An Aquatic History of Spy Pond

Spy Pond Committee
http://arlingtonma.gov/spypond
https://www.facebook.com/spypondcomm/

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Contents

Introduction

Spy Pond provides opportunities for outdoor recreation, land and water conservation, and education. Sustaining the ecological health of the Pond is central to these opportunities. To this end, The Spy Pond Committee, a volunteer group working with the Town of Arlington, has been tasked with monitoring the Pond, and recommending management objectives and methods that help preserve its benefits for the citizens of Arlington. The following information is a compendium of scientific and informal observations about Spy Pond. We can improve our care of Spy Pond by understanding its history.

From 1999 to 2013, Aquatic Control Technology of Sutton, MA managed Spy Pond for non-native plants, excessive vegetation, and algae blooms. From 2014 to date, this work was performed by Solitude Lake Management of Shrewsbury, MA.

The following notes are from studies of Spy Pond, academic papers, annual reports of Aquatic Control Technology, annual reports of Solitude Lake Management, minutes and email of the Spy Pond Committee, and archives of the Spy Pond Association. Each note is preceded by a date. The corresponding source is provided at the end of this document. Minutes, reports, and some of the studies and papers are available on the Arlington website.

The first section, *Spy Pond*, covers Spy Pond and its animal life. The next section, *Aquatic Plants*, concerns its aquatic plants. It is followed by a section on *Algae*. The fourth section, *Water Quality and Treatments*, concerns Spy Pond's problems and how we have addressed these problems. The last section, *Sources*, lists the source reference for each note.

Spy Pond has had water quality issues since the late 1800s. Itis well fertilized with phosphorus and other nutrients from its urban watershed and its sediments. Prior to urbanization in the 1940s, Arlington and surrounding communities were the vegetable growing district for most of New England. Manure enriched the soil, greenhouses extended the season, and New England and New York provided the market. Two farms abutted Spy Pond with additional farms nearby. By 1980, Spy Pond was eutrophic or hypereutrophic (literally "well fed" or nutrient rich).

Since 1981, water quality studies and projects have attempted to resolve these issues. Best management practices attempt to reduce the amount of phosphorus entering the pond. Even if no phosphorus entered Spy Pond, aquatic plants would continue to thrive. The shallow sill between the north and south basins is lined with eleven feet of organic muck, largely from decades of excessive vegetation.

Plants and algae compete for sunlight and nutrients. Rooted plants take most of their nutrients from the sediment while algae depends on nutrients in the water column. When rooted plants fill the shallow areas, there is less nutrients available for the algae. In summer, the pond stratifies with a warm layer on the surface, and a cold, oxygen-poor layer on the bottom. Nutrients settle to the bottom and iron oxides release phosphorus from the sediment. At fall turnover, the pond mixes and nutrients move throughout the water column.

Without care, the littoral (sunlit) zone of Spy Pond fills with rooted plants, often covered with filamentous algae. When plants break the surface, boating and other uses of Spy Pond are limited. Algae blooms turn the pond green and lead to health issues. If plants and algae are left to rot, as in the late fifties, the pond becomes obnoxious.

A sanitary engineering study in 1950-1952 described Spy Pond's problems starting from 1871, while finding that Spy Pond was in reasonably good shape. By 1959, Spy Pond was a smelly mess. Children had rashes and huge itching welts from contact with its waters. The shores and shallow areas were covered with rotting vegetation.

The primary control methods for excessive vegetation and algae are herbicides and algaecides. The first treatment of Spy Pond was in 1921. In the summer of 1960, the Massachusetts Department of Public Health treated the pond. By August 1, 1960, Spy Pond was weed free. This lead to the glory days of Spy Pond described in *Spy Pond Stories* (Balazs, 1997). The last treatment of this period was 1972.

Since then, Spy Pond has steadily declined. After multiple studies from 1980 to 2002, the Town of Arlington decided to start herbicide treatments. A systemic herbicide, Sonar (*fluridone*), was applied in 2001, with various treatments since then.

As documented in this history, we have information about aquatic plants and algae from 1997 to date. Notice that plants become troublesome in waves: Coontail from 1997 to 2009, Eurasian Watermilfoil from 1999 to 2016, Sago Pondweed from 2009 to 2012, Curly-leaf Pondweed from 2010 to 2019, Spiny Naiad in 2017, Snailseed Pondweed in 2018 and 2019, and Water Chestnut in 2018.

In 2019, there was no Water Chestnut, and scattered or no Coontail, Eurasian Watermilfoil, and Sago Pondweed. The reason for Water Chestnut disappearing was that all plants were removed with their seeds in 2018. The others appear to be due to herbicides and competition with other plants. The clearest story is Eurasian Watermilfoil. It was treated with Sonar in 2001, 2005, 2010, 2013, and 2016. Since then only scattered plants have been found. An explanation is that Curly-leaf Pondweed gets a head start in the Fall and is well established by early Spring, blocking the growth of Eurasian Watermilfoil.

Locations on Spy Pond

Sill– the shallow areas west and north of Elizabeth Island. It is mostly covered with a rich layer of sediment. In 1999, the average thickness of the sediment was eleven feet.

NE cove– The northeast cove is part of the north basin. It is the shallow cove in front of Spy Pond Condominiums. It was especially shallow during 2019 due to the foot-and-a-half drop in water level.

SW cove– The southwest cove is the shallow area near the corner of Rt. 2 and Lake Street. It is the original outlet for Spy Pond to Little Pond in Belmont. After Rt. 2 expanded in the early 1970s, the outlet was replaced by a concrete outfall about a third of the way to Pleasant Street. In extended, heavy rains, the pipe to Little Pond will fill with water.

Rock island– Rock island is a rocky, submerged hill in the west corner of Spy Pond near Rt. 2 and Pleasant Street. The water is shallow from there to the shoreline. Cormorants gather there.

South basin– Nineteen feet deep basin near Route 2. The shallow areas are the sill, SW cove, and rock island

North basin– Thirty-eight foot deep basin in front of the Boys and Girls Club. The shallow areas are the NE cove and the northern shore towards Elizabeth island.

Shallow areas– The sill, the SW cove, rock island, and the NE cove

Summaries

Aquatic plants

Coontail – dense/treated:1999, 2001, 2004, 2005, 2009

Curly-leaf pondweed– dense:2010. 2014, 2015, 2017, 2018, 2019

Eurasian watermilfoil – dense/treated:1999, 2001, 2004, 2005, 2007, 2009, 2010, 2012, 2013, 2015, 2016; sonar:2001, 2005, 2010, 2013, 2016; diquat:2012

Pondweed – dense waterweed 1952, pondweed treated 1966, dense thin-leaf 2012

Sago pondweed – dense:2009, 2010, 2012; diquat:2012

Snailseed pondweed – dense 2018, 2019; diquat 2018, 2019

Spiny naiad – dense 2017; moderate 2018; diquat 2017, 2018

Water chestnut – two plants 2017, eleven plants 2018, no plants 2019

Algae

Blue-green algae – dense/treated 1911, 1915, 1924, 1928, 1929, 1951, 1952, 1959, 1960, 1961, 1966, 1980, 2007, 2008, 2009, 2011, 2012, 2019; restrictions: 2007, 2008, 2011, 2019

Filamentous algae – dense/treated: 1921, 1959, 1960, 1980, 2003, 2012, 2015, 2016, 2018, 2019; diquat w/algaecide 2017, 2018, 2019

Other algae – dense/treated:: 1956, 1957, 1960, 1961, 1970, 1971, 1972, 1980, 2005, 2017

Treatment summary

no aquatic treatment -- 2000, 2002, 2003, 2004, 2006, 2008, 2011, 2014, 2015

3-AT -- 1960

algaecide -- 1911, 1915, 1921, 1928, 1956, 1957, 1960, 1961, 1966, 1968, 1969, 1970, 1971, 1972, 2019

algaecide is usually added to a diquat treatment -- 1966, 2012, 2017, 2018, 2019

alum -- 2004

diquat-- 1966, 1967, 2012, 2017, 2018, 2019

Amitrole-- 1962

AquaPro (*glyphosate*): 2009, 2010, 2011, 2012, 2013, 2016

Aquathol-K (*endothall*) 1972

*sodium arsenate*1960

*arsenate oxide*1962, 1963?, 1968, 1981?

*dalapon*1960

*fenoprop*1960

Sonar (*fluridone*) 2001, 2005, 2010, 2013, 2016

Water quality studies

Nov 25, 1952 – Sterling, The Sanitary Condition of Spy Pond, Metropolitan District Commission (MDC)

1972 – Habitat, Inc., Proposal to study the eutrophication problem of Spy Pond, Belmont, MA

1973 – Cortell, Report of conditions in Spy Pond

July-Aug 1981 – Chesebrough and Duerring, Spy Pond: A diagnostic study, water quality and storm drains, 12/82

Sept 1982 – Chen and Chesebrough, Feasibility Study for Restoration of Spy Pond, flow rate, Rt. 2 dye study, simulated runoff for one year, recommendations

1988 – MEPA Draft Environmental Impact Report Whitman & Howard

Dec 1997 – Shanahan et al, Review of recommendations for the restoration of Spy Pond

Dec 1998, July 2002 – Urban watershed management in the Mystic River Basin, Spy Pond & Horn Pond, Metropolitan Area Planning Council (MAPC) and Dept. Envir. Protection (DEP)

Jan 6, 2000 – Baseline aquatic vegetation survey at Spy Pond, Aquatic Control Technology

1999 – Ivushkina, T., Toxic elements in the sediments of the Alewife Brook and Mill Brook Watersheds

June 1999 – MacLaughlin, An investigation of arsenic in Spy Pond

Jan 2000 – Gawel et al, Characterization and Cycling of Phosphorus and Arsenic, (2/19/99)

2001 – Abbasi, K., Monitoring and Modeling of Phosphorus in Spy Pond , Masters thesis, Tufts Univ

Oct 17, 2001 – Lakes and Ponds Demonstration Grant, MA Department of Environmental Management (DEM, now DCR)

2004 – Durant et al, Elevated levels of arsenic in the sediments of an urban pond

Jan 8, 2004 – 319 Grant for 22 Arlington/Belmont hooded deep-sump catch basins on either side of Rt. 2, Comprehensive Environmental Inc (CEI) designed some baffled sediment tanks

Dec 2007 – ACT Arlington Ponds 2007 Baseline Survey

Dec 2010 – 2010 ACT Report with pre-treatment and post-treatment surveys concerning Sonar and Phragmites

Dec 2012 – 2012 ACT Report for Spy Pond, Arlington Mill Reservoir and Hills Pond

Dec 2013 – 2013 ACT Report with pre-treatment and post-treatment surveys concerning Sonar and Phragmites

Dec 4, 2018 – Spy Pond Edge Protection and Erosion Control CPA project

Links

http://spypond.arlington.ma.us/History.htm

http://spypond.arlington.ma.us/SpyPondQuiz.htm

http://spypond.arlington.ma.us/Water%20Depth%20Map.htm

http://spypond.arlington.ma.us/Watershed%20Map.htm

Spy Pond

Spy Pond and Boating

1907 – Arlington was said to be the number one market garden town in the country

1920s – market gardens explode around Spy Pond, with Wyman Farm on south shore and George Hill Green Houses in West corner

1951 – All industry and farming around Spy Pond replaced by residential housing

Sept 26-Oct 7, 1960 – skin divers from Allied Biological Control Corp cleared submerged obstructions, cans, bottles, automobile, and low-hanging tree limbs

Summer, 1963 – boats and skiers restricted to a counter-clockwise course on weekends and holidays. Enforced by Boat Patrol officers deputized as special police

Apr 3, 1975 – Boats on Spy Pond restricted to 10 hp by Town Meeting

Aug 24, 1991 – Cleanup of NE cove by the Conservation Commission and volunteers. Huge fallen trees, branches, twigs, leaves, weeds, algae, bottles, cans, plastic, foam cups, and a kitchen sink. Many plastic cigarette lighters. Ten boat loads of trash.

