An Aquatic History of Spy Pond

Collected by Brad Barber
Spy Pond Committee
http://arlingtonma.gov/spypond
https://www.facebook.com/spypondcomm/

February 9, 2021

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.

The following notes are from studies of Spy Pond, annual reports of Aquatic Control Technology, annual reports of SOLitude Lake Management, academic papers, minutes and email of Spy Pond Committee, email of Kelwyn Manor, 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 studies and papers are available on the Arlington website.

A summary of aquatic plants, algae, treatments, and studies follows this introduction. The first section, *Spy Pond*, covers Spy Pond and its animal life. The next section, *Aquatic Plants*, concerns its aquatic plants. The following section is 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 for each note.

Spy Pond has had water quality issues since the late 1800s. Spy Pond is 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. Four farms abutted Spy Pond with additional farms nearby. By 1980, Spy Pond was eutrophic or hypereutrophic (literally "well fed" or nutrient rich).

Since 1980, water quality studies and projects have attempted to resolve these issues. Best management practices attempt to reduce the amount of phosphorus entering the pond. However 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.

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, SOLitude Lake Management of Shrewsbury, MA manages Spy Pond's vegetation and algae.

Plants and algae compete for sunlight and nutrients. Rooted plants take most of their nutrients from the sediment while algae takes nutrients from 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. When plants and algae die,

they decompose, release nutrients, and sink to the bottom. Each year, the pond becomes shallower and more productive.

The sanitary engineering study of 1950-1952 described Spy Pond's problems starting from 1871. It reported 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 dredging, harvesting, herbicides, and algaecides. Dredging and harvesting are expensive for a water body of Spy Pond's size. The first treatment of Spy Pond was in 1911. In the summer of 1960, the Massachusetts Department of Public Health treated the pond with an arsenic-based herbicide. By that August, Spy Pond was weed free. This led to the glory days of Spy Pond described in *Spy Pond Stories* (Balazs, 1997). The last treatment of this period was 1972.

Jason Cortell was a biologist for the companies treating the pond from 1960 to 1972. In 1973, he wrote a detailed, historic synopsis of conditions in Spy Pond. It contains a wealth of information about Spy Pond. For example, the appendices list the aquatic plants and algae species from 1880 to 1972, and chemical treatment data from 1921 to 1972. Cortell reports that the sediment in Spy Pond contains large amounts of decaying organic matter. He writes "The volume of the sediment in shallower parts of the pond is greater than the volume of water and contains roughly four to five hundred times more phosphorus."

From the 1970s to the 1990s, Spy Pond's problems increased. In 2001, the Town of Arlington started herbicide treatments after several studies of Spy Pond and its watershed. A systemic herbicide, Sonar (*fluridone*), was applied in 2001, followed by an alum treatment in 2004 and a second Sonar treatment in 2005. Treatments of Spy Pond continue.

Massachusetts participated in the Clean Water Act of 1977. In 1996, the Massachusetts Department of Environmental Management produced a field manual and course book, *Lake and Pond Management*. In 2004, the UMass Water Resources Research Center produced a Generic Environmental Impact Report (GEIR), *Eutrophication and Aquatic Plant Management in Massachusetts*. Both reports emphasized reducing phosphorus from the watershed. In 1996, the Arlington DPW cleaned all 3,300 catch basins in Arlington. In 1997, Friends of Spy Pond Park distributed a fertilizer flyer to 500 homes in the Spy Pond watershed. In 2003, 15 leaching catch basins were installed. The development of best management practices continues.

Troublesome aquatic plants and algae appear to occur in waves: algae from 1880 to 1972 and 2007 to 2012, pondweeds and waterweeds from 1902 to 1971 and from 1999 to 2019, Coontail from 1997 to 2009, Eurasian Watermilfoil from 1997 to 2016, Sago pondweed from 2009 to 2012, Curly-leaf pondweed from 2010 to 2020, Spiny naiad in 2017, Water chestnut in 2018, and Snail-seed pondweed in 2018 and 2019.

In 2020, there was no Water chestnut, no Coontail, no Sago pondweed, and scattered Eurasian watermilfoil. The reason for Water Chestnut disappearing was that all plants and almost all seeds were removed in 2018. The other declines 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 2016 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. In addition, Eurasian watermilfoil may become less troublesome after 10 to 20 years.

In 2020, Spy Pond was treated with Sonar. After a brief, algae bloom due to disintegrating curly-leaf pondweed, Spy Pond was clear of aquatic plants. Algae was limited to the bottom of shallow areas, the SW cove, and south end of the Rt 2 shore. Additional algae appeared in October.

Sonar is a systemic herbicide that should not be used every year. It is expensive and non-selective. It prevents the growth of almost all aquatic plants. Applying contact herbicides after plants cover the surface is likewise undesirable (e.g., 2017, 2018, and 2019). A large mass of plants decays all at once, leading to algae blooms and increased sedimentation.

As the shallow areas of Spy Pond fill with decayed plants, its problems will only get worse. More sunlight reaches the sediments, growing more plants. This is a natural process much accelerated by urban development. Accumulation rates can be 2-3 inches per year. The sill between north and south basins is four to six feet deep. If sediment accumulates at 1/2 inch per year, the sill starts becoming a marsh in 96 years.

Ideally, Spy Pond would have aquatic plants on the bottom, emergent plants along the shore, and enough open water for fishing, sailing, rowing, and other activities. Sonar is systemic and should limit plant growth for two to four years. Earlier, smaller, and repeated herbicide applications of diquat and other herbicides may avoid excessive plant growth.

Locations on Spy Pond

Spy Pond is a glacial kettle-hole pond similar to Walden Pond in Concord. It is about 3.7 ft above sea level. Spy Pond is the headwaters of the Great Swamp that covered much of North Cambridge. Its 102 acres are separated into a north and south basin by Elizabeth Island and a shallow sill. The basins have steep sides. The north basin is on the axis (deepest line) of the glacial Fresh Pond Buried Valley. For example, the Minuteman bikeway immediately east of Spy Pond sits on 150 feet of sand and gravel. On the western shore of Spy Pond, cores drilled during the Rt. 2 expansion showed organic material to 70 feet below sea level. The southern shore is mostly sand with a thin covering of topsoil. The northern shore is steep with rocky soils raising 400 feet to the water tower on Arlington Heights.

This report refers to the following features of Spy Pond.

Sill– the shallow areas west and north of Elizabeth Island. The sill is mostly covered with a layer of organic muck, 11 feet thick on average, up to 22 feet. There is about 6 feet of water.

