existing Conditions

Physical and Ecological Conditions and Characteristics

The approximately 10 square mile watershed is dominated by residential urban development, a population of over 100,000 people, and infrastructure that includes several major highways and an extensive combined and separate sewer and stormwater pipe network. Alley Pond Park is a significant, continuous area of open space in the center of the watershed. The surrounding landscape surface is less densely developed than much of NYC, yet is still over 40% impervious surface land cover.

In large part due to the presence of extensive parkland, the watershed includes a diverse range of habitats. These include approximately: 440 acres of upland forest, 90 acres of freshwater wetlands, 40 acres of grassland meadows, 15 acres of riparian forest and freshwater wetlands, 3 acres of spring fed aquatic systems, 50 acres of salt marsh, 3 miles of public shoreline, and 1,400 acres of open water and marine habitat. A particularly high value habitat, for both wildlife and people, is the Alley Pond Park Southern Forest at the top of the watershed, known to have

a diverse native bird population including scarlet tanager and wood thrush. Within the Southern Forest, the picturesque Kettle Ponds also support spotted salamander, wood frog and many other freshwater wetland species rare in NYC. The abundant springs along the Alley Creek corridor supply clean cool groundwater to streams and wetlands, enhancing these habitats for amphibians seeking refuge during long periods of hot weather and offering surprising beauty for park visitors.

Along the shores of Little Neck Bay (LNB), at the mouth of Alley Creek and Udalls Cove, the expansive salt marsh provides gorgeous views of the Bay while helping to filter the water and provide forage, nursery, and nesting habitat for fish and wildlife. Hundreds of species of birds and fish migrate through, overwinter or breed in the watershed and the Bay, one of only five such embayments on the north shore of Long Island that have been designated a Significant Coastal Fish and Wildlife Habitat by the New York State Department of State. The inter-tidal waters, salt marsh, and adjacent forest and freshwater wetlands have also been identified in the NY-NJ Harbor Estuary Program and the Long Island Sound Coastal Management Program as critical for helping to meet goals for target ecosystem characteristics and habitat restoration. The wildlife of the watershed is a significant part of the overall experience for residents who enjoy boating, swimming, clamming and fishing along the shore, as well as for visitors to the forests and wetlands.

Management and Stewardship Context

Multiple stakeholders – from community groups and local private and public land owners, to state and federal agencies – have recognized and worked to protect the resources of this urbanized watershed over many decades. Following the end of unregulated salt marsh filling and highway expansion in the 1950s, when the watershed was almost fully developed, the City and local citizens embarked on numerous programs and projects to manage and enhance the parks within the watershed. Since the late 1990s, city investments in improving and enhancing natural resources in the watershed have included: $22 million in salt marsh restoration (28 acres), $110 million in sewer upgrades to improve water quality and reduce combined sewer overflows by 54%, $1.5 million in tree restoration (9,355 trees planted over 15 acres with another 15 acres prepared for additional plantings in Fall 2015), 145 acres of forest management, 9 acres of freshwater wetland enhancement, approximately 3 acres of stormwater management projects, ongoing forest restoration and maintenance in the headwaters of Alley Pond Park and adjacent to the tidal Alley Creek, and salt marsh assessment and restoration planning.

An important characteristic of habitat management within the watershed is the historical and present day environmental stewardship by the community. Today there are four environmental stewardship groups whose focus is entirely within the watershed, and many more community groups who incorporate environmental stewardship in their activities. Their work includes invasive plant control, native plant re-vegetation, and erosion control around the Alley Creek Environmental Center near the mouth of Alley Creek and along the forested shorelines and upland ravine and ponds of Udalls Cove Park.