2001 – Spy Pond Cleanup Day

Jan, 2009 – Spy Pond is a MA Great Pond owned by Arlington, 78 house lots, four condos, Boys and Girls Club, Spy Pond Park, Kelwyn Manor Park, Elizabeth Island, Rt. 2 path by MassDOT

Apr 28, 2009 – Arlington-Belmont Crew practicing on Spy Pond, problems with noise

Oct 31 - Nov 4, 2016 – Appalachian Mountain Club camped on Elizabeth Island and built two stairs

Spy Pond Park and Eastern Shore

1929 – Article 58 approved to purchase Spy Pond Park for $7,500 between railway and Spy Pond and Linwood to Pond Lane and land owned by Corper

Oct 9, 1959 – the State will remove some 200 underwater pilings and timbers from now none-existent ice houses, boat house, and a hotel-tavern

1960 – A. Carlson pulled a tusk of a mastodon, or perhaps a wholly mammoth, tusk from Spy Pond. It was in three feet of water where the Boy's Club was constructed in 1962 . It is 6.5ft long and weighs about 50 lbs. with about a third missing. The tusk was carbon dated to 42,072 +-4305 years old. It was first noticed by his 10 year-old son, Steven

1968 – Spy Pond apartments built on the east shore

Dec 4, 1980 – Conservation Commission hearing on 905'stone wall from Boys and Girls Club to Spy Pond Playground

Sept 4, 2002 – Dropped irrigation of playing fields from DEM grant due to schedule restrictions. No DEP permit needed if less than 100,000 gallons/day.

Sept 29, 2007 – Spy Pond Splash with Friends of Spy Pond Park and Arlington Center for the Arts, canoes and kayaks from Still River Outfitters, 200 participants

Summer, 2008 – Canoe and kayak rental by Recreation Department, also 2009, 2014-2019

Ice and ice industry

1900s decade – Several ice houses and an ice tool manufacturing adjacent to Spy Pond

1967 – candles of ice like the Devils Postpile, when they broke up it was like wind chimes and beautiful

Nov 30, 2000 – In last 30 years, no ice mid-December, usual ice by Jan 1, ice out in March

Oct 8, 2002 – Film on Ice industry by MIT professor

Mar 19, 2003 – Long lasting ice

April 12, 2005 – ice out early April with 1.5m secchi depth due to brown algae

Mar 18, 2011 – Ice out, a good average date

Mar 5, 2013 – ice safe for skating just one day

Mar 3, 2015 – snow and ice may lead to a fish kill

Jan 3, 2018 – skating on black ice over most of the north basin

Jan 10, 2019 – In 2018, several days of skating on black ice

Jan 2, 2020 – In 2019, one day of skating on black ice

Geology, Hydrology, and Watershed

http://waterdata.usgs.gov/ma/nwis/uv?01103025-- USGS 01103025 Alewife Brook

July 16, 1934 – edge of pond elevation of 3.7 ft

1945 – Geological survey of Spy Pond watershed, mostly sand, gravel, and clay

1959 – Geological survey of the Fresh Pond buried valley, E. shore of Spy Pond is more than 150'of sand and gravel (1944 seismic survey along the railroad, fig. 33)

Dec 1997 – one half of Spy Pond is deeper than three meters, and hence anaerobic at the height of summertime stratification

Dec 1997 – Preliminary estimate of 0.2 million gallons per day of natural ground water flow into Spy Pond from the NE (based on several 21E sites and a deep well at Mirak Chevrolet). It reduces the EDP estimate of hydraulic residence time to 0.8 yrs.

Dec 1997 – Spy Pond's watershed is 706 acres (286 hectares), 70% in Arlington and 30% in Belmont. The area is fully developed and drainage is conveyed to the pond by 43 storm drains

Oct 18, 1981 – Flow rates 0.67"of rain in 6 hrs., Rt. 2 (2-24 cfs), Brooks & Elmhurst (0-4.4 cfs), Spring Valley (0.1-6.25 cfs), Roanoke (0-0.33 cfs)

Oct 26, 1981 – Flow rates 0.44"rain in 5 hrs., Rt. 2 (1.8-2.8 cfs), Brooks & Elmhurst (0-0.9 cfs), Spring Valley (0-4.5 cfs), Roanoke (0-0.12 cfs)

Nov 6, 1981 – Flow rates 0.25"rain in 4 hrs., Rt. 2 (1.75-3.75 cfs), Brooks & Elmhurst (0-0.4 cfs), Spring Valley (0.2-2.25 cfs), Roanoke (0-0.09 cfs)

Oct 26, Nov 6, 1981 – Spy Pond Flow circulation at Rt. 2 using dye tracer during sporadic rain (10/26, 2.3-2.7 cfs, visible dye NW corner, reached north basin in 26 hrs.) and after a

downpour with heavy SW winds (11/6, 2.2-5.2 cfs, visible dye in south basin, reached north basin in 6.5 hrs. and most of north basin in 29 hrs.)

Sept 1982 – full year simulation of runoff using 1968 as a average year, calibrated to the 1981 flow studies, annual runoff Spy 1 (Rt. 2, 219 acre-ft), Spy 5 (Spy Pond Park to Raleigh St, 56 acre-ft), not-Rt 2 (252 acre-ft)

Sept 1982 – Pond volume 59.6 x $10^6 ft^3$, Retention time 1.15 yr.

Sept 1982 – Water volume per year 51.82 x $10^6 ft^3$ (16% rainfall-evaporation, 21% direct runoff except Rt 2, 11% direct runoff Rt 2, 37% base DWF except Rt.2, 15% base DWF Rt/ 2, no estimate of groundwater flow)

1929 – article 51 approved to lay a pipe from the reservoir in Arlington Heights at Swan Place (Arlington Center) to Spy Pond, to increase the flow of water to Spy Pond when there is a surplus

Feb 6, 2002 – Bathymetry of Spy Pond

Mar 19, 2003 – Tri-Community Group considering Spy Pond as a retention area for Alewife flooding

Nov 7, 2017 – presentation by Ella Mattingly on a bathymetry map of Spy Pond using an aquatic drone. She is a member of the MIT Lincoln Labs Venture Crew 475

Route 2

1932 – four-lane, Rt. 2a built using sand and gravel from Sheraton Park

Apr 21, 1967 – Supreme Court Justice P.G. Kirk temporarily halted the widening of Rt. 2

1967-1968 – Rt. 2 expansion project, filled two hectares of Spy Pond, reports of “mud waves” as predicted by property owners

1967-1968 – Rt 2 construction filled in 10% of Spy Pond and displaced sediment thus releasing a lot of nutrients

1968-1971 – Spy Pond unusable due to silt from Rt. 2 construction, Rt. 2 may have covered a glacial fault that fed Spy Pond with water

Dec 3, 2013 – Swales above Rt. 2 @ Pleasant Street do not appear to receive water, confirmed 10/6/15

Rt. 2 path and Spy Pond Trails Day

1952 – A 48”pipe drains Concord Pike into the NW corner (aka southwest corner)

June 15, 2002 – Cleanup of Rt. 2 path

Mar 3, 2004 – Subcommittee on Rt. 2 path, an acoustic engineer recommended against a noise barrier

May 14-15, 2005 – First Spy Pond Trails Day, 80 volunteers including repeats, 3 sets of stone steps, removed invasives, much trash removed especially on highway side of fence

May 13, 2006 – Spy Pond Trails Day, constructed stone steps, removed invasives, picked up trash, in heavy rain all day

May 12, 2007 – Spy Pond Trails Day with vistas, steps, willows, and invasives by fence post (Ailanthus, barberry, bittersweet, burning bush, buckthorn, Elaeagnus, garlic mustard, multiflora rose, swallowwort). Constructed a bench of full-length curbstones. Continued every year, usually the Saturday before Mother's Day

May 13, 2008 – Mass Highway approached about moving the Rt. 2 fence

Nov 12, 2008 – - survey of Rt. 2 path by town engineer

Apr 28, 2009 – Rt. 2 Ailanthus trees chewed up by MassHighway's 'T.Rex', the fence probably cannot be moved due to safety concerns, a bike path would require a guard rail on the Spy Pond side

July 15, 2009 – Locations of poison ivy on Rt 2 path by fence post

June 7, 2011 – MassHighway repaved the Rt. 2 path

Apr 2, 2015 – damaged Rt. 2 fence repaired by MassDOT, due to heavy snow

Apr 30, 2016 – 40-50 members of the Arlington-Belmont Crew pulled bittersweet and trash from the Rt. 2 path the weekend before Spy Pond Trails day

May 7, 2019 – garlic mustard on Rt. 2 path

May 11, 2019 – Spy Pond Trails Day volunteers planted ca. fifty dogwoods and five arborvitae

July 22, 2019 – black swallow wort on Rt. 2 path, post 140, 125, 77-74, and scattered elsewhere

Feb 28, 2020 – MassDOT cut bushes and trees on the Rt. 2 bank, and laid conduit for lighting upgrades

Sand bar and Rt. 2 storm drain

1971 – visible sandbar by Rt. 2 storm sewer, dredged by MassHighway, filling in a Great Pond

Nov 24, 1999 – the thickness of the sandbar in the SW corner ranged from 4.0 to 8.0 feet

2001 – average dry-weather discharge of Rt. 2 storm drain is about 0.03 m^3s^{-1} As much as 50% of the dry-weather flow entering the pond is groundwater that has infiltrated the storm sewers.

Nov 13, 2002 – MassHighway decided not to remove the Rt. 2 sandbar

Sep 11, 2008 – letter to MassHighway on sandbar, joint meeting Dec 11, 2008

Sept 28, 2017 – presentation on the sandbar by P. Schweich to the Arlington Conservation Commission

Oct 20, 2017 – site walk of the Rt. 2 sandbar with Bryan Cordeiro of MassDOT

Jan 12, 2018 – MassDOT started an investigation of the sandbar in the West cove of Spy Pond

Sept 15, 2018 – Meeting with MassDOT District 4, MassDOT Boston, VHB Inc., Town Counsel, DPW, Conservation Commission, Spy Pond Committee,

Oct 1, 2019 – NOI for Fall 2020 sandbar dredging approved by the Conservation Commission.

Outfall to Little Pond

May 1926 – Dam at Spy Pond with 36" pipe to Little Pond. West of Metropolitan Ice House 12.53 near Cross St.. Base of pipe at 5.71 Boston Base, low water grade 7.0, high water grade 11.0, top of structure grade 12, 2x6" planks, topped with an iron grating.

1953 – Reconstructed the outfall at 9.8'Boston City Base after 300'of broken pipe in 1952

1967 – Outfall plans relative to MDPW Datum of 1929, concrete pad at -0.4', 36"pipe to Little Pond, spillway 4.17', boards to top of spillway, outfall cover 7.32'

May 1, 1968 – new outfall is same level as old one (Boston City Base 9.8'at spillway, +5.63')

Sept 1985 – during Hurricane Gloria, the outfall's flashboards gave way, replaced two years later by the MDPW

Aug 8, 1991 – outfall is clogged and badly damaged by vandals

Oct 15, 2001 – notify state about adjustable outflow structure and removal of ice-house piers (to be removed Oct 2004)

June 19, 1999 – Request to Board of Selectman to drop outfall by six inches to avoid shore erosion

May 21, 2002 – top of concrete outfall is 4.7 ft. above sea level

June 15, 2004 – gully above the outfall filled with black-top

Mar 16, 2010 – DPW replaced 2"oak boards in outfall. No pressure due to flooding.