SE cove– The southeast cove is part of the north basin. The cove is in front of Spy Pond Condominiums. The end of the cove is particularly shallow near Princeton Road.

SW cove– The southwest cove is the shallow area at 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. During extended heavy rains, the outlet 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 on Rock Island when the water is low.

South basin– The south basin is the basin between Elizabeth Island and Route 2. It is 19 feet deep near the turning buoy. Towards Pleasant Street, it is 17 feet deep next to Route 2. The shallow areas for the south basin are the SW cove, Rock Island, and the sill.

North basin– The north basin is the basin between Elizabeth Island and Spy Pond Park. It is 38 feet deep in front of the Boys and Girls Club. The shallow areas for the north basin are the northern shore northeast of Elizabeth Island, and the far end of the SE cove. A small shallow area occurs beyond the end of Spy Pond Lane.

Shallow areas– The shallow areas of Spy Pond are the sill, the northern shore northeast of Elizabeth Island, the far end of the SE cove, Rock Island, and the SW cove. The shoreline plus shallow areas constitute the *littoral* zone of Spy Pond, i.e., where sunlight reaches the bottom in sufficient intensity for rooted and bottom-dwelling plants. The shallow, littoral zone covers 46% of Spy Pond (ACT 2009 report).

Summaries

Aquatic plant summary

Coontail – dense or treated 1990s, 1997**,** 1999, 2001, 2004, 2005, 2009

Curly-leaf pondweed – dense or treated 2003, 2010, 2011, 2013, 2014, 2015, 2017, 2018, 2019, 2020

Eurasian watermilfoil – dense or treated 1990s, 1997, 1998, 1999, 2000, 2001, 2004, 2005, 2007, 2009, 2010, 2011, 2012, 2013, 2015, 2016; sonar used in 2001, 2005, 2010, 2013, 2016

Pondweeds, waterweed, etc. – dense or treated 1902, 1914, 1929, 1951, 1952, 1955, 1959, 1960, 1962, 1963, 1965, 1966, 1967, 1968, 1971, 1991, 1996, 2003, 2012, 2015

Sago pondweed – dense 1980, 2009, 2010, 2012

Snail-seed pondweed – dense 2018, 2019

Spiny naiad – dense 2017; moderate 2018

Water chestnut – two plants 2017; eleven plants 2018; no plants 2019, 2020

Algae summary

Blue-green algae – dense or treated 1880, 1911, 1915, 1924, 1928, 1929, 1951, 1952, 1956, 1957, 1959, 1960, 1961, 1962, 1963, 1965, 1966, 1967, 1968, 1969, 2007, 2008, 2009, 2011, 2012; restriction 2007, 2008, 2011

Filamentous algae – dense or treated 1921, 1926, 1953, 1959, 1960, 1963, 1965, 1966, 1969, 1970, 1980, 2003, 2012, 2015, 2016, 2018, 2019

Other or unspecified algae – dense or treated 1871, 1956, 1957, 1960, 1961, 1962, 1963, 1964, 1967, 1968, 1970, 1972, 1980, 1982, 1996, 2003, 2004, 2005, 2015, 2017, 2019; restriction 2019

Treatment summary

no aquatic treatments (1956-date) – 1958, 1959, 1964, 1965, 1973-1980, 1982-2000, 2002, 2003, 2006-2008, 2011, 2014, 2015

Algaecide for algae

copper sulfate -- 1911, 1915, 1921, 1928, 1929, 1956, 1957, 1960, 1961, 1966, 1968, 1969, 1970, 1971, 1972, 2001, 2012, 2017, 2018, 2019

lime (reduces acidity) – 1915

Herbicides for aquatic plants

alum (potassium aluminum sulfate for binding phosphorus) – 1981, 2004

diquat (Reward, usually with copper sulfate) -- 1966, 1967, 2009, 2012, 2017, 2018, 2019

dichlone (Phygon) -- 1956

endothall (Aquathol-K) – 1972, 2003

fenoprop (Silvex) -- 1960

fluridone (Sonar, systemic) -- 2001, 2005, 2010, 2013, 2016, 2020

sodium arsenite ($NaAsO_2$, As_2O_3 in an aqueous solution) – 1960, 1962, 1963, 1968

Herbicides for emergent plants

2,2-Dichloropropionic acid (Dalapon for cattail, phragmites, pickerel weed) -- 1960, 1963

3-AT (Aminotriazole or Amitrole for cattail, phragmites, pickerel weed) -- 1960

glyphosate (AquaPro for phragmites) -- 2009, 2010, 2011, 2013, 2016

Water quality studies summary

Nov 25, 1952 – Sterling, The Sanitary Condition of Spy Pond, House Document 2208

June 1972 – Survey of storm drains, water quality, and microscopic examination by Allied Biological Control

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

April 1988 – Whitman & Howard, MEPA Draft Environmental Impact Report

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

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

June 6, 1999 – Spy Pond Shore Rehabilitation Project

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

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

Sept 2001 – Abbasi, K., Modeling Phosphorus Cycling and Road Salt Effects, Master's thesis, Tufts Univ

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

July 2002 – Justus, Urban watershed management in the Mystic River Basin, Spy Pond & Horn Pond

June 17, 2003 – 15 leaching catch basins installed on east side of pond by CEI Consultants, Inc.

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

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

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

Oct 24, 2017 – Mattingly, Inland global warming preparedness project, bathymetric model of Spy Pond via an aquatic drone

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

Jan 2020 – Mystic Phosphorus Alternative TMDL Report, prepared by Mystic River Watershed Association, EPA, and MassDEP

Spy Pond

Spy Pond

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

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

1703 – Capt. Reginald Boardman purchased Elizabeth Island from the proprietors of Cambridge.

1730 – Colonel Elijah Phipps purchased Elizabeth Island. He named Elizabeth Island after his wife.

1876 – Dr. Thompson developed the MOXIE drink. He lived in the Charles Addison house at 208 Pleasant St. Eva Balazs and her family lived there 1951-1952. Torn down 1955.

1950s – Mr. Silk's sand and gravel company with a high hill of sand at the end of Spy Pond Pkwy

1952 – 16 concrete storm drains around the pond, only one had steady, dry weather flow. Incoming water was clear, with a low bacterial count. No pollution entering the pond.

Dec 4, 1957 – Spy Pond covers about 115 acres at an average depth of 12 ft.

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, 1991 – Cleanup of SE 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.