Governance and Regulatory Context

Over the past decade, the NYC Department of Environmental Protection (DEP) has focused on improving the water quality of the Bay and meeting state and federal standards. Under current water quality regulations, the Bay is designated as water quality Class SB, which indicates the best usage is “primary and secondary contact recreation and fishing” whereas Alley Creek is Class I, which has a best use of “secondary contact recreation and fishing." Both of these classes indicate the water quality must be suitable for fish, shellfish, and wildlife propagation and survival. To attempt to meet water quality standards, DEP has conducted extensive monitoring in the Bay and Alley Creek to characterize the water quality conditions and assess

sources of impairments. These impairments include combined sewer overflows (CSOs), stormwater runoff, illicit discharges, and seepage from septic tanks. In June 2014, DEP submitted a draft of the Long Term Control Plan (LTCP) for Alley Creek, which is required by Order of Consent with NYS Department of Environmental Conservation (DEC) to identify appropriate controls on combined sewer overflows necessary to achieve waterbody-specific water quality standards. The LTCP presents the results of numerical models used to evaluate opportunities for reducing pollution and attaining water quality standards. Recent improvements in grey infrastructure – particularly the CSO retention facility – have reduced outfalls by over half and succeeded in meeting the water quality standards for Class I. The LTCP assessed additional CSO control measures to determine how attainment could be reached in Alley Creek if it was re-classified to Class SC - limited primary contact recreation and future primary contact water quality criteria (2012 EPA RWQC).

Threats to Watershed Resources

Despite the significant efforts and successes in environmental protection and management, the ecological resources of the watershed are still significantly impaired compared to pre-development conditions and still face multiple threats associated with a highly developed urban landscape. Earthmoving, land filling, development, storm and sewer infrastructure construction, and other ongoing human activities have irreversibly altered the soil, hydrology, and biological interactions in the watershed. Consequently, ongoing management and planning is needed to counteract these stressors and maintain the ecological characteristics we value.

In the upland forest and meadows, for example, non-native fill soils, heavy foot traffic, and associated disturbances such as trampling of vegetation and soil erosion create conditions which are favorable to invasive exotic biota and disturbance tolerant species, and are generally unfavorable to a diverse native vegetation community. Within Alley Pond Park there are approximately 60 acres where invasive plants are prevalent or dominant, 5 acres where gaps in the tree canopy make the forest vulnerable to exotic plant invasion, and 2 acres total of downed wood that facilitates exotic vine growth and needs to be managed. The integrity of the forest and the kettle ponds is also undermined by excessive and redundant trails (over 3 miles), which can fragment the forest system adjacent to the ponds where amphibians complete stages of their breeding cycles. Too many heavily used trails leads to compaction, increased runoff, and erosion, all of which can potentially damage sensitive vegetation and degrade water quality within the ponds. In addition, there are over 2 acres where dumping and illicit activities are a concern. Newly created meadows, valued by the community, are also vulnerable to invasion by non-native plants.

The three riparian corridors in the watershed – Oakland Ravine, Alley Creek and Gabbler's Creek – are also impaired by invasive vegetation and a significantly disturbed hydrology. The development and paving of the upslope stormwater contribution areas to these former stream systems, as well as the re-routing of rainwater into storm sewers, have resulted in loss of headwater streams and associated vegetation complexes. Instead of being intercepted by vegetation and absorbed by the soil in the uplands, rainwater now flows across roads and parking lots, collecting nutrients, particulate matter, heavy metals, and other pollutants as it is rapidly shunted to drains and pipes. In the combined sewer system, this high volume of stormwater runoff overloads the system and contributes to combined sewage and untreated stormwater discharges. In the separated stormwater and direct drainage systems, this untreated stormwater delivers runoff to the stream network more frequently and in greater volume than under pre-development conditions. This concentrated, polluted stormwater runoff has resulted in deep gullies and severe bank and channel erosion, particularly in Alley Creek. In addition to truncating the stream network and extensively straightening, armoring, and piping stream channels, urban runoff has resulted in a stream system characterized by low diversity, pollution tolerant biota.