July 8, 2014 – a MassDOT crew installed a fence around the outfall to keep out debris

Water Level

May 1, 1968 – Since 1962, pond lowered from November-May. This practice will continue

Before 1985 – typical water level 3.5'-4.0'

1985-87 – Historic low water level, ca. 2.0'

1987-1996 – typical water level 4.50'

Oct 22, 1996 – historic high water 7.00'

Jan 22, 1997 – Spy Pond design level of 40 researched by Tom Lisco, with access to MassDOT records

Oct 13, 2009 – High water level all summer due to rain

Mar 16, 2010 – Crest of 40+ year flood. Will drop about 2 feet/week if no rain. Flooded pipe carries 15cfs.

Mar 27,2010 – Spy Pond dropped 29" inches from its peak flood to flowing all sides of the outfall. Another 6" to the boards. (6.58'above MDPW 1929, 1996 was 7.00')

May 21, 2013 – - Discharge rate of 9.6 cfs due to 6"reduction (to 27 outfall gauge) for Sonar treatment, pond level dropped 7.25"in 96 hours.

May 30, 2013 – Lisco level of 40 on J. Durant's outfall gauge is 1cm below the board. Received 53 mm of rain since the Sonar treatment (water level to rain multiplier is 3.5).

Sept 6, 2016 – Low pond level (11 cm) all summer due to drought, level dropped in May 40-30 cm for Sonar treatment

May 28, 2019 – Spy Pond water level reduced for shoreline restoration

Mar 13, 2020 – Water level at outfall structure restored (1.5feet, 2 boards)

Mar 13, 2020 – Spy Pond level rising after the viewing platform was installed. Shoreline restoration is almost done

Animals

Fish

http://www.mass.gov/eea/docs/dcr/watersupply/lakepond/factsheet/asian-clam.pdf

Aug 7, 1951 – Fish survey by Fish and Game, mostly white and yellow perch, also large-mouth bass, carp, bullheads, pickerel, killifish

1957 – Spy Pond was reclaimed and stocked with largemouth black bass, brown bullhead, and yellow perch

1973 – significant decline in cold-water fish species due to loss of oxygen via the decomposition of aquatic vegetation

1980 – Fish survey of Spy Pond – abundant largemouth bass, yellow perch, white perch, brown bullhead, pumpkinseed, bluegill, golden shiner, alewife, American eel, goldfish, big carp

Sept 1980 – Spy Pond stocked with 700 tiger muskies

April 1993 – Spy Pond was stocked with tiger muskie fingerlings for more than a decade

1996 – Largest tiger muskie in MA, 15 lbs

2001 – last stocking of Spy Pond with tiger muskie

April 17, 2002 – many bluegills died, MA Fish and Wildlife reported it was natural, perhaps due to spawning and temperature fluctuations

May 6, 2004 – Public health warning about eating Spy Pond carp due to elevated DDT and chlordane

Apr 24, 2016 – More than 25 large carp died, approx. 30 inches long. Like the 2015 epizootic on Charles R. and Lower Mystic lake

July 27, 2016 – I. King caught at 40”Northern Pike weighing 12 pounds

Aquatic animals

1952 – snails, small mussels, and midge larvae found on the bottom of Spy Pond

Sept 2, 2014 – children found large freshwater shell

Jan 10, 2015 – muskrat tracks on the ice and NW shoreline with coyote tracks nearby

May 11, 2015 – Asian Clam (*Corbicula Fluminea*) found at 104 Spy Pond Pkwy

July 10, 2015 – muskrat crossing Spy Pond, nest on Elizabeth Island near the swan nest

Oct 1, 2015 – painted turtles

Sept 6, 2016 – two muskrats and one weasel seen over the summer

Oct 4, 2016 – Asian clams are common on Spy Pond

Oct 7, 2018 – Asian clams found throughout Spy Pond

Apr 25, 2017 – record number of turtles

Birds

http://www.geesepeace.com

http://spypond.arlington.ma.us/Birds.htm

Summer, 1952 – 50-100 ducks on Spy Pond, mostly mallards and black ducks

Jan 1999 – Bald eagle visited Spy Pond twice, also Jan 2000

Apr 2000 – addling of goose eggs, Dept. Health, MA Fish & Wildlife to 2004, $3000-6000/yr

2001 – Coots and Wigeons no longer seen on Spy Pond

Oct 15, 2001 – Goose report from SP Park's Goose Committee, anti-geese-feeding law, 100+ geese sometimes seen, warning to person placing massive amounts of food

March 5, 2003 – Training on addling of goose eggs, to check for late eggs, total of 90+

May 3, 2003 – new birds for the Spy Pond list at the Rt. 2 cleanup, ring-necked pheasant and a wild turkey

May 11, 2004 – five dead geese and many abandoned nests on Elizabeth Is. Unknown predator

2007 – Spy Pond bird list, 32 swimmers and 86 non-swimmers

April, 2008 – Ongoing goose egg addling, 14-19 nests with 72-95 eggs, permits by Dept. of Health, training by MSPCA

June 10, 2008 – three pairs of nesting swans with 11 cygnets, coyote seen in backyard

Sep 23, 2009 – Three swan pairs last Spring, at least one left

Mar 18, 2011 – 20 Buffleheads after ice out

Mar 6, 2012 – fly over by bald eagle at Rt. 2 during site visit with MassHighway and town engineer

Apr 15, 2012 – Bald eagle over Spy Pond

Dec 3, 2013 – 12 Great blue herons on Eliz Island, huge flock of cormorants, and even more mergansers

May 7, 2013 – Large predator (coyote?) killed a goose and destroyed the goose nests

Sept 2, 2014 – no swan's nest this year

Oct 28, 2014 – wood duck seen at handicap ramp, large flock of cormorants, possible bald eagle

Aug 22, 2015 – 100 geese on Spy Pond

Oct 27, 2015 – ring-necked duck, ruddy duck, two young ospreys, and a kingfisher

Oct 1, 2015 – great blue and green herons

Jan 10, 2016 – In 2015, hooded mergansers, American coots, eagles, green herons, ruddy ducks, ospreys, cormorants, blue herons, belted kingfisher, coopers hawk. 18"of ice for most of the winter

Jan 13, 2016 – Two immature eagles on the ice

Jan 16, 2016 – Two eagles feasting on a large carp on the ice, SW cove

Jan 31, 2016 – Eagle family on Spy Pond (mom, dad, and junior)

Feb 2, 2016 – seen on Spy Pond: eagles, ruddy ducks, mergansers, and American Widgeons

May 3, 2016 – Juvenile and adult eagles seen near Rt. 2

Jan 4, 2017 – 11 swans on Spy Pond and an eagle at dawn

Apr 4, 2017 – 100+ Common Mergansers left after a longer than usual stay, also 2 Buffleheads

Apr 25, 2017 – 8 eggs in the swan nest on Elizabeth Island

Sept 5, 2017 – seen on Spy Pond: northern flickers, mocking birds, eagles, red tailed hawks

Jan 12, 2018 – In 2017, Five cygnets. Mergansers, northern flickers, eagles, and numerous ducks

Apr 10, 2018 – eagles on Spy Pond

Jan 10, 2019 – In 2018, many cormorants, common and hooded mergansers, buffleheads, eagles. Five cygnets

Feb 2, 2019 – great black backed seagull on the ice

Oct 30, 2019 – Over a hundred cormorants chasing and eating fish in shallow areas

Jan 2, 2020 – In 2019, many cormorants, common and hooded mergansers, buffleheads, eagles

Mar 1, 2020 – Ten migrating tundra swans on Spy Pond, south basin

Mar 5, 2020 – Twenty swans on Spy Pond, north basin

Other Animals

1945-1952 – Spy Pond did not produce mosquitoes in any significant amount

May 11, 2004 – five dead geese and many abandoned nests on Elizabeth Is. Unknown predator

Aug 10, 2009 – many coyotes in the evening or early morning around Kelwyn Manor

Nov 11, 2009 – Large wolf-looking coyote in Kelwyn Manor and the maple forest

Dec 10, 2010 – coyote killed a racoon in Kelwyn Manor marsh

Jan 6, 2011 – coyotes howling and running through Kelwyn Manor at 4:30am

Jan 11, 2011 – two or three coyotes living on Elizabeth Island, lots of singing. Postponed work group

Feb 2, 2013 – picture of coyote taking a sunbath near Elizabeth Island

May 7, 2013 – Large predator (coyote?) killed a goose and destroyed the goose nests

Sept 3, 2013 – weasel in back yard near Rt. 60 corner, osprey seen all summer

Nov 5, 2013 – Repeated coyote sightings

Feb 11, 2014 – two coyotes crossing the ice at 2am in the moonlight, heading northwest

Feb 19, 2014 – Fresh coyote tracks from near Eliz. Island to Rt. 2 path, perhaps to underpass

Mar 17, 2015 – two coyotes in Kelwyn Manor and on Spy Pond ice

Jan 1, 2017 – Coyote in Kelwyn Manor

Feb. 19, 2017 – spectacular howling of multiple coyotes at 5 AM, some howling the night before, and that evening

June 2, 2018 – two opossums in Kelwyn Manor at 10pm

Jan 11, 2019 – three large coyotes at 3:30 near Kelwyn Manor park, a bloody-murder-scream

July 23, 2019 – two huge coyotes at 10pm in Kelwyn Manor

May 26, 2019 – opossum in Kelwyn Manor during the day

Aquatic Plants

Coontail (Ceratophyllum demersum)

1997 – Coontail is increasingly prevalent on Spy Pond

July and August, 1999 – Coontail and milfoil formed dense, contiguous mats on the sill

Nov 24, 1999 – dominant throughout Spy Pond to 12'deep, especially the sill with 75% cover and the NE cove

May-June, 2001 – Coontail did not respond to the Sonar treatment for milfoil

July 12, 2001 – Reward and K-Tea (algaecide) treatment, 25 acres

July 9, 2004 – throughout the shallow areas, less dense than watermilfoil.

June 10, 2005 – Responded to Sonar treatment with follow-up July 13, reduced water level

July and August 2007 – Not observed

June 22, 2009 – extensive over most of the south basin, less than milfoil

June 27, 2012 – observed

April 30, 2013 – Scattered Coontail

Curly-leaf pondweed (*Potamogeton crispus*, invasive)

https://gobotany.newenglandwild.org/species/potamogeton/crispus/

https://www.illinoiswildflowers.info/wetland/plants/curly_pondweed.html

Turions sprout in the fall. They are dormant over the winter, and the first to grow in the spring. They flower and fruit in June and die back in mid-summer. They can grow to 15-feet tall. Curly-leaf pondweed was the dominant plant last year.