Dec 7, 1999 – Concrete pier in water at Spy Pond Park near Linwood Circle (from ice house). S. Rogovin removed small pieces last summer. Four other pieces need pulling.

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

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

Spy Pond Boating

1871 – Arlington Yacht Club formed with a clubhouse at the bottom of Spring Valley Road

1880 – The yacht club moved to the site of the Boys and Girls Club and renamed the Arlington Boat Club.

1943 – The Boy's Club was founded.

Summer 1959 – Little or no swimming or boating. Stagnant, slimy, odorous water was reported.

Summer 1963 – boats and water 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. Maximum speed 10 mph. No wake within 50 feet of Spy Pond Park. Town Bylaws Title IV Public Areas, Article 4 Section 2. Effective June 1976

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

Spy Pond Farming

1734 – Start of Robbins Farm. It closed in 1941

1800s – Arlington and its surrounding communities are the vegetable growing district for most of New England. E. Arlington's principal crops were lettuce and celery (Wyman: and cabbage, onions, beets, and carrots). The land was very, very rich. No stones below the center of Arlington. E. Arlington is all sand.

Warren W. Rawson created "hotbeds" with a glass top, 3 x 6 ft over hot manure and loam, protected by 6 x 6 ft. straw mats. Later developed greenhouses 200 x 40 ft with steam

boilers

1845-1850 -- Abner Wyman started the Wyman Farm on the south shore of Spy Pond. His sons Franklin and Daniel took it over, followed by Franklin's sons Arthur and Clark. Starting in 1928 or 1929, they sold lots on Alfred Road and Pondview Road. The Wyman Farm closed in 1937.

1845-1850 -- The Lyons Farm ran from Linwood Street to Lakehill Avenue. Thousands of yards of warm manure came from the Boston stables via a truck that hauled big dump bodies. Each stable packed a dump body by hand.

1880s – First cucumbers in the United States grown by Mr. Rawson at the corner of Warren and Tufts. Developed the Arlington White Spine Cucumber to grow in greenhouses. Patrick Campobasso on the Crosby Farm (on Mystic St) developed the Crosby Egyptian Beet. The white Pascal Celery originated in Arlington

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 the northwest corner

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

1952 – Report of a 2-acre truck garden on the north bank of the northeast cove

Spy Pond Park and Eastern Shore

1850s – Taft Hotel or Spy Pond Hotel established at the end of Spy Pond Lane. In the 1870s, it hosted up to four picnics a week. Burned down Aug 6, 1907

1929 – The Town purchased Spy Pond Park for $7,500. The park is between the railway and Spy Pond and from Linwood St. to Pond Lane and land owned by Corper (Article 58)

Oct 9, 1959 – the State will remove some 200 underwater pilings and timbers from (now non-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 6.5 ft 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 SE cove

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

Apr 4, 2000 – No unauthorized feeding of waterfowl at all public spaces in Arlington, by Town Meeting. Town Bylaws, Title IV Public Spaces, Article 5, Section 2. Proposed by the Friends of Spy Pond Park to alleviate the geese problem.

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. Rentals continued in 2009 and from 2014 to 2019.

May 30, 2015 – Spy Pond Fun day with Friends of Spy Pond Park, Spy Pond Committee, 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

Ice and ice industry

1740-41 – Fireman Jones reported "Spie Pond was frozen until March 7. The ice was frozen at times to the thickness of 30 inches"

about 1825 – Ice harvesting started on Spy Pond

1840-1920's – Ice harvesting an important history on Spy Pond. Gage, Hillman and Company erected ice storage houses, and later built a spur track to connect with a railroad to Charlestown.

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

1920s-1950s – Foundry on the shore of Spy Pond

Mar 31, 1929 – The ice house at the end of Linwood Ave burned down. It was not rebuilt.

1967 – As the ice melted, it produced candles of ice like the Devils Postpile. They sounded like wind chimes and beautiful

Nov 30, 2000 – Over the last 30 years, no ice mid-December, usually 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 – heavy snow and ice may lead to a fish kill

Jan 10, 2016 –Eighteen inches of ice for most of the winter

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

Winter 2020 – During 2020, there was neither skating nor ice fishing for the first time in many years.

Jan 31, 2021 – About 200 skaters, walkers, and ice fisherman on Spy Pond, first ice. Open water near Rt. 2 and along west edge of the north basin.

Geology, Hydrology, and Watershed

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

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

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

1666 – a brook ran from a spring (now at the “Menotomy Indian Hunter,” Robbins Park) to the north end of Spy Pond. Spy Pond Field was a boggy, swampy area. Spy Pond itself was 140 acres.

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

July 16, 1934 – edge of pond elevation is 3.7 ft above sea level

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

1959 – Geological survey of the Fresh Pond Buried Valley. The axis of the Fresh Pond Buried Valley runs through the north basin of Spy Pond (Plate 14). E. shore of Spy Pond is more than 150 ft of sand and gravel (1944 seismic survey along the railroad, p. 191; figure 33; point E of Plate 14). Cross-section through Spy Pond shows a thin layer of Fresh Pond moraine over the ground moraine, -50 ft below sea level. Above this layer is a 40 ft cone of peat under Spy Pond (1904 boring, p 210). Sand and gravel outwash surrounds Spy Pond (Plate 16). Boreholes 172 and 174 E. and SE. of Spy Pond show sand to 20 ft and 28 ft below mean sea level (p. 204)

June 1972 – Survey of 28 storm drains around Spy Pond. Seven had high storm flow, one had continuous flow, another was suspected of delivering sewage during excessive rainstorms.

Location of Storm Drains – 1972. A map of Spy Pond showing its storm drains

#1 Spy Pond Pkwy -- 1.5 ft x 1.5 ft intermittent flow

#2 SW corner – 18” highway drainage, evidence of large intermittent flow

#3 to #10 Rt. 2 highway drainage -- 4” to 10”, low discharge

#11 large storm drain for Rt. 2, Belmont, and Arlington storm sewers – only permanent flow noted. Evidence of high storm flow

#12 ca. 218 Pleasant St (3 W of Dr. Hart) – 18” steel storm drain, evidence of large intermittent flow

#13 end of Gould Rd – 10” concrete – a small intermittent flow

#14 ca. 8 Devereaux (I E of Ricci) – 10” ceramic, evidence of high storm flow

#15 ca. 10 Chapman (1 E of Berman) – 20” storm drain, large flow evident, evidence of sewerage during excessive rainstorms [repaired]