Even along lower gradient and spring fed streams, *Phragmites australis*, an exotic invasive wetland reed that outcompetes native species, dominates the stream channel. Features typical of healthy riparian habitat, such as large woody debris and overhanging banks anchored by native vegetation, are absent. Freshwater wetlands, particularly those associated with constructed ponds, are also often dominated by *Phragmites*. Water bodies suffer from a variety of water quality impacts, such as high fecal coliform levels at Oakland Lake and untreated stormwater runoff carrying pollutants from the street and high nutrient loads from fertilized lawns to Alley Pond.

Along the shoreline the salt marsh, one of the defining features of the watershed, is at risk. As estimated from aerial photo analysis, the watershed has lost about 10 acres of salt marsh since 1974. An ecological assessment conducted in the marsh in 2013 indicated that the marsh along the shoreline has a weaker soil and root network than other Long Island Sound marshes. This characteristic, together with wave action and large amounts of marine debris, may be a factor in the high rate of salt marsh loss. Further upstream in the tidal portion of Alley Creek, freshwater inputs from springs, high nutrient freshwater inputs from storm and CSO outfalls, historic fill, and a potentially more restricted tidal flow may also be limiting salt marsh extent and contributing to the dominance of *Phragmites*. In recent years DEP and Parks have, in total, invested over $20M toward 16 acres of wetland mitigation and restoration and currently are in the process of identifying additional wetland restoration opportunities.

Goals for the Watershed

To help ensure continued collaboration between all stakeholders and achieve the vision for the watershed, the Plan articulates four over-arching goals. These goals are intended to be consistent across plans and projects, to consider existing watershed characteristics and constraints, and to address current and future threats to the resources.

Goal I. Protect, restore and enhance habitat to maximize areas of diverse, native ecological communities.

Upland forests, meadows and streetscapes -Forests should exhibit structural and functional characteristics typical of healthy native forests, and not be dominated by invasive plants. Meadows should consist of native herbs and grasses in areas of sufficient size to support grassland dependent birds. Streetscapes, from the public owned right of way to private yards, should consist of diverse trees species, gardens should feature native herbs and grasses, and impervious area should be minimized to the maximum extent possible.

Riparian and Freshwater wetland --Riparian areas should support native plants tolerant of inundation, be of sufficient width to absorb flood flows, provide buffers for pollution, and provide shade, organic matter inputs and habitat structure. Freshwater wetlands should be fed by rainwater and groundwater, and receive stormwater runoff only after it is treated and detained. Constructed, stormwater-fed wetlands should be integrated into the Plan.

Coastal wetlands –Salt marsh loss should be abated and identified restoration projects implemented. These projects include but are not limited to removal of fill and marine debris, and pilot projects to re-construct recently eroded vegetated marsh.

Goal II. Manage stormwater to improve water quality downstream and establish a more natural hydrology.

Water Quality –The Creek and Bay should, at a minimum, meet water quality standards for best use designations. For Alley Creek this is fishable (Class I); for Little Neck Bay this is fishable and swimmable (SB). Other small water bodies should be protected from impairments to water quality through the best land management practices available.

Hydrology – Stormwater runoff to habitats sensitive to erosion (riparian channels, freshwater and tidal wetlands) should occur only after larger storms. Specifically, maximum permitted discharges should follow the channel protection standards of the 2015 New York State Department of Environmental Conservation Stormwater Management Design Manual. Stormwater should be intercepted, infiltrated, re-used, detained and treated, while impervious areas should be effectively disconnected from receiving waters, where possible.

Goals III. Maximize Public Engagement to increase community awareness, facilitate sustainable use, and ensure that natural open space landscapes will promote healthy living and invite stewardship.

*Access -*Access to natural areas should be safe and managed to provide enjoyment to community members and visitors without damaging the ecological resources.

*Stewardship -*A coordinated network of community groups and individuals should provide effective and meaningful stewardship for all ecological systems in the watershed.

Education - The educational potential of the watershed should be fully reached and utilized as a strategy to engage the public, build a new generation of stewards, and progress management objectives.