July-Aug 1980 – scattered locations on the north shore from the Rt. 2 corner to Hopkins Rd

June 19, 2003 – fairly heavy growth of curly-leaf pondweed, mostly SW cove and Rock Island, 15 to 20 acres

June 19, 2003 – curly-leaf pondweed may be treated with Sonar, Diquat, Aquathol K (dipotassium endothall)

Nov 4, 2003 – Spy Pond not treated

May 4, 2010 – curly-leaf at or near surface of shallow areas

May 21, 2010 – curly-leaf less apparent, overtaken by milfoil and sago pondweed

Sept 6, 2011 – lots of curly-leaf pondweed

April 30, 2013 – low-density growth widespread throughout the pond, usually at or near the surface

June 4, 2014 – considerable amount of curly-leaf pondweed in shallow areas, typical year after sonar

July 1, 2014 – Few aquatic plants observed on a transect of the sill, curly leaf pondweed died out

Oct 28, 2015 – Considerable weed growth during spring training (AB Crew)

June 13, 2017 – curly-leaf pondweed in shallow areas (sill, NE cove, SW cove, rock island)

May 16, 2018 – curly-leaf pondweed throughout sill

June 24, 2018 – northwest shoreline along Pleasant Street

May 2, 2019 – moderate to dense bottom growth at 26 survey sites across shallow areas

June 7, 2019 - Six inches below surface and on surface near shore

June 22, 2019 – Lots of curly-leaf pondweed in the center, much reduced near shore

June 29, 2019 – Just a little curly leaf pondweed, replaced by snail-seed pondweed

Eurasian watermilfoil (*Myriophyllum spicatum,*invasive) – Last seen in abundance, May 9, 2016

https://gobotany.newenglandwild.org/species/myriophyllum/spicatum/

1978 – Wagemann et al reported that Eurasian watermilfoil can apparently take up sedimentary-As through its roots

Dec 1997 – Shanahan et al recommended wintertime drawdown by three or more feet and the release of aquatic weevils to control Eurasian watermilfoil

Nov 24, 1999 – throughout Spy Pond, especially the sill with 25% cover and the NE cove

Nov 24, 1999 – even when aquatic weevils (*Euhrychiopsis lecontei*) controlled milfoil, the duration of control is cyclical generally on the order of 2-3 years

Nov 24, 1999 – milfoil controlled by fluridone, 2,4-D granular, diquat, and endothal

May 18, 2001 – Sonar treatment with follow-up June 6, problem of considerable outflow

June 19, 2003 – No milfoil found, lots of curly-leaf pondweed

July 14, 2003 – Moderate growth of milfoil in SW cove, 10 acres

July 9, 2004 – Problematic levels throughout the shallow areas, 75% of the south basin

June 10, 2005 – Sonar treatment with follow-up July 13, reduced water level

July 31, 2007 – widespread eurasian watermilfoil up to 10-12'deep, dense in the NE cove

Aug 31, 2007 – 75-100% cover in the NE cove to 8'deep, and 64% of south basin sites

June 22, 2009 – moderate to dense eurasian watermilfoil on or near surface in shallow areas, 4-8'deep (47 acres)

May 4, 2010 – moderate to dense eurasian watermilfoil on sill, NE cove, SW cove, and hill

May 21, 2010 – watermilfoil was 4-6 feet tall and curly-leaf pondweed was less apparent

June 1, 2010 – Sonar treatment with follow-up July 7

Sept 6,2011 – lots of eurasian milfoil

May 25, 2012 – Spy Pond is highly chocked with weeds

June 7, 2012 – south basin fully engaged with eurasian watermilfoil and another pondweed (60/40). Just as bad as June 2010 before the sonar treatment

June 27, 2012 – 45acres of dense, topped-out, or nearly so, eurasian watermilfoil and sago pondweed

July 17, 2012 – Treated with Reward and a chelated copper algaecide

April 30, 2013 – dense eurasian watermilfoil (2-3 feet tall) SW basin, rock island, north sill near Elizabeth Island, NE cove

May 21, 2013 – Treated with Sonar with follow-up June 28. Milfoil had grown quickly over the previous two weeks. Should have treated sooner.

Aug 22, 2015 – Thick milfoil on sill, interrupting the flow of water by Elizabeth Is.

Oct 14, 2015 – trace to moderate in shallow areas, moderate near Sherwood Road

Late April or May 2016 – sparse to dense eurasian watermilfoil

May 9, 2016 – treated with Sonar with follow-up June 13

Phragmites and other emergent species

Aug1951 – found cattails and pickerel weed, but did not report phragmites

1952 – limited quantities of cattails on the north shore of the NE cove, Kelwyn Manor marsh and SW cove, very limited amounts of pickerel weed, and small clumps of phragmites in the

June 24-27, 1960 – entire shoreline treated for phragmites, cattails, and pickerel weed and Kelwyn Manor marsh and SW cove

Sept 26-Oct 7, 1960 – Re-treated cattails, phragmites

1962 – plans to treat Cattail and Phragmites

1980 – picture of sparse phragmites near Kelwyn Manor beach

1980 – large stand of phragmites at Kelwyn Manor marsh, also SW side of Elizabeth Island, and near Gould Rd

Nov 24, 1999 – purple loosestrife and phragmites are of concern

Apr 13, 2004 – Phragmites is a problem on Spy Pond

Oct 6, 2009 – Phragmites in water treated

Feb 22, 2011 – Green brier on Elizabeth Island

Oct 5, 2011 – Phragmites on abutters land treated

May 1, 2012 – Planting plan for KM marsh after removal of phragmites

Sept 13, 2012 – after phragmites removed the marsh had jewelweed, cattail, sedges, blackberries, poison ivy, bittersweet nightshade, purple loosestrife, golden rod, pokeweed, and many more. Volunteers planted bayberry, blueberries, American Cranberrybush, tussock sedge, soft stem bull rush, joe pye weed, and cardinal flowers.

Oct 9, 2013 – Phragmites treated, mainly Kelwyn Manor Park and western shore of Elizabeth Island

Oct.5, 2016 – Phragmites treated via backpack sprayers and hand-wiping

Pondweed and other aquatic plants

https://www.illinoiswildflowers.info/wetland/plants/sl_pondwd.html

late 1800's, early 1900's – substantial weed growth around Elizabeth Is. is visible in photos

1902 – Board of Health recommended extensive dredging to exterminate the growth of weeds

1914 – sometimes large quantities of aquatic plants

Aug 1951 – Elodea and Potamogeton on surface of NE cove

1952 – very small quantities of yellow pond lily in NE cove and SW cove

1952 – 50% coverage to 10'deep, 90% waterweed (*Elodea canadensis*), and 10% floating pondweed (*Potamogeton natans*), most are wholly submerged. Elodea needs a high pH >8.0. Spy Pond is in good balance

1955 – 85% of Spy Pond covered in weeds

July 3, 1959 – 80% of surface covered with weeds and algae along Pleasant St shoreline. Impossible to swim, fish, boat, or even walk nearby

Spring, 1960 – cat-o-nine tails, water lilies, algae, etc. so dense that M.M. Boschetti surveyed Spy Pond with an "air boy" as in the Everglades

June 6-27, 1960 – heavy growths of Elodea, Potamogeton, and lilies along the shoreline to 200'

June 30-July 2, 1960 – heavy growths of Potamogeton with scattered Elodea

Aug 3, 1966 – Potamogeton treated with Diquat

May 1, 1968 – weeds is biggest problem

July 15, 1968 – treated tremendous accumulation of large aquatic weeds, up to tree size

Aug 24, 1991 – Weeds and algae a problem for years in the NE cove

June 19, 2003 – 10 acres of pondweed in NE cove, heavily coated with filamentous algae

August 31, 2007 – South basin and sill with thin-leaf pondweed (*Pot. pusillus*, 20% of sites), bushy pondweed (*Najas Flexilis*, 6% of sites)

June 27, 2012 – widespread thin-leaf pondweed on sill, bushy pondweed observed

April 30, 2013 – Scattered thin-leaf pondweed and waterweed

Sept 2, 2014 – pondweeds not bad, NE cove less weedy than before

Oct 6, 2015 – weeds becoming a safety issue for swimmers and boaters

Oct. 14, 2015 – Sparse slender naiad (*najas flexilis*) shallow areas

May 2, 2019 – Trace thin-leaf pondweed on sill and NE cove

Aug 15, 2019 – Trace thin-leaf pondweed on south basin

Sago pondweed (*Stuckenia pectinatus*)

Summer, 1980 – Sago pondweed was the most common aquatic plant, particularly around Elizabeth Island, NE cove and southern shores. Frequently covered with filamentous algae.

June 22, 2009 – Sago pondweed extensive over most of the south basin, less than milfoil

May 4, 2010 – Sago pondweed (2-3'tall)

June 27, 2012 – dense Sago pondweed covered ca. 17 acres of the sill

July 17, 2012 – Treated with Reward and a chelated copper algaecide

April 30, 2013 – Decaying, dense sago pondweed on the sill, most of biomass from 2012

Oct 14, 2015 – Trace on sill

Snailseed pondweed (*Potamogeton* bicupulatus, native)

https://gobotany.nativeplanttrust.org/species/potamogeton/bicupulatus/

July 31, 2007 – observed, not found in the August 31 survey

July 27, 2016 – sparse to trace after May sonar treatment, also thin-leaf pondweed

June 24, 2018 – filling up Spy Pond on the sill behind Elizabeth Island (not sago pondweed)

July 26, 2018 – dense growth of snailseed pondweed on sill and NE cove

Aug 13, 2018– treated with Reward and algaecide, 40 acres, shallow areas

June 30, 2019 – fairly dense snailseed pondweed, 2-5'of water, 13'secchi depth

July 12, 2019 – treated with Reward and algaecide, shallow areas

Spiny naiad (*najas minor*, brittle or European naiad, invasive)

https://www.mass.gov/files/documents/2017/09/06/european-naiad.pdf

June 27, 2012 – small patch observed

Oct. 14, 2015 – trace Spiny naiad, north shore of north basin and scalon field

August 4, 2017 – dense spiny naiad (NE cove, N Elizabeth Isl, Kelwyn Manor, SW cove, Rt. 2)

August 28, 2017– 38 acres treated with reward

July 19, 2018 – moderate spiny naiad

Aug 13, 2018– treated with Reward and copper algaecide, 40 acres, shallow areas

Water chestnut (*trapa* natans, invasive)

http://www.oars3rivers.org/threats/invasive/water-chestnut
http://www.mass.gov/eea/docs/dcr/watersupply/lakepond/factsheet/water-chestnut.pdf

June 13, 2017 – two plants removed (near Spring Valley Road and end of Sheraton Park)

Aug 2, 2018 – ten plants removed along north shoreline from Spring Valley Rd to Wellington St.

Aug 20, 2018– one plant removed the previous week, near Wellington St

June-Sept, 2019 – no plants observed

Algae

Blue-green algae– toxins can be dangerous

1880 – Cambridge water board reported large amounts of Clathrocytis (blue-green algae), making Spy Pond unfit for domestic use

1911 – treated with copper sulphate by the Cambridge Ice Company

1915 – treated with lime followed by copper sulphate, neighbors called the Board of Health

1924 – enormous growth of Clathrocytis (blue-green algae)

1928, 1929 – blue-green algae treated

Aug 1951 – algae bloom of Microcystis

1952 – Cyanophyceae blue-green algae (6400-8100 colonies/ml)

Aug 9, 1959 – children have rashes and huge itching welts after contact with Spy Pond water

Sept 9, 1960 – algae treated with copper sulfate, 0.3 ppm

Aug 24, 1961 – algae treated with copper sulfate

1966 – algae treated with copper sulfate

July 26, 1968 – Spy Pond was “milky green”, treated with copper sulphate

1980 – J. Hill reported that Spy Pond is in some years pea soup

late July, 1980 – cyanophyceae peak north basin 7/28/80 6,666 cells/ml, south basin 7/21/1980 10,833 cells/ml

Sept 1982 – During the summer months, the south basin more than the north basin is prone to nitrogen limitation (N/P<14) which encourages blue-green algae (utilizes particulate nitrogen)

Sept 6, 2007 – Spy Pond swimming and dog restrictions due to microcystis algae bloom

Aug 21, 2008 – high levels of microcystis algae detected by MyRWA, Board of Health requests no swimming

July-Aug, 2009 – microcystin level was at or above 1 ppb three times. From 2009 to 2011, ten instances of Microcyctis counts exceeding 75,000

June 27, 2011 – Spy Pond closed due to elevated counts of microcystis (blue-green) algae. Not lifted

Feb 2, 2012 – Meeting with Board of Health regarding blue-green algae

June 27, 2012 – moderate blue-green algae in south basin, *Anabaena*(2,960 colonies). High green algae in north basin

July 11, 2012 – high blue-green algae in south basin, *Microcystis* (32,560 colonies/ml) and *Aphanizomenon* (*17,760 colonies*). High green algae in north and south basins

July 17, 2012 – treated with Reward and algaecide, shallow areas

June 9, 2013 – scratchy swim, water a bit hazy. Day before was OK. Sonar treatment May 21

July 12, 2019 – treated with Reward and algaecide, shallow areas

July 31, 2019 – clear to 4’

Aug 1, 2019 – blue-green algae on surface near south shore

Aug 5, 2019 – clumps of algae throughout the water column, like the fall turnover

Aug 9, 2019 – small algae throughout (informal secchi depth 2.75’)

Aug 10, 2019 – cleaner, no problems swimming

Aug 18, 2019 – scratchy swim with visible algae

Aug 20, 2019 – no algae visible on sill, good swim

Aug 21, 2019 – algae treated with copper sulfate algaecide, shallow areas, due to request by Dept. of Health and abutters of the NE cove

Sept 5, 2019 – algae spot treated with copper sulfate algaecide, NE cove and maybe elsewhere

Sept 20, 2019 – algae bloom public health advisories lifted

Filamentous algae – (*Conferva, Rhizoconium, Mougeotia*) mats of algae

https://extension.psu.edu/filamentous-algae

1921 – Conferva growing on the bottom produced objectionable odors

1926 – Many complaints of odors from Spy Pond during warm dry periods. Addressed by the Spy Pond Improvement Committee

July 3, 1959 – dense, smelly algae covering plants

June 24-27, 1960 – heavy growths of algae along the shoreline, scattered growth beyond 200’

1980 – large mats and abundance of filamentous algae along the shores and littoral zones, primarily Rhizoconium and Mougeotia

June 19, 2003 – NE cove pondweed heavily coated with filamentous algae

Sept 2, 2010 – Thin layer of filamentous algae covering most of the observed plants

June 7, 2012 – Filamentous algae starting to form on dense eurasian watermilfoil in south basin

June 27,2012 – dense eurasian watermilfoil and filamentous algae in NE cove (picture)

Oct. 9, 2013 – thin layer of filamentous algae on most of the observed plant cover

Aug 22, 2015 – terrible looking white algae coating the underwater brush

Oct 1, 2015 – mats of bubbling filamentous algae in SW cove

July 27, 2016 – dense filamentous algae in NE cove after May sonar treatment

June 24, 2018 – green mats along the edges of Spy Pond, along the bottom, and draping over plants

May 2, 2019 – present at 7 sites at SW cove, Boys and Girls Club, Spy Pond park

July 12, 2019 – Spy Pond treated with Reward and algaecide for snailseed pondweed

July 20, 2019 – heavy algae and pondweed in NE cove, secchi depth 2'5"

Aug 15, 2019 – filamentous algae present at 9 sites at SW cove, Spy Pond Park, and NE cove

Aug 15, 2019 – dense algae in NE cove, earlier reports by abutters and Dept. of Health

Aug 21, 2019 – algae treated with copper sulfate algaecide

Sept. 5, 2019 – follow-up spot treatment with copper sulfate algaecide

Other algae

https://fortress.wa.gov/ecy/gisresources/lakes/AquaticPlantGuide/descriptions/nit.html

June 6, 1871 – Cambridge water board reported fermentation that required filtering

Sept 21, 1960 – Spy Pond turned pea soup green after the June/July treatment

Aug 24, 1961 – algae treated with 1400 lbs. of copper sulphate

early July, 1980 – large algal bloom and the pond was green, in Spring, brown and turbid

Nov 13, 1980 – algal bloom due to fall turnover, brownish hue in Sept and Oct.

Sept 1982 – on an annual average basis, Spy Pond is limited by phosphorus (N/P>18) and green algae and diatom concentrations are high

Aug 24, 1991 – Weeds and algae a problem for years in the NE cove

Sept 3, 2003 – algae growth, no significant weeds after 2001 Sonar treatment

Oct 27, 2004 – algae and weeds starting to grow back, turbidity increased significant by late summer despite alum treatment in June

April 12, 2005 – ice out early April with 1.5m secchi depth due to brown algae

Apr 23, 2017 – dense, reddish-brown algae everywhere, 0.5m secchi depth

May 2, 2019 – sparse stonewort at 1 site at Spy Pond Park

Aug 15, 2019 – dense stonewort at 1 site at Spy Pond Park, sparse at 14 sites at sile, SW cove, and Spy Pond Park

Algae counts and secchi depth – closure if 70,000 cells/ml (2012 ACT report)

Jul 7, 1980 – summer peak of total algae >30,000 cells/ml

Nov 13, 1980 – fall peak of total algae, >30,000 cells/ml

Apr 1993 – water is transparent to ten feet

Feb 22, 1998 – Secchi depth south basin 1.8m (4/20/14 email)

June 19, 2003 – green water color, Secchi depth 3.5-4.0 ft

July 14, 2003 – Secchi depth 4.0 ft

Apr 25, 2004 – Secchi depth south basin 2.6m north basin 2.5 (4/20/14 email)

Apr 4, 2005 – Secchi depth south basin 1.3m north basin 1.6 (4/20/14 email)

Aug 31, 2007 – Moderate algae counts, 90% golden algae (*Synura*, 11,248 of 12,654), 1 site had stonewort (*Nitella spp.*)

Mar 10, 2008 – Secchi depth south basin 1.7m north basin 1.7 (4/20/14 email)

Mar 20, 2009 – Secchi depth south basin 3.1m north basin 3.0 (4/20/14 email)

Summer, 2009 – Secchi depth 0.8,

Mar 10, 2010 – Secchi depth south basin 3.0m (4/20/14 email)

May 2, 2011 – Secchi depth south basin 5.0m (4/20/14 email)

Apr 21, 2012 – Secchi depth south basin 3.30m north basin 4.0 (4/20/14 email)

June 27, 2012 – total algae counts are 142,228 north basin, 38,036 south basin

July 11, 2012 – total algae counts are 78,736 north basin, 172,716 south basin

July 17, 2012 – treated with Reward and algaecide, shallow areas

Aug 3, 2012 – total algae counts are 44,252 north basin, 76,664 south basin

Aug 16 – total algae counts are 31,524 north basin, 35,668 south basin

July 4, 2012 – Secchi Dipin N/S ave. m, 1997 1.2, 1998 2.0, 1999 1.3, 2000 1.6, 2001 2.0, 2002 1.1, 2003 1.3, 2004 6.6, 2005 3.8, 2006 4.3, 2007 4.0, 2008 4.0, 2009 4.2, 2010 6.0, 2011 5.7, 2012 3.1

July 14, 2013 – Secchi depth south basin 1.8m north basin 2.0 (7/16/13 email)

Apr 20, 2014 – Secchi depth south basin 1.4m north basin 1.4 (4/20/14 email)

May 3, 2015 – Record low secchi depth (0.6m) for Spy Pond (2 years after Sonar treatment)

Dec 13, 2015 – Low secchi depth (0.8m) for Spy Pond, probably due to fall turnover

Apr 23, 2017 – Record low secchi depth (0.5m) due to brown algae

Water Quality and Treatments

Water Quality Associations

1929 – Report of the Spy Pond Improvement Committee

July 17, 1959 – Spy Pond Association formed, incorporated Apr 13, 1961

1966 – Arlington Conservation Commission formed

1967 – Mystic Valley Watershed Association formed by Dr. Herbert Meyer

Oct 15, 1971 – Spy Pond Study Committee formed by Town Meeting

May 14, 1980 – Spy Pond Improvement Association formed, John Hill is the head of the committee. There was also a Spy Pond Study Committee at the same time

Aug 19, 1996 – Spy Pond Committee formed with J. Howard, E. Karpati and others

Sept 4, 2002 – D. Kopans developing the Spy Pond website

Dec 13, 2005 – Review of Spy Pond Water Quality with Prof. Durant

Jan 10, 2006 – Spy Pond Nonpoint Source Pollution Community Survey, sent out late January

Sep 27, 2006 – Weed Watcher Training with A. Monnelly and J. Straub.

Oct 3, 2006 – Securing the Health of Our Lakes with W. Reed

May 3, 2011 – Spy Pond Stories: Fish, Fables, and Tall Tales at Town Hall

Aug 7, 2012 – Spy Pond barbecue. Continued annually the first Tuesday in June

Mar 23, 2013 – EcoFest on secchi disk and quiz about watersheds

May 7, 2013 – Visit to Wayland Committee on control of milfoil on Dudley Pond by divers

June 3, 2014 – Spy Pond barbecue with Nancy Flynn and Spy Pond Assoc. archives

May 30, 2015 – Spy Pond Fun day with Spy Pond Committee, Friends of Spy Pond Park, Arlington-Belmont crew, Arlington Land Trust, Arlington Public Art, Mystic River Watershed Assoc, Still River Outfitters, Department of Public Works, Mass Audubon, Creek River String Band, Lokensgard Brass Quintet, face painting, painting the pond

Mar 24, 2018 – Demonstration of clam trucks and storm drains at EcoFest with cardboard cylinders and post hole digger

May 1, 2018 – Discussion with Prof. John Durant of Tufts University about Spy Pond

Sept 4, 2018 – Discussion of the 2012 National Lakes Assessment Final Generic Environmental Impact Report, continued at other meetings

Nov 15, 2018 – Meeting with Conservation Commission and Spy Pond Committee on Spy Pond concerns

Jan 2, 2020 – Spy Pond Committee Facebook page (spypondcomm)

Water Quality Projects

http://spypond.arlington.ma.us/SPCWhy.htm

http://spypond.arlington.ma.us/DEM.htm

http://spypond.arlington.ma.us/Challenges.htm

Nov 25, 1952 – Sterling, The Sanitary Condition of Spy Pond, Metropolitan District Commission (MDC), House document No. 2208

Mar 6, 1980 – $87,500 two-year grant to study Spy Pond, Urban Initiative Clean Lakes Program, headed by E. Chesebrough

Oct-Nov 1981 – Water quality, rainfall, storm-water flow at Rt. 2, Spring Valley, Roanoke, and Brooks&Elmurst. Sampled manholes, particularly Rt. 2 drainage

Sept 1982 – Water leak into Rt. 2 drainage system from standpipe at top of Park St, repaired

Sept 1982 – Preferred control plan 8a: groundwater inflow from a new well near end of Water St, O_2 diffuser in north basin, 12" pipe to carry dry water flow from Rt. 2 to north basin, 30" pipe to carry first flush from Rt. 2 to outlet.

1988 – Whitman & Howard concluded that diversion to Little Pond would lead to flooded yards. They recommended a pilot study of a wetland treatment facility at the former MDC skating rink, and a hypolimnetic aeration system

Aug 8, 1991 – Town Manager cancelled the last option for improving Spy Pond by building a $250,000 water treatment plant at the old, MDC skating rink

Aug 24, 1991 – Clean up of NE cove by the Conservation Commission and volunteers. Huge fallen trees, branches, twigs, leaves, weeds, algae, bottles, cans, plastic, foam cups, and a kitchen sink. Many plastic cigarette lighters. Ten boat loads of trash.

Sept 24, 1992 – end of state funding for Spy Pond work from the Federal Clean Lake funds

June 21, 1997 – Spy Pond cleanup by the Spy Pond Committee and 70 volunteers, mid-90s, tree trunks, branches, large amounts of weeds, plastic, balls, pens, bottles, bottle caps, fishing wire, a bathtub, a bicycle, a sink, and dead muskrat and racoons

Dec. 1997 – Shanahan, P., Spink, J., Morales, A., Review of Recommendations for the Restoration of Spy Pond, Arlington, Massachusetts, HydroAnalysis, Inc. of Acton, MA and MNS Counsultants, Inc of Wellesley, MA

Dec 1998 – MAPC study funded by DEP grant "Urban watershed management in Spy Pond & Horn Pond areas, Stacey Justus, published July 2002

1999 – shoreline survey of Spy Pond via 'City Green' GIS for tree cover, impervious surface, and stormwater runoff. By Stacey Justus of MAPC

Mar 2000 – Arlington Warrant Article 63, Spy Pond Weed Remediation

2000 – Spy Pond Demonstration grant from MA Dept Environmental Management (DEM) for storm drain marking, fertilizer flyers, ecological gardening, ca. 15 leaching catch basins, and alum treatment

2001 – first fertilizer flyer from Spy Pond Committee to all households in watershed, via Neighborhood Newsletter, and Arlington High School SAVE and Workplace students. Designed by C. Wallace. Transferred to D. Kopans 2004

2001 – Spy Pond Cleanup Day

Oct 17, 2001 – Awarded $300,000 3 yr. DEM grant (Lakes and Ponds Demonstration Grant, MA Department of Environmental Management, now DCR). E. Pannetier developed the proposal for 15 leaching catch basins (identify by Prof. Durant), 500 catch basin markers, more frequent cleaning of catch basins, irrigation with pond water, alum treatment, aeration system, public education, design and monitoring by Tufts,

Apr 27, 2002 – BSCES, Arlington High SAVE, and volunteers marked storm drains with 1000 plastic markers designed by high school students “Only Rain Down the Drain – Flows to Spy Pond” and “Dump No Waste – Flows to Spy Pond”. Markers from DAS Manufacturing. 60 volunteers in about 325 hours over 4 sessions

May 6, 2002 – Scope of work for DEP study by Eileen Pannetier

July 2002 – the MAPC study recommended leaching catch basins, stormwater retrofits, a lower water level, anti-erosion measures for Spy Pond Park (shoreline, path, swale, boardwalk), stormwater treatment at the MDC rink, stormwater bylaws, improved cleaning of catch basins, a new sweeper, a road salting policy, and various education programs

Jan 22, 2003 – Letters to Garden Centers in 2001 on low-phosphorus fertilizer did not do much

Mar 25, 2003 – Ecological Gardening Class as part of DEM grant, three Tuesdays plus workshop, and ecological gardening tour

April 15, 2003 – Quality Assurance Plan (QAPP) for DEM grant by J. Durant, monitoring Spy Pond for stratification for five years, published Dec 2005

June 17, 2003 – !5 leaching catch basins installed on east side of pond by CEI Consultants, Inc.

July 15, 2003 – Rebecca Overacrethesis on chloride levels since 1998, recommended aeration

Jan 8, 2004 – 319 Grant for 22 Arlington/Belmont hooded deep-sump catch basins on either side of Rt. 2, Comprehensive Environmental Inc (CEI) designed some baffled sediment tanks

Nov 17, 2004 – Investigated three Solar Bees for aeration, G. Smith reported that aeration helps about half the time

Dec 2007 – Arlington Ponds 2007 Baseline Survey, ACT

Mar 31, 2009 – draft Spy Pond Management Plan, like the Open Space Committee

Mar 11, 2008 – Presentation on rain gardens by Rachel Calabro, Mass Riverways Program

Mar 21, 2010 – F. Clark workshop on landscape and lake edge plans, 37 attendees

Oct 1, 2011 – rain garden installed next to the Spy Pond playground

Dec 4, 2018 – Spy Pond Edge Protection and Erosion Control CPA project by Friends of Spy Pond Park, Arl. Conservation Commission, and Chester Engineers

Feb 4, 2020 – Storm drain markers removed or serious water damage, good one at Orvis Rd @ Freeman St, south corner. Steel markers from Almetek may last longer

Treatments

https://www.minnesotawildflowers.info/grass-sedge-rush/engelmanns-flatsedge

1902 – Arl. Board of Health recommended extensive dredging to exterminate the growth of weeds

1911 – treated with copper sulphate by the Cambridge Ice Company

1915 – treated with lime followed by copper sulphate

1921 – Dept of Public Health recommended dredging to 8'to control filamentous algae

1921 – copper sulphate

1925 – recommendation to raise pond level by 2.2'and dredge to 8', initiated by legislative act

Fall, 1928 – treated with copper sulphite for blue-green algae

1929 – two treatments of copper sulphite for blue-green algae, all three by Weston & Sampson

1952 – phragmites along marsh and SW cove

1952 – sodium arsernite is a recognized poison. When applied by untrained individuals it is extremely dangerous to operators, all who use the water, and to all forms of life that it contains

Aug, Sept 1956 – copper sulfate

Aug 1957 – copper sulfate

June 6, 1960 – Elodea and Potamogeton in the beach area of Kelwyn Manor treated with silvex (Fenoprop) 2ppm

June 6-27, 1960 – treated Elodea and Potamogeton at the Kelwyn-Manor beach area

June 24-27, 1960 – treated entire shoreline with with silvex (Fenoprop) for Elodea, Potamogeton, and lilies (200'into the water)

June 24-27, 1960 – treated entire shoreline with Aminotriazole (3-AT) to control cattails, phragmites, pickerel weed

July 2, 1960 – Potamogeton treated with sodium arsenite 10 ppm (two doses, 2-3 days apart)

Aug 1, 1960 – Spy Pond is weed free

Sept 21, 1960 – algae treated with copper sulfate, 0.3 ppm

Sept 26-Oct 7, 1960 – Re-treated cattails, phragmites etc. with Dalapon at 20 lbs. per acre

Sept 26-Oct 7, 1960 – skin divers from Allied Biological Control Corp cleared submerged obstructions, cans, bottles, automobile, and low-hanging tree limbs

Aug 24, 1961 – algae treated with 1400 lbs. of copper sulphate

1962 – plans to treat Cattail and Phragmites

July 18, 1962 – Arsenic Oxide 19 ppm for submerged aquatic growths, Dalapon and Amitrol for cattail and phragmites

June 1, 1963 – Charra (musk grass) and Potamogeton treated with sodium arsenite [?]

July 1966 – copper sulfate 600 lbs. entire lake

Aug 3, 1966 – 15 acres of Potamogeton treated with 15 gallons of Diquat

Aug 1967 – diquat on 15 acres

May 1968 – Arsenic Oxide 7.5 ppm, treated tremendous accumulation of large aquatic weeds, up to tree size

May 1968 – copper sulphate 0.3 ppm

July 26,1968 – treated algae with copper sulphate 0.3 ppm

June 1969 – copper sulphate 0.3 ppm

April 2, 1970 – Discussion of fish population vs. herbicide (sodium arsenite)

July 1970 – copper sulphate 0.3 ppm

May 27, 1971 – Div. of Fisheries & game does not allow previous herbicides

July 28 to Sept 17, 1971 – copper sulfate

July 1972 – copper sulfate and Aquathol-K (endothall)

1981 – Last treatment with sodium arsenate (doubtful, reported 13 yrs. Later)

May 18, 2001 – Eurasian milfoil treated with Sonar (*fluridone*) with follow-up June 6, problem of considerable outflow

Sept 4, 2002 – No weeds in Spy Pond

June 19, 2003 – Mostly curly-leaf pondweed, not treated

June 19, 2003 – curly-leaf pondweed may be treated with Sonar, Diquat, Aquathol K (*dipotassium endothall*)

May 20-28, 2004 – Heavy alum treatment to reduce phosphorus (multiple tank trucks)

June 10, 2005 – Eurasian milfoil treated with Sonar with follow-up July 13, reduced pond level

April 10, 2007 – Arlington Water Bodies Fund established by MA Home Rule petition, approved by state June 2008

Oct 17, 2007 – Milfoil is getting bad again, no treatment

Apr 9, 2008 – Karro Frost surveyed Spy Pond for Engl. Sedge, found on Spy Pond Park

Nov 12, 2008 – No treatment due to endangered sedge

June 30, 2009 – Treated, probably with diquat. RFP too late for Sonar treatment

Oct 1, 2009 – Frances Clark surveyed for Engel. Umbrella Sedge (*Cyperus engelmannii*)

Oct 6, 2009 – Phragmites in water treated with AquaPro (*glyphosate*) using backpack sprayers and a ladder boat, 1 acre

Nov 12, 2009 – 60 residents contributed $6,000 for phragmites treatment to the Water Bodies Fund

June 1, 2010 – Eurasian milfoil treated with Sonar with follow-up July 7, reduced pond level

Sept28, 2010 – Frances Clark surveyed for Engelmann. Umbrella Sedge

Oct 12, 2010 – Phragmites on land treated with AquaPro using backpack sprayers, boat, and ARGO all-terrain vehicle, 1.1 acres

Summer, 2011 – No treatment of Spy Pond

Sept 18, 2011 – Ted Elliman surveyed Spy Pond for Engl. Umbrella Sedge (. date)

Oct 5, 2011 – Phragmites on abutters land treated with backpack sprayers

May 16, 2012 – Presentation by Aquatic Control Technology on treating algae and reducing phosphorus, including ultrasound, aeration, algaecides, Phcomycin, SeClear. and Phoslock.

July 17, 2012 – Eurasian milfoil and Sago pondweed treated with Reward (*diquat*) and a chelated copper algaecide; algaecide added to aid in cuticle penetration and control of algae

May 21, 2013 – Eurasian milfoil treated with Sonar with follow-up June 28, reduced pond level

Oct 9, 2013 – Phragmites treated with AquaPro using backpack sprayers, mainly Kelwyn Manor Park and western shore of Elizabeth Island (0.75 acre). Natural Heritage, no take, Engl. Sedge

2014 – No treatment of Spy Pond

May 21, 2015 – Charles Quinlan survey for Engel. Umbrella sedge

June 8, 2015 – Considered 2,4-D or triclopyr to protect the sedge for Natural Heritage

Oct 1, 2015 – Brett Trowbridge survey for Engelmann's umbrella sedge

Jan 10, 2016 – Stopped 2015 treatments of Spy Pond due to Engelmann's Umbrella Sedge

May 9, 2016 – Eurasian milfoil treated with Sonar with follow-up June 13, shallow all summer due to drought (ca 6-9"drop)

Sept 6, 2016 – lots of Engel. Sedge due to low water and sandy beaches

Sept 6, 2016 – lots of purple loosestrife in Kelwyn Manor marsh

Oct.5, 2016 – Phragmites treated with AquaPro via backpack sprayers and hand-wiping. Amanda Weise monitored treatment for Engel. Sedge

Aug 28, 2017 – Spiny naiad treated with Reward and algaecide, 38 acres, shallow areas

Aug 13, 2018 – Snailseed pondweed and spiny naiad treated with Reward and algaecide, 40 acres, shallow areas

May 28, 2019 – Spy Pond water level reduced the previous week by about a foot (1 board), another board was removed later for shoreline restoration of Spy Pond Park (total of 1.5'lower)

Apr 2, 2019 – RFQ's for biological survey and lake management awarded to Solitude Lake Management

Apr 2, 2019 – Dropped the idea of a 604B grant. Spy Pond and its watershed are well-studied, although dated. Total phosphorus is too high and Spy Pond is eutrophic

July 2019 – Spy Pond Management Plan from Solitude Lake Management

July 12, 2019 – Snailseed pondweed treated with Reward and algaecide, shallow areas

Aug 21, 2019 – algae treated with copper sulfate algaecide, shallow areas

Sept 5, 2019 – algae spot treated with copper sulfate algaecide, NE cove and maybe elsewhere

Phosphorus

Summer, 1952 – average phosphorus near surface, 0.003 ppm (0.0-0.015)

1972 – Stumm and Stumm-Zollinger report orthophosate concentrations in the interstitial water in lake sediments as much as 1000 times greater than typical water column concentrations. Under anaerobic conditions, phosphorus in the sediment is readily released to the water column. Orthophosphate is quickly consumed by algae

July-Dec 1980 – peak of total phosphorus in µg/l, north basin July 180 and Dec 240, south basin July 130 and Dec 200, the maximum total phosphorus concentration of nearly 250 µg/l is far into the hypereutrophic range

Apr 3, 1981 – N:P ratio of 66.4:1, extreme phosphorus limitation, but additions of both nitrogen or phosphorus increased algal yield significantly, biological available P is 0.44 mg P/l (Appendix F)

Sept 1982 – Phosphorus loading 0.83 g/m^2/yr (internal 0.33, direct runoff 0.28, base flow 0.19, atmospheric 0.03, or Rt.2 0.22, except Rt2 0.0.25). Yearly retention 60 kg/yr (direct runoff 138, base flow 94, atmospheric 15, discharge 187, retention 24%) [Shanahan p. 25, internal load undocumented]

Sept 1982 – on an annual average basis, Spy Pond is limited by phosphorus (N/P>18) and green algae and diatom concentrations are high

Sept 1982 – During the summer months, the south basin more than the north basin is prone to nitrogen limitation (N/P<14) which encourages blue-green algae (utilizes particulate nitrogen)

1982 – Wang and Harleman show that diffusion across and below the thermocline of stratified lakes is at or near the rate of molecular diffusion, an extremely low rate of mass transfer

1988 – Whitman & Howard estimated that watershed controls (e.g., frequent cleaning of stormwater drains) would reduce the phosphorus load by 0.04 g/m^2/yr, or 8% of the total.

Oct 1992 – Schueler predicates removal rates for constructed wetlands for suspended solids (75%), total phosphorus (45%), and total nitrogen (25%). For combination pond-wetland systems the rates are total phosphorus (65%) and total nitrogen (40%).

1993 – Cooke et al recommended extreme caution with alum treatments when alkalinity is below 30 mg/l. Otherwise fish kills may occur. Spy Pond occasionally drops below the level. Alum treatment is only viable if external phosphorus loads are reduced.

1993 – Cooke et al recommend against hypolimnetic aeration in lakes with maximum depth less than 12 to 15 meters, otherwise the aerator erodes the thermocline. Spy Pond is 11.5 meters deep

Dec 1997 – Spy Pond is currently eutrophic or hypereutrophic (literally “well fed” or nutrient rich).

Dec. 1997 – Weed growth draws on nutrients stored in the sediments while algae depend upon nutrients in the water column

Dec 1997 – one half of Spy Pond is deeper than three meters, and hence anaerobic at the height of summertime stratification

Dec 1997 – flow measurements did not accompany the stormwater water-quality measurements so that nutrient loading estimates could not be made from Chesebrough and Duerring 1982, nor were sediment samples collected and analyzed for phosphorus. Sediments almost certainly act as a major source of nutrients

Dec 1997 – sediment sample collection and analysis for phosphorus requires the installation of seepage meters/sample collectors during a field program of several weeks' duration (Lee 1977)

Dec 1997 – Shanahan et al suggested feasibility studies for gravity drainage and Rt. 2 intercept to a wetland at the old MDC skating rink, subsurface infiltration under Spy Pond field for Spy 4 and Spy 5 runoff, and wetland treatment at Elizabeth Island

1998-1999 – Total phosphorus at deepest point, north basin 780-1100 µg/l7/6-10/27, south basin 2000-3250 µg/l7/6-10/6

Oct 1998 – "Ten Years of Artificial Mixing and Oxygenation: No Effect on the Internal Phosphorus Loading of Two Eutrophic Lakes", Durant summarizes that P release is unrelated to dissolved oxygen concentration

Jan 24, 1999 – Highest Phosphate stormwater drain #9 (Spy Pond Lane, 0.896 mg PO4-P/L) and #10 (Roanoke, 0.986 mg PO4-P/L)

Feb 19, 1999 – Spy Pond eutrophic and at times hypereutrophic, 1m salt layer at bottom of south basin, stormwater phosphorus has not decreased since 1981 (140 kg/yr) and may be as much as 250-510 kg/yr). The top 20 cm of sediments contain ca. 10,000 kg P, with ca. 250 kg deposited each year. Average dissolved phosphorus of 93 kg of which 81 kg exits each year. Internal loading from the sediment is ca. 90 kg/yr. Total phosphorus concentration in the epilimnion (upper layer) have not increased since 1981, but concentrations in the hypolimnion (bottom layer) have increased from 750 micro gramP/L to 1,100 micro gram P/L (highest in south basin due to salt layer)

Nov 24, 1999 – The sill contains muck/silt sediment with an average thickness of 11.00 ft

Jan 2000 – approx.. 90 kg of phosphorus mobilized from pond sediments each year, north basin 58kg/yr, south basin 33 kg/yr

Jan 2000 – approx.. 10,000 kg of phosphorus in the top 20 cm of the sediments

Dec 11, 2001 – Phosphorus carried by wind and rain via soil dust

J. Durant suggested changing the outflow so that the water comes from the phosphorus-heavy bottom rather than the top.

2004 – alum treatment, resulted in substantially higher water clarity

Sept 4, 2007 – Ave. total phosphorus was 0.03 mg/L at the threshold to stimulate algae

Desirably low dissolved P 0.018 mg/L bottom of south basin, 0.011 mg/L bottom of north basin

June 27 and Aug 16, 2012 – High total phosphorus at the bottom of the south basin (0.320 mg/L), no dissolved P

Water Quality

1850 – Spy Pond Water Company pipes water to West Cambridge (now Arlington)

1867 – renamed as Arlington Lake Company

1898 – Arlington joined the Metropolitan District Commission

1932-1951 – Annual testing of Spy Pond by MA Public Health

1951 – Traces of dissolved oxygen to 33'

1952 – average pH of 8.8 (8.3 to 9.3)

Aug 8, 1952 – dissolved oxygen in north basin, 2.2 ppm at 20', 0.9 ppm at 25', 0 ppm at 30'

April 15, 1964 – Sewerage problem on Spring Valley due to tree trunk in manhole

April 2, 1970 – Spring Valley storm water overflow with raw sewerage

July-Aug 1980 – high levels of fecal coliform due to storm drains, later identified as a broken sanitary sewer that leaked into a stormwater manhole, after complaint by a Stoney Brook Rd. resident

Early1997 – high concentrations of arsenic in Spy Pond sediments, 500 ppm to 800 ppm, followed by 1m core 1/30/98

Dec 1, 1998, Feb 19, 1999 – north basin had the highest arsenic of 76 sediment samples (2644 ppm)

Feb 1999 – anoxia in bottom 1m of north basin, winter-time stratification when surface waters cool below 4^{o}C. North basin had transient chemical stratification due to salt, while south basin was stratified for much of the year.

Mar 17, 1999 – sediment cores show sharp peaks in arsenic concentration from near zero historic levels, north basin (2000 ppm @ 10cm, 400 ppm @ 0 cm) and south basin (2800 ppm @ 27 cm, 500 ppm @ 0 cm)

Jan 2000 – Anoxia from mid-May to November. The onset of anoxia in Spy Pond is accelerated compared to Upper Mystic Lake and other stratified lakes, perhaps due to high loadings of organic matter.

Jan 2000 – top 20 cm of sediments contain between 1600 and 2500 kg arsenic of which 160 kg may be due to stormwater and groundwater. From Cortell 1973 figures, herbicides would account for 1 kg of arsenic. Clayton and Tanner (1994) report 5500 kg arsenic applied to Lake Rotoroa, New Zealand in 1959

Jan 2000 – consider reducing salt from road runoff in the south basin to reduce chemical stratification, but thermal stratification will continue

2002 – DEP found DDT and Chlordane above safe limits in carp, signs posted spring 2004

Sept 4, 2007 – normal pH – 7.02 bottom of south basin, pH 8.52 bottom of north basin

low to moderate turbidity – 0.98-2.0 NTU on July 30 and 0.85-1.0 NTU on Sept4 on surface and bottom of basins

Mar 3, 2009 – MyRWA found coliform bacteria at Rt 2 infall. Unknown source

May 21, 2010 – Dissolved oxygen was good throughout the water column, ave. 8.8 mg/L to 8 meters (85% saturation)

Sept 2, 2010 – Dissolved oxygen ave. 7.8 mg/L to 6 meters (90% saturation). Below the thermocline, it was <1.0mg/L due to thermal stratification

June 27 and Aug 16, 2012 – High pH of 9.3 on 6/27 at surface of north basin, other readings 6.6-7.8

Low to moderate turbidity at surface, high turbidity at bottom (3.2-7.3 NTU)

Dissolved oxygen 7.8-10.9 mg/L to 2 meters, 0.16-0.3 below the thermocline

Aug 16, 2012 – Elevated E.coli for south basin (140-190 colonies per 100 ml), OK for swimming

Oct 1, 2012 – Moderate concentrations of cooper in the sediment, near average for MA (170 mg/kg north basin, 200 mg/kg south basin)

April 30, 2013 – Dissolved oxygen good, ave. 9.8 mg/L to 8 meters (100% saturation)

Oct. 9, 2013 – Dissolved oxygen good above the thermocline, ave.9.5 mg/L to 5 meters (95%)

Oct 17, 2019 – Soil test of Spy Pond sediment pH 5.8, (ppm): P 3.9, K 54, Ca 1117, Mg 111, S 97.4, Sodium 649, soil organic matter 10.4% Sorbed Metals (mg/Kg) Pb 56.9, Cu 16.3, As 16/3. Sodium is 20x normal, optimum levels P 4-14, K 100-160, Ca 1000-1500,Mg 50-120, S >10

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June 19, 2003 – ACT Aquatic Plant Surveys, EK Spy Pond Notebook, 11/3/2003

July 14, 2003 – ACT Aquatic Plant Surveys, EK Spy Pond Notebook, 11/3/2003

July 15, 2003 – SP minutes 7/15/03, 9/3/03

Nov 4, 2003 – SP minutes 11/4/03

2004 – Durant, J.L., Ivushkina, T., MacLaughlin, K., Lukacs, H., Gawel, J., Senn, D., Hemond, H.F., Elevated levels of arsenic in the sediments of an urban pond: sources, distribution and water quality impacts, *Water Research*, vol. 38, 2989-3000.

Jan 8, 2004 – SP minutes 1/8/04, 1/13/04

Mar 3, 2004 – SP minutes 3/10/04, 4/20/04, 6/15/04

Apr 13, 2004 – SP minutes 3/10/04

May 6, 2004 – Advocate 5/6/04 “Warning issued about eating Spy Pond carp”

May 20-28, 2004 – EK Spy Pond notebook, 5/13/2004 “Spy Pond Nutrient precipitation/inactivation treatment”, SP minutes 5/11/04

June 15, 2004 – SP minutes 6/15/04

July 9, 2004 – 2005 ACT Report

Oct 27, 2004 – SP minutes 10/27/04, 11/17/04

Nov 17, 2004 – SP minutes 11/17/04, 1/11/05, 1/4/05

May 14-15, 2005 – SP minutes 10/27/04, 6/7/05

June 10, July 13,2005 – 2005 ACT Report

Dec 13, 2005 – SP minutes 12/13/05

Jan 10, 2006 – SP minutes 1/10/06, EK Spy Pond notebook with survey, MyRWA

May 13, 2006 – Advocate letter 5/23/06 “Rain doesn’t stop volunteers” in EK Spy Pond notebook

2007 – http://spypond.arlington.ma.us/Birds.htm

Apr 10, 2007 – SP minutes 4/10/07, 6/10/08, Advocate 7/24/08 in EK Spy Pond notebook

May 12, 2007 – EK Spy Pond notebook 3/6/07, SP minutes 6/5/07

July 31, Aug 31, Sept 4, 2007 – 2007 ACT Report

Sept 6, 2007 – ConComm agenda for 9/20/07

Sept 29, 2007 – SP minutes 12/5/06, 1/9/07, 2/6/07, 6/5/07,10/17/07, EK Spy Pond notebook 3/5/07

Oct 17, 2007 – SP minutes 10/17/07

Dec 2007 – Arlington Ponds 2007 Baseline Survey, 2007 ACT Report

May 11, 2008 – SP minutes 5/11/08

April, 2008 – EK email 11/7/08 J. Friis, in Open Space Plan for Spy Pond

April 9, 2008 – SP minutes 4/9/08, CBB notebook #99

May 13, 2008 – SP minutes 5/13/08

June 10, 2008 – SP minutes 6/10/08

Summer, 2008 – SP minutes 4/9/08, EK Open Space Management Plan for Spy Pond 1/09

Aug 21, 2008 – SP minutes 8/21/08, Advocate 8/21/08 “High levels of algae in Spy Pond”

Sep 11, 2008 – EK Spy Pond notebook, 12/11/08, 10/28/14

Nov 12, 2008 – SP minutes 11/12/08

Jan, 2009 – EK Open Space Management Plan for Spy Pond

Mar 3, 2009 – SP minutes 3/3/09

Mar 31, 2009 – SP minutes 3/31/09

Aug 10, 2009 – KM email V. Turner “coyote”

Apr 28, 2009 – SP minutes 4/28/09

June 30, 2009 – SP minutes 6/9/09

July 15, 2009 – KP SP notebook

July-Aug, 2009 – See Feb 2, 2012

Summer 2009 – SP minutes 10/13/09

Sep 23, 2009 – CBB email “Meeting last night in Arlington (swans)

June 22, June 30, July 15, Aug 20, Sept 2, Oct 6, 2009 – 2009 ACT Report

Oct 1, 2009 – CBB email F. Clark, 9/30/2009, “Spy Pond Botanist Work Order…”

Oct 13, 2009 – SP minutes 10/13/09

Nov f11, 2009 – KM email, K. Zimmerman “Wolf?”

Nov 12, 2009 – EK Spy Pond notebook

Mar 16, 2010 – CBB email, 3/15/10, W Eykamp and J. Friis “Optimal time to replace wooden boards”

Mar 16, 2010 – SP email, W Eykamp “Spy Pond Level

Mar 21, 2010 – EK Spy Pond notebook, 3/10/2010, SP minutes 4/6/20

Mar 27, 2010 – SP email, W Eykamp “Spy Pond Level Update”

May 4, May 21, June 1, July 7, Sept 2, Oct 12, 2010 – 2010 ACT Report

Sept 28, 2010 – CBB email F. Clark 10/1/10 “Spy Pond, permit plant report #09-26949”

Dec 2010 – ACT 2010 report (see May 4 …)

Dec 10, 2010 – KM email J. McKenna, “Dead Racoon in the park”

Jan 6, 2011 – KM email D. Blood-Deschamps, H. Noyes, “Kyotes”

Jan 11, 2011 – CBB email C. Beckwith, B. Rehrig “coyotes on Elizabeth Island”

Feb 22, 2011 – CBB email “Phragmites and green brier on Elizabeth Island

May 3, 2011 – SP minutes 5/3/11

Mar 18, 2011 – SP email 3/19 W. Eykamp, “Ice out” w/ reply by E.B. Benson

Summer, 2011 – Review of CBB email

June 27, 2011 – Arlington Board of Health minutes 11/2/11, SP minutes 9/6/11

Sept 6, 2011 – SP minutes 9/6/11

Sept 18, 2011 – CBB email T. Elliman 9/16/11 “Looking for botanist …”

Oct 1, 2011 – SP minutes 10/4/11

Oct 5, 2011 – SP email “Phragmites treatment”

Feb 2, 2012 – CBB email, W. Eykamp “BOH meeting tonight” and “Meeting with Board of Health regarding blue-green algae”. And12/6/11 “Some data…” and “Microsystis MDPH Spy Pond Data 2009-2011”

May 1, 2012 – SP minutes 5/1/12, 6/5/12

May 16, 2012 – CBB email 5/10/12, J. Glushko “Treament(s) for Town Water Bodies”

May 25, 2012 – CBB email 5/25/12, J. Burns, “Spy Pond weed irradication”

Apr 15, 2012 – KM email “Bald eagle over Spy Pond Pkwy today”

June 7, 2012 – CBB email 6/7/2012. W. Eykamp “Spy Pond--facts on the water”

June 27, July 11, July 17, Aug 3, Aug 16, Oct 1, 2012 – 2012 ACT Report

July 4, 2012 – CBB email 9/14/2012, W. Eykamp “Town Day” “Secchi for town day 20121.xls”

Sept 13, 2012 – SP/KM email “What grows at Spy Pond”

Dec 2012 – 2012 ACT Report for Spy Pond, Arlington Mill Reservoir and Hills Pond (see June 27…)

Feb 2, 2013 – KM email H. Hoyes

Mar 5, 2013 – SP minutes 3/5/13

April 30, May 21, June 28, Oct 9, 2013 – 2013 ACT Report

Apr 30, 2013 – SP minutes 4/2/13

May 7, 2013 – SP email E. Leondar-Wright “Preadator(s) just ate geese…”

May 21, 2013 – email W. Eykamp “Herbicide Debriefing” and “USGS…”

May 23, 2013 – SP minutes 5/23/13

May 30, 2013 – email W. Eykamp “water level”

June 9, 2013 – CBB email 6/10/13 “algae bloom?”

July 16,2013 – email W. Eykamp “Secchi Dipin on Bastile Day”

Sept 3, 2013 – SP minutes 9/3/13

Nov 5, 2013 – SP minutes 11/5/13

Dec 2013 – 2013 ACT Report with pre-treatment and post-treatment surveys concerning Sonar and Phragmites (see April 30,…)

Dec 3, 2013 – SP minutes 12/3/13, 9/30/14

2014 – review of CBB email

Feb 11, 2014 – KM email T. Petryshen “dogs barking last night”

Feb 19, 2014– CBB email W. Eykamp “Coyote tracks”

Apr 20, 2014 – CBB email W. Eykamp “Secchi Reading Easter Sunday”

June 3, 2014 – SP minutes 6/3/14

June 4, 2014 – CBB/ACT email “curlyleaf pondweed”

July 1, 2014 – CBB email “Spy Pond snorkel”

July 8, 2014 – SP email 7/15/14, C. Holemo, MassDOT “Spy Pond Outfall Protection”

Sept 2, 2014 – SP minutes 9/2/14

Oct 28, 2014 – SP minutes 10/28/14

Jan 10, 2015 – CBB email W. Eykamp, with picture of tracks, “Nature in new snow”

Mar 3, 2015 – SP minutes 3/3/15

Apr 2, 2015 – CBB email W. Eykamp 4/5/15 “Path”, email B. Loosian 3/27/15 “[Down fence]”

May 3, 2015 – CBB email W. Eykamp “New Record Secchi Spy Pond!”

May 11, 2015 – CBB email C. Beckwith “Asian clam”

May 17, 2015 – KM email D. Donahue, T. Petryshen, “coyote on Spy Pond”

May 21, 2015 – CBB email M.-A. Marold, 6/8/15 “Spy Pond Plans for 2015”

June 8, 2015 – ACT email “Spy Pond Plans for 2015”

July 10, 2015 – CBB email T. Petryshen “water critter”

Aug 22, 2015 – CBB email M. McDonnell “Spy Pond worries”

Sept 22, 2015—CBB email “Brett on Spy Pond today”

Oct 1, 2015 – CBB email B. Trowbridge (biologist) “John Durant installed Spy Pond gauge”

Oct 6, 2015 – SP minutes 10/6/15

Oct 14, 2015 – ACT email “Dominic Spy Pond Survey”

Oct 27, 2015 – SP minutes 10/27/15

Oct 28, 2015 – email M. Grinberg (AB Crew) “Spy Pond Weeds”

Dec 13, 2015 – SP email “Spy Pond algae”

Jan 10, 2016 – Vision-2020 email “Spy Pond Report for 2015”

Jan 13, 2016 – SP email “Eagles”

Jan 16, 2016 – KM email “Great bird watching/photo op …”

Jan 31, 2016 – KM email “eagle family on the pond”

Apr 24, 2016 – SP/KM email “carp die-off on Spy Pond”

Apr 30, May 3, 2016 – SP minutes 5/3/16

Feb 2, 2016 – SP minutes 2/2/16

May 9, June 13, July 27, Oct 5, 2016 – 2016 SLM Report

July 27,2016 – Advocate, 8/11/ 16, “A tooth grin”

Sept 6, 2016 – SP minutes 9/6/16

Oct 4, 2016 – SP minutes 10/4/16

Oct 5, 2016 – CBB email A. Weise, 10/6/15, “Spy Pond Treatment 10/5”

Oct 31 - Nov 4, 2016 – SP minutes 11/1/16

Jan 1, 2017 – KM email E. Logan, “Coyote”

Jan 4, 2017 – CBB email W. Eykamp “Spy Pond Tonight”

Feb 19, 2017 – KM email D. Blood-Deschamps, H. Rossi, T. Petryshen, “howling this morning”

Apr 23, 25, 2017 – SP email W. Eykamp “New Record”

June 13, Aug 4, Aug 28, 2017 – 2017 SLM Report

Sept 28,2017 – CBB email P. Schweich “when is the CC hearing on the sandbar”

Oct 20, 2017 – CBB email B. Cordeiro “Spy Pond sandbar”, SP minutes 11/7/17

Jan 2, 2018 – SP email “2017 Annual Report for the Spy Pond Committee”

Jan 3, 2018 – CBB email “skating today …”

Mar 24, 2018 – SP minutes 4/10/18, SP/KM email 3/21/18 “EcoFest 2018”

Apr 10, 2018 – SP minutes 4/10/18

May 1, 2018 – SP minutes 5/1/18

May 16, July 19, July 26, Aug 13, 2018 – 2018 SLM Report

June 2, 2018 – KM email “T. Petryshen”

June 24, 2018 – SP/KM email “water chestnuts, brittle naiad, and treatment plan for Spy Pond”

Aug 2, 2018 – SP/KM email “water chestnuts found on Spy Pond”

Aug 20, 2018 – SP/KM email “update on Spy Pond”

Sept 4, 2018 – SP minutes 9/4/18

Sept 15, 2018 – SP minutes 10/2/18

Oct 7, 2018 – SP letter to ConComm “Spy Pond concerns”

Nov 15, 2018 – SP minutes 11/6/18

Dec. 4, 2018 – SP minutes 12/4/18

Jan 10, 2019 – SP email “2018 report for the Spy Pond Committee”

Jan 11, 2019 – KM email D. Kenney “2 Coyotes”

Feb 2,2019 – SP minutes 2/5/19

Apr 2, 2019 – SP minutes 4/2/19, 2/5/19

May 2. June 30, July 12, Aug 15, Aug 21, Sept 5, 2019 – 2019 SLM Report

May 11, 2019 – CBB email J. Entwistle, K. Atkinson, S. Rogovin 4/23/19 “Tree choices from Northeast”

May 26, 2019 – KM email B. Mitchell, J. Marsden “New neighbor!”

May 28, 2019 – CBB email “Spy Pond drawdown”

July 2019 – SpyPond2019ManagementPlan.pdf, SP minutes 10/1/19

July 20, July 31, Aug 1-10, Aug 18-20, 2019 – CBB field journal

July 22, 2019 – CBB email K. Atkinson, C. Miller 7/22/19 “black swallow wort”, SP email 8/1/19

July 23, 2019 – KM email L. Charles “Coyotes”

Sep 20, 2019 – Arlington Health & Human Services News, “Algae Bloom …Spy Pond”

Oct 1, 2019 – SP minutes 10/1/19

Oct 17, 2019 – SP minutes 12/3/19, UMass Extension Soil Test Report 10/17/19 S191003-205

Oct 30, 2019 – email “Comorants”

Jan 2, 2020 – SP email “2019 report for the Spy Pond Committee”

Jan 7, 2020 – SP minutes 1/7/20

Feb 4, 2020 – SP minutes 2/4/20

Feb 28, 2020 – CBB email W. Eykamp 2/28/20 “work on Route 2 by Spy Pond”

Mar 1, 2020 – CBB email B. Battuello, “Just under the wire”

Mar 5, 2020 – SP email “About 20 swans”

Mar 13, 2020 – SP/KM email “pond level is rising”