#16 ca 2 Chapman (2 E of Berman) – 20” less evidence of flow than #15

#17 ca 25 Spring Valley (3 E of Berman) – 6” little evidence of flow

#18 ca 25 Spring Valley (3 E of Berman) – 18” storm drain, no evidence of large flows

#19 end of Spring Valley – 18” storm drain, trickle, evidence of large storm flow

#20 Boy’s Club parking – 2 small drains

#21 ca. Boy’s Club -- 18” storm drain, evidence of large storm flow

#22 ca. Elks Lodge – 10” and 12” drains, evidence of large storm flow

#23 north of boat ramp – 18" drain, evidence of large storm flow, downhill of possible warehouse

#24 Spy Pond Park – 14" drain, little evidence of flow

#25 SE corner – 3 ft storm drain, evidence of large storm flows

#26 north of Alfred – 2 ft and 2.5 ft storm drains, evidence of large storm flows

#27 end of Alfred – street gutter draining large street area, interesting during a storm

#28 ca. end of Spy Pond Lane – 8" drain, little evidence of flow. From map, appears to have been filled in

June 1972 – Sediments are up to 22 ft thick with a large amount of decaying organic matter. The volume of the sediment in shallower sections is greater than the volume of the water. The sediments contain roughly 400-500 times more phosphorus than the water.

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)

1996 -- In fast soils (sand and gravel), ground water flow velocity may be 1 foot/day [DEM Coursebook, p. 2-37]

Dec 1997 – one half of Spy Pond is deeper than three meters; 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

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

Sept 2001 – Groundwater data is missing for Spy Pond. Water deficit appears to be adequate in the Spy Pond model.

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 of a bathymetric model of Spy Pond using an aquatic drone. Spy Pond has shallow areas off the end of Spy Pond Lane and the north shore NE of Elizabeth Island. The south basin has a 17 foot hole adjacent to Route 2 close to the sandbar. The Route 2 expansion filled a cove west of this hole.

Jan 2020 – Spy Pond reach volume is 1,690,000 m^3. The detention time is 292 days (p. 64). Ave. modeled Stormwater Rainfall-Runoff due to stormwater was 6,257 acre/yr (p. E-164). Ave. modeled Groundwater Flow was 14,857 acre/yr (p. E-166)

Route 2

1932 – Four-lane, Rt. 2a built using sand and gravel from Sheraton Park with its 20 ft hill

1964 – Widening of Rt. 2 proposed, at least 100 ft parallel to Rt. 2 from the Rt 60 aqueduct to Lake street. MA DPW agreed to extensive landscaping, willows, all silt to be removed, no silt in Spy Pond, minimized roiling of Spy Pond, odor control

1967 – Haley and Aldrich soil engineers found that the bottom of organic material was below elevation -70 for a distance of 230 ft. Outside of these limits the bottom rose. Since excavation is usually incomplete, mud waves could occur as embankment material is placed. Result would be 6-12 in. of sediment on the bottom and 1-2 in. of sediment on the shoreline within 500 ft. of construction.

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

May 1968 – five acres filled in by the Rt. 2 project.

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

1971 – Reports of mud waves on the shores, perhaps due to Rt. 2 construction. Increased weed growth and odor. Requests made for dredging to eliminate mud and silt.

June 8, 2013 – 13 outfalls to Spy Pond drain approx. 38 acres of MassDOT roadways. 12 of these drains are 12”-18” and drain two acres or less. The 54” outfall drains 30 acres of MassDOT roadways, plus local roadways in Arlington (Cedar Ave., Park Ave, Bellington, Hillcrest, Spring, Morton, Jason streets) and Belmont (Frontage Road, Clifton, Pleasant streets). The subwatershed contained no existing BMPs. Designed 1 infiltration swale, 2 infiltration basins, and 7 leaching catch basins for 2.1 acres reduction. A further 26 acres reduction was not possible due to site constraints.

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

Rt. 2 path and Spy Pond Trails Day

June 15, 2002 – Cleanup of Rt. 2 path by the Spy Pond Committee

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. Trails Day continues 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 removed 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

July 12, 2020 – Ivy covering the ground and trees north of the stone steps to the sandbar, took pictures

Sept 11, 2020 – Report on outcomes of planting dogwoods and arbor vitae. Most of the dogwoods survived, but only one arbor vitae.

Nov 6, 2020 – Demonstration by A. Landry on control of oriental bittersweet with bottles of vinegar attached to cut vines.

Sand bar and Rt. 2 storm drain

1952 – A 48 in. pipe drains Concord Pike into the NW corner

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

June 1972 – 3 ft Rt. 2 storm drain was the only drain with permanent flow and evidence of high storm flow.

1998 – MA budget line item to remove sandbar. Vetoed by Gov. Cellucci

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

Nov 5, 1999 – letter from Mass Highway on requests for cost proposals to remove the sandbar

Sept 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.

Aug 5, 2020 – MacKay Construction awarded the sandbar contract

Outfall to Little Pond

May 1926 – Dam at Spy Pond with 36” pipe to Little Pond. West of Metropolitan Ice House near Cross Street. 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.

1950s – Before Rt. 2 was widened, the outlet to Little Pond was in the SW corner with remnants of an old bridge.

Nov 25, 1952 – 300 ft of the drainage pipe was broken

1953 – Reconstructed the outfall at 9.8 ft. Boston City Base

1963 – Request for proposed spillway be kept at 9 ft. 8 in.

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

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

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

Dec 4, 1997 – Letter to Board of Selectman on Spy Pond water level, with draft of letter to Mass. Highway Department w/ supporting documentation. The boards should be 6 in. below the concrete spillway (3 ft. 8 in. above sea level).

June 19, 1999 – Request to Board of Selectman to drop outfall by six inches to avoid shore erosion; letter not sent

July 21, 1999 – hole in the outfall structure, boards replaced during the summer

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

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

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

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

Water Level

1929 – Severe drought lowered Spy Pond by 18" (p. 68)

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

Before 1985 – typical water level 3.5-4.0 ft

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

1987-1996 – typical water level 4.50 ft

Oct 22, 1996 – historic high water 7.00 ft

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

Sept 14, 1999 – 3.75" rain fell the week before and raised the pond level 8-9" (below the top board). Hurricane Floyd on 9/16 brought 4" rain and raised the level 7-8" totaling 16" above the low water mark. Now over the top board.

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

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

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

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

May 30, 2013 – Lisco level of 40 cm on J. Durant's outfall gauge is 1 cm 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 (1.5 ft, 2 boards)

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

July 12, 2020 – Water level at outfall structure 42.3 cm with water just broaching the boards

Sept 26, 2020 – Water level at outfall 29 cm after a dry summer

Jan 2, 2021 – Water level at outfall 55 cm just over concrete on both sides. Pipe about half full.

Animals

Fish

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

1676 – Spy Pond had a reputation for good fishing.

Aug 14, 1716 -- Rev. Cotton Mather “Today a singular thing befall me, I fell into Spie Pond while canoeing! May God help me understand the meaning of it.”

Spring 1913 – Increased number of dead fish on the shore. Unhealthy fish for several years.

1918 – stocked 900 white perch

1920 – stocked 250,000 walleye (Stizostedion vitreum)

1921 – stocked 1,000 smallmouth black bass

1922 – stocked 325 largemouth black bass, 900 bluegill, 21,000 brown bullhead, and 200,000 walleye (Stizostedion vitreum)

1923 – stocked 5,000 smallmouth black bass, 1,600 bluegill, 2,000 brown bullhead

1924 – stocked 300 brown bullhead, 600 white perch, and 100 pickerel

1926 – stocked 3,000 brown bullhead

1927 – stocked 1,000 brown bullhead

1929 – stocked 10,800 smallmouth black bass and 1,200 white perch

1931 – stocked 10,000 smallmouth black bass

1936 – stocked 400 brown bullhead, 6250 white crappie, and 200 black crappie

1941 – stocked 1,652 brown bullhead, 200 yellow perch, and 1,536 white crappie

1945 – stocked 4,200 brown bullhead, 3,000 yellow perch, 50 pickerel, and 800 black crappie

1949 – stocked 8,320 brown bullhead, 4,170 yellow perch, 24 pickerel, 30 white crappie, and 130 sunfish

1950 – stocked 8,610 brown bullhead and 3,450 yellow perch

1950s – Alewives spawned in Spy Pond during May and June. They travelled the polluted Alewife Brook, through culverts and other obstacles.

Aug 7, 1951 – Fish survey by Fish and Game, mostly white and yellow perch, also large-mouth bass, carp, bullheads, pickerel, killifish. No trout due to oxygen deficiency below 13 ft.

1953 – Above average growth of game and panfish. Good balance between predator and prey. No additional stocking needed.

Aug 16, 1957 – Spy Pond reclaimed with Rotenone, killing 1000s of fish, eels, carp, perch, and bass. A crop of 257 lbs./acre was collected (67% carp). This was one of the largest carp populations in Massachusetts.

1957 -- stocked with 10,898 largemouth black bass

1958 – stocked 520 brown bullhead and 438 yellow perch

Summer 1960 – MA Fish and Game tagging study showed abundant bass and yellow perch before treatments began

Summer 1963 – severe decrease of fish population. Three or four of every 100 yellow perch had one or two deformed eyes or empty eye sockets. Fish and Game recommended that sodium arsenite not be used.

1963 – stocked 2,535 largemouth black bass

1965 – stocked 4,353 largemouth black bass

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.

1996 – When fish kills are due to unnatural causes, usually multiple species die over a wide size range in a short period of time. Natural mortality tends to effect individual species or size classes. [DEM Coursebook, p. 3-15]

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

June 2004 – Pickerel spawns after ice out, yellow perch spawns in early spring, white perch and largemouth bass in late spring, bluegill in early summer, and pumpkinseed in summer. Spawning is a critical period for fish. (GEIR 1-30)

Apr 24, 2016 – More than 25 large carp died, approx. 30 inches long. In 2015, there was a similar epizootic on the Charles River and Lower Mystic lake

July 26, 2016 – I. King caught at 40” Northern Pike weighing 12 lbs

June 30, 2020 – The son-in-law of E. Herman caught a 5.5 lbs. large mouth bass. The same bass was caught by a Kelwyn Manor youngster.

July 8, 2020 – Several large aggregations of carp

July 8, 2020 – I. Winkler caught a 3 lbs largemouth bass

Jan 30, 2021 – 13” yellow perch caught on the first day of ice fishing

Aquatic animals

1926 – Arlington Advocate reported turtles weighing 50 or more pounds. They eat ducklings and duck legs

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

1996 – Swimmer's itch is caused by a parasite called schistosome which lives partly in certain snails. The snails prefer lakes with substantial leafy plants and moderate to high pH [DEM Coursebook, p. 3-15]

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

Apr 25, 2017 – record number of turtles

Oct 7, 2018 – Asian clams found throughout Spy Pond

Jun 19, 2020 -- N. Kertnzer found a ca. 7" Red-eared slider (invasive) laying 10+ turtle eggs near Spy Pond Pkwy

Aug 2, 2020 – a bed of Asian Clams under filamentous algae is near the Kelwyn Manor boat ramp

Sept 23, 2020 – J. Cordeiro of UMass Boston identified the large shell of an Eastern Floater (a river mussel)

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

1955 – For many years, Balazs maintained a Spy Pond bird list published by the Audubon Society.

Oct 15, 1997 – E. Karpati wrote "Birds seen at Spy Pond, 1993-1997" … "98 so far!"

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

Apr 4, 2000 – No unauthorized feeding of waterfowl at all public spaces in Arlington, by Town Meeting.

Apr 7, 2000 – Addling of goose eggs on Elizabeth Island (by MA Fish & Wildlife on the Town's request). One family of goslings. Repeated yearly from 2000 to 2004 for $3000-$6000 per year.

2001 – Coots and Wigeons no longer seen on Spy Pond

Oct 15, 2001 – Goose report from SPC 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 – Ring-necked pheasant and wild turkey added to the Spy Pond bird list.

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 heron and green heron

Jan 10, 2016 – In 2015, hooded mergansers, American coots, eagles, green herons, ruddy ducks, ospreys, cormorants, blue herons, belted kingfisher, coopers hawk.

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

June 5, 2019 – MassDEP observed 70-100 geese near the end of Sheraton Park

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

May 5, 2020 – No goslings this year

May 18, 2020 – The swans abandoned their nest. No cygnets this year.

May 26, 2020 – At least four Eastern King Birds

Aug 12, 2020 – An adult swan died at the Kelwyn-Manor boat ramp. No sign of trauma. The swan was not from the nesting pair of swans.

Aug 14, 2020 – Three adult Bald Eagles on the north shore for a couple weeks. Two are about two years old by their mottled brown/white plumage.

Aug 22, 2020 – A Sora rail was spotted twice on the sandbar. They normally hide in the marshes.

Sept 16, 2020 – A cormorant died next to the Kelwyn Manor boat ramp. No sign of trauma.

Other Animals

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

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 across Route 2

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 the next 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

Apr 23, 2020 -- coyote in Kelwyn Manor at 12:30am

May 22, 2020 – river otter in Spy Pond, caught on a trail camera

Nov 28, 2020 – coyote in Kelwyn Manor, also Nov 15

Jan 9, 2021 – two foxes seen in Kelwyn Manor, one with an injured leg. A fox was also seen the previous month in Kelwyn Manor and near Pleasant Street.

Aquatic Plants

Coontail (Ceratophyllum demersum)

1990s – Sailing became difficult on the south basin of Spy Pond due to Eurasian milfoil and Coontail.

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 – Coontail dominant throughout Spy Pond to 12 ft. deep, especially the sill with 75% cover and the SE 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

Aug 20, 2009 – Coontail much reduced by the July diquat treatment. Most of the remaining Coontail was low growing.

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 ft tall. Curly-leaf pondweed was the dominant plant in 2019 and 2020.

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, SE 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 5, 2019 – MassDEP observed a lot of curly-leaf pondweed

June 7, 2019 – Curly-leaf pondweed six inches below surface and on surface near shore, also June 5

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

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

Eurasian watermilfoil (*Myriophyllum spicatum,* invasive)

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

1990s – Sailing became difficult on the south basin of Spy Pond due to Eurasian milfoil and Coontail.

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

Mar 1998 – Watermilfoil may subside after 10 to 20 years as observed in Wisconsin. The reasons are unknown. Most beds of milfoil are clones which may loss vitality.

Oct 7, 1998 – Milfoil was the dominant weed this summer

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

July 27, 2000 – Worst summer for aquatic weeds since 1985, Coontail and Eurasian milfoil dominant

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 ft. deep, dense in the SE cove

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

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

May 4, 2010 – moderate to dense eurasian watermilfoil on sill, SE cove, SW cove, and Rock Island

May 21, 2010 – watermilfoil was 4-6 ft 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 – 45 acres 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 ft tall) SW basin, rock island, north sill near Elizabeth Island, SE 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 2016 – Last time Eurasian milfoil seen in abundance

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

Pondweed and other aquatic plants

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

late 1800's, early 1900's – substantial weed growth northeast of Elizabeth Is. is visible in the photo "Icehouses on Lake Street"

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

1914 – sometimes large quantities of aquatic plants

1929 – very rapid growth of aqueous weeds (p. 69)

Aug 1951 – Elodea (rooted or free-floating waterweeds) and Potamogeton (pondweeds) on surface of SE cove. Aquatic plants fringed the pond from the edge to 5-30 ft. out, to about 6 ft deep. Also Waterlily (nymphaea) and Brazilian waterweed (anacharis)

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

1952 – 50% coverage to 10 ft 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

Aug 22, 1956 – Moderate growth of Elodea and Potamogeton in north-east section

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 ft.

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

July 12, 1962 – survey by MA Dept Public Health showed dense Potamogeton

1963 – Potamogeton

Summer 1964 – no weed problem was reported

Aug 1965 -- Potamogeton recurred, no treatment

Aug 3, 1966 – Several acres of Potamogeton treated unsuccessfully with diquat

Aug 1967 – Fifteen acres of Potamogeton treated unsuccessfully with diquat

May 1, 1968 – weeds are Spy Pond's biggest problem. Potamogeton flourished after widening of Rt. 2. Treated with Arsenic oxide on May 27

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

1969 – No weeds visible in Spy Pond

May 1971 – Pondweeds again dominant along with filamentous algae and immersed shoreline vegetation

July 1972 – Minor weed problems, treated end of July with Aquathol-K (endothall)

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

Summer 1996 – the explosive growth of aquatic weeds led to the formation of the Spy Pond Issues Group

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

June 2004 – The macroalgae *Chara* and *Nitella* are highly desirable, as are carpet forming species of *Najas*, and most *Potamogeton* species.

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, SE 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 SE cove

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

Phragmites and other emergent species

Aug 1951 – cattails and pickerel weed, phragmites, Bulrush.

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

June 24-27, 1960 – entire shoreline treated for phragmites, cattails, and pickerel weed

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

1962 – plans to treat cattail and phragmites

1963 -- Cattails and pickerel weed

1966 -- Cattails

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

Jan 17, 2000 – The diagram of Spy Pond problems showed phragmites at Kelwyn Manor, Elizabeth Island, and the NW corner.

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

Sago pondweed (*Stuckenia pectinatus*)

Summer, 1980 – Sago pondweed was the most common aquatic plant, particularly around Elizabeth Island, SE 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 ft tall)

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

July 17, 2012 – Sago pondweed 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

Snail-seed pondweed (*Potamogeton* bicupulatus, native)

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

July 31, 2007 – Snail-seed pondweed 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 snail-seed pondweed on sill and SE cove

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

June 30, 2019 – fairly dense snail-seed pondweed, 2-5 ft of water, 13 ft Secchi depth

July 12, 2019 – Snail-seed pondweed treated with diquat 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 of spiny naiad observed

Oct. 14, 2015 – trace spiny naiad, north shore of north basin and Scalon field

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

August 28, 2017– 38 acres of Spiny naiad treated with Reward

July 19, 2018 – moderate spiny naiad

Aug 13, 2018– Snail-seed pondweed and spiny naiad 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. None in 2020

Algae

Blue-green algae– toxins can be dangerous

1880 – Cambridge water board reported large amounts of Clathrocystis (toxic blue-green algae, same as Microcystis), 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 Clathrocystis (blue-green algae)

1928, 1929 – blue-green algae treated

Aug 1951 – algae bloom of Microcystis

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

Aug 22, 1956 – Strong odors and heavy blooms of blue-green Aphanizomenon (45,000 cells/ml in NE section, maybe toxic) and Microcystis (39,000 cells/ml in NE section).

Sep 4, 1956 – After treatment with copper sulphate.in August, heavy bloom of blue-green Aphanizomenon (190,000 cells/ml in NE section, 71,000 cells/ml in E section), Anabaena (126,000 cells/ml in E section, 101,000 cells/ml in SE section), Microcystis (18,000 cells/ml in E section), and Coelosphaerium (75,000 cells/ml in SE section; 9,000 cells/ml in E section). Water had a deep green color.

1957 -- blue-green Aphanizomenon and Microcystis before and after treatment, blue-green Anabaena and Coelosphaerium

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

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

Sept 9, 1960 – algae treated with copper sulfate, 0.3 ppm. Coelosphaerium and Aphanizomenon toxic blue-green occurred after treatment

Aug 24, 1961 – Coelosphaerium and Aphanizomenon toxic blue-green algae and Staurastrum green algae created color and odor problems. Treated with copper sulfate. Blue-green Aphanizomenon seen after treatment.

July 12, 1962 – survey by MA Dept Public Health showed dense blue-green Aphanizomenon and green Scenedesmus. Cortell also reports Anabaena blue-green

1963 – After treatment, Anabaena blue-green algae

1965 – blue-green Aphanizomenon

1966 – algae treated with copper sulfate

Late August, 1967 – blue-green Aphanizomenon and Microcystis occurred after a diquat treatment

May 1968 -- blue-green Coelosphaerium and Microcystis flourished after widening of Rt. 2

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

June 1969 – Anabaena blue-green algae treated with copper sulphate

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 Microcystis 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 – Spy Pond treated with Reward and algaecide, shallow areas

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

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

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

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

1921 – Conferva (yellow-green algae) 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

1953 – Filamentous green algae included Spirogyra, Zygnema, and Tribonema.

July 3, 1959 – dense, smelly algae covering plants

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

Sept 9, 1960 – Aphanizomenon toxic filamentous algae

1963 -- Spirogyra filamentous algae. After treatment, Nostoc cyanobacteria filaments

Aug 1965 -- Spirogyra filamentous algae recurred, no treatment

1966 – Hydrodictyon filamentous algae

June 1969 – Mougeotia filamentous algae. Also occurred after treatment with copper sulfate 0.3 ppm

May 1970 – Filamentous algae again dominant, treated with copper sulfate in August. Anacystis observed post-treatment; it has a filamentous mutant.

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

June 19, 2003 – SE 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 SE 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 SE 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 – filamentous algae present at 7 sites: SW cove, Boys and Girls Club, Spy Pond park

July 12, 2019 – Spy Pond treated with Reward and algaecide for snail-seed pondweed

July 20, 2019 – heavy algae and pondweed in SE cove, Secchi depth 2.4 ft

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

Aug 15, 2019 – dense algae in SE 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

July 29, 2020 – filamentous algae floating in the water and on the bottom near shore. Probably due to Sonar booster

Aug 9, 2020 –Lots of filamentous algae in the southwest corner. Elsewhere some algae on the bottom. Much better than last year.

Aug 27, 2020 – OARS reported that their ponds had a bad year for filamentous algae. The Hudson impoundment had lots in 2019 and even more this year. Also a fair amount at Gleasondale and Ben Smith wrapped around other submerged vegetation.

Oct 12, 2020 – Lots of filamentous algae along Rt. 2 and SW cove near the shore

Other algae

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

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

Aug 22. 1956 – Heavy blooms of the diatom Synedra (23,000 cells/ml)

1957 -- diatom Synedra, and after treatment, diatom Navicula

Sept 9, 1960 -- Tabellaria diatoms and Staurastrum, Pediastrum, and Synura green algae seen after treatment

Aug 24, 1961 – algae treated with 1400 lbs. of copper sulphate due to blue-green algae, Tabellaria diatoms

1962 – green Scenedesmus, Coelastrum, Pediastrum, and Staurastrum; diatoms, Asterionella, and Synedra

April 1963 – Heavy blooms of Fragilaria and Synedra diatoms, and Chara (stonewort). Also Tabellaria green.

1963 – After treatment, green algae Scenedesmus, Pediastrum, Protococcus, and Staurastrum

1964 -- diatom Synedra and green algae Pediastrum

Aug 1965 – Moderate green algae growth, Coelastrum, Scenedesmus, Pediastrum, Protococcus, and Staurastrum. Spirogyra filamentous algae and Chara (stonewort) recurred. No treatment.

1966 – Moderate growth of green algae Kirchnerjella. Light growth of Chara. Also Fragilaria diatoms, green algae Scenedesmus. Scenedesmus also occurred after treatment.

July 1967 – Predominant were Cyclotella and Tabellaria diatoms, and Dictyosphaerium green algae. Also present was Fragilaria diatoms and Staurastrum green algae. Following the August diquat treatment, Staurastrum and Protococcus green algae occurred along with blue-green algae. Also present was Fragilaria diatoms

Summer 1968 – After treatment with Arsenic oxide and Copper sulfate for blue-green algae, the predominant algae was Staurastrum green algae

June 1969 – Tabellaria diatoms, blue-green and filamentous treated with copper sulfate

July 1970 – Copper sulfate treatment, unspecified algae, same concentration as June 1969. After treatment Fragilaria diatoms, and green algae Coelosphaerium, Ankistrodesmus, Chlorococcum, Coelastrum, Scenedesmus, Staurastrum, and Tetraspora.

End of July 1972 – Copper sulfate treatment for fair growth of Scenedesmus green algae. Also present prior to treatment: Fragilaria and Navicula diatoms and green algae Ankistrodesmus, Chlorella, Coelastrum, Micractinium, Oocystis, Pediastrum, Scenedesmus, Staurastrum. Also red algae Phytoconis and yellow-green algae Gloeobotrys.

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

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 SE cove

Summer 1996, 1997 – From the air, Spy Pond is green while Mystic Lakes are blue.

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

June 2004 – The macroalgae *Chara* and *Nitella* are highly desirable, as are carpet forming species of *Najas*, and most *Potamogeton* species.

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

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

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

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

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

July 31, 2019 – clear to 4 ft

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 ft)

Aug 10, 2019 – cleaner, no problems swimming

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

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 SE cove

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

Sept 20, 2019 – public health advisories lifted for excessive algae bloom

July 25, 2020 – water smells of algae north of Elizabeth Island

Algae counts, microorganisms, and Secchi depth

Closure if 70,000 cells/ml (2012 ACT report).

June 26, 1972 – North basin 11.2m bottom -- diatom Asterionella 120 cells/l. Green algae Pediastrum 720 cells/l, Staurastrum 14.4 cells/ml. Total genera 3, 15.24 organisms/ml, dense amorphous matter, algae lacks plastids

June 26, 1972 – South basin surface – diatom Asterionella 21.6 cells/ml, Fragilaria 7.2 cells/ml.. Green algae Coelastrum 14.4 cells/ml, Pediastrum 14.4 cells/ml, Phytoconis 7.2 cells/ml, Scenedesmus 158.4 cells/ml, Staurastrum 21.6 cells/ml. Yellow-green algae: Gloeobotrys 7.2 cells/ml. Rotifera Keratella 240 cells/l., Epiphanes 40 cells/l. Polyartha 40 cells/l. Total genera 11, 252.32 organisms/ml

June 26, 1972 – South basin 4.0 m – diatom Fragilaria 7.2 cells/ml. Green algae Micractinium 7.2 cells/ml, Oocystis 7.2 cells/ml, Pediastrum 7.2 cells/ml, Scenedesmus 36.0 cells/ml, Staurastrum 36.0 cells/ml. Yellow-green algae: Gloeobotrys 28.8 cells/ml. Protozoa Actinosphaerium 14.4 cells/ml, Difflugia 7.2 cells/ml., Euglypha 7.2 cells/ml. Total genera 10, 158.4 organisms/ml, Cyclops 40/liter, Daphnia 120/liter

June 26, 1972 – South basin 5.5 m bottom–, diatom Asterionella 14.4 cells/ml, Fragilaria 7.2 cells/ml, Navicula 14.4 cells/ml. Green algae Ankistrodesmus 7.2 cells/ml, Chlorella 64.8 cells/ml, Coelastrum 14.4 cells/ml, Oocystis 36.0 cells/ml, Pediastrum 7.2 cells/ml, Phytoconis 100.8 cells/ml, Scenedesmus 129.6 cells/ml, Staurastrum 40 cells/l. Yellow-green algae: Gloeobotrys 64.8 cells/ml. Blue-green algae Coelosphaerium 360 cells/l. Protozoa Euglypha 7.2 cells/ml. Ciliophora Podophyra 43.2 cells/ml. Rotifera Keratella 160 cells/l., Polyphemus 80 cells/l. Total genera 15, 511.6 organisms/ml, daphnia 120/liter, algae has plastids, Euglypha feeding on amorphous material, zooplankton 360 organisms/litter

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

1996 – Total algae counts are not a good indicator of algal biomass. Algal taxa differ in mass by four or more orders of magnitude. Phytoplankton populations vary dramatically over time depending on a number of factors. [DEM Field Manual, p. 12, 16]

1996 – Zooplankton population peaks during the early summer. They can substantially reduce the biomass of phytoplankton by their grazing, sometimes leading to a brief “clear water phase”. [DEM Coursebook, p. 1-30]

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 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 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, 2012 – total algae counts are 31,524 north basin, 35,668 south basin

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 Studies and Projects

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

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

Nov 25, 1952 – Sterling, “The Sanitary Condition of Spy Pond,” House Document 2208

Dec 4, 1957 – “Control of submerged weeds in certain Great Ponds of Massachusetts,” House Document 3041

June 1972 – Survey of storm drains, water quality, and microscopic examination by Allied Biological Control

Jan 20, 1978 – Mass. Environmental Affairs determined that the 1978 Environment Impact Report was inadequate due to its emphasis on herbicides and algaecides. These

chemicals may lead to chemical-resistant macrophytes and algae, increased sedimentation, and damage to non-target organisms.

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

Oct-Nov 1981 – Measured water quality, rainfall, and storm-water flow at Rt. 2, Spring Valley, Roanoke, and Brooks & Elmhurst. Sampled manholes, particularly in the Rt. 2 drainage area.

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.

Oct 1982 –Multi-year study of the Upper Mystic Lake watershed for US EPA's Nationwide Urban Runoff Program (NURP)

1984 – Arlington Town Meeting authorized a pollution control water treatment program. Blocked by Belmont.

April 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 – Cleanup of SE 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

1995 – Hills Pond (3 acres above Spy Pond) was dredged, with a wetland detention basin and Vortechnics swirl concentrator to handle primary storm water discharge. Measured phosphorus declined tenfold.

1996 – MA DEM, "Lake and Pond Management," Field Manual

1996 – The DPW cleaned all 3,300 catch basins in Arlington

1997 – The Mystic Watershed Coalition received a two-year $50,000 capacity building grant from Mass. DEP

Jan 22, 1997 – RFP to review prior work on Spy Pond and recommend options. Sixteen firms requested copies and four firms submitted proposals. Interviews on Feb. 20 with HydroAnalysis and Guertin. HydroAnalysis selected Mar 26. Shananhan met with the committee April 2 and June 3. He presented the draft report Aug 19. Lisco review Sept 29

Jan 22, 1997 – "What's waiting under the ice on Spy Pond" and "A Spy Pond Primer", four pages on Spy Pond and its issues, to be included with the Arlington Town Survey

Mar 15, 1997 – Massachusetts Water Watch Partnership's Fifth Annual Clean Water Conference, W. Eykamp attended. He attended lake monitoring training on May 10.

April 1997 – Fertilizer flyer, “What will Spy Pond be like in 5 years?”, with cleanup dates and information about Friends of Spy Pond Park. It was distributed to 500 homes in the Spy Pond Watershed

Apr 12, 1997 – Spy Pond cleanup by Friends of Spy Pond Park

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, a dead muskrat and racoons

July 1997 – W. Eykamp participated in the Secchi Dip In, the first of many years

July 17, 1997 – First annual Spy Pond Festival to celebrate Spy Pond Park with an environmental message

Aug 15, 1997 – Spink and Morales, “Preliminary Engineering Study, Spy Pond Hydraulics”. It included the design of a watershed pressure pipe, and detention and treatment tanks for first flush treatment of Spy Pond stormwater.

Nov 9, 1999 – Presentation by G. Smith of Aquatic Control Technologies on lake and pond management

Nov 11, 1997 – The Landsat-5 satellite will take readings of Spy Pond every 16 days for the Water Watch Partnership. W. Eykamp and other volunteers will collect water quality data which will hopefully correlate with the satellite data.

Nov 24, 1997 – Spy Pond Goals and Action Timetable, 1st draft. Lake and pond management grants, census mailing insert, slow-release fertilizer, prevent dumping of grass clippings and leaves, reduce trash, summer cleanup, water festival, lower water level, eliminate concrete debris, gosling birth control, goose traffic control, get rid of sandbar, reduce feeding of waterfowl, work with Mystic River Watershed Assoc, Robbins Library, and other organizations

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 Consultants, Inc of Wellesley, MA

Dec 12, 1997 – Letter to MA Office of Environmental Affairs supporting the Massachusetts Watershed Initiative and Massachusetts Water Watch Partnership

Feb 4, 1998 – Public meeting on Shanahan et al, Review of Recommendations Dec 1997

Apr 27, 1998 – Town Meeting Article 30 on Goals for Spy Pond (approved). The goals are water quality and control, public use and access, flora and fauna, and public