Goal IV. Improve Resiliency of watershed resources. Natural ecosystem restoration and management projects should be planned and designed to accommodate continued or increased disturbance through sea level rise, extreme storm events, and higher temperatures with their threats to significant coastal fish and wildlife habitats, people and infrastructure. The design and further development of these projects in the watershed should ensure its ability to absorb disturbance and return to desired conditions.

Management Recommendations

To achieve the four overarching goals described above, ten broad strategies are identified in the Plan (Executive Summary Table 1). Each of these broad strategies will help achieve one or more goals. Multiple actions or recommendations are identified as a part of these broad strategies. Some recommendations are site specific while others are programmatic, or applicable on a watershed-wide basis. In total, the Plan gives 79 programmatic or watershed-wide recommendations, identifies over 60 sites where stormwater management recommendations could be explored, and lists 70 sites where habitat and other management actions should be considered.

A subset of actions can be implemented by various stakeholders and through partnerships to make progress towards achieving specific goals. The actions proposed for implementation are cost effective, have stakeholder support, will protect existing healthy habitats, provide opportunity to expand habitat through existing restoration programs, move toward providing co-benefits (such as educational opportunities, will increase stewardship, serve to improve access and resiliency) and can be maintained to ensure success of investments. Actions deemed feasible in the short term (0 -2 years) and long term (>2 years) are presented in summary tables 24-34 at the end of the Alley Creek Watershed and Habitat Restoration Plan.

Executive Summary Table 1. Summary of Strategies and Recommendations

Strategy	Recommendation	Goals met			
		I	II	III	IV
1. Protect and Restore Habitat	1.1. Complete ecological assessment of salt marsh 1.2. Close redundant trails 1.3. Update parks salting practices 1.4. Plan "phase 3" forest restoration 1.5. Continue invasive plant and forest maintenance program 1.6. Manage and track management actions at restoration sites 1.7. Design vernal pool for inclusion in phase 3 reforestation 1.8. Complete ecological assessment of freshwater wetlands 1.9. Progress designs for salt marsh restoration 1.10. Coordinate marine debris removal at "Alley Outer" marsh 1.11. Progress conceptual design of "Alley Outer" water-ward restoration.	X			X
2. Manage Stormwater Using Best Practices	2.1. Develop conceptual designs and raise funds for priority green infrastructure projects 2.2. Advocate and fundraise for Oakland Ravine restoration 2.3. Continue to use the Alley Creek CSO Retention facility 2.4. Continue to implement the Green Infrastructure program 2.5. Develop protocol for prioritizing GI on co-benefits	X	X	X	X
3. Fix Illicit Connections and Unmanaged Septic Systems	3.1. Identify and remove all dry weather illicit discharge		X	X	
4. Promote Partnerships and Interagency Collaboration	4.1. Continue city interagency collaboration on the development of the citywide stormwater management program and associated plan. 4.2. USFS, NAC & NRG partnerships 4.3. Integrate stewardship activities with maintenance needs at Oakland Lake ball field meadows 4.4. Partner with APEC in landscape planning at new APEC building		X	X	
5. Review and Update Regulations and Codes	5.1. Assess development size thresholds for MS4 permit	X	X		X
6. Engage the Public	6.1. Carry out park stewardship survey 6.2. Hire staff to coordinate outreach 6.3. Identify key issues which require, or would benefit from, educational programs	X		X	
7. Training and Professional Capacity	7.1. Update standard operating procedures and train staff who work at facilities within MS4 catchments			X	
8. Research and Adaptive Management	8.1. Identify knowledge gaps for watershed management 8.2. Continue and expand collaboration with universities 8.3. Salt marsh restoration assessment for adaptive management	X			X
9. Track and Monitor Plan Progress	9.1. Continue forest restoration inspections 9.2. Track forest planting and management 9.3. Continue monitoring at established sites	X	X	X	X
10. Communication of Progress and Plan Updates	10.1. Hold annual meetings			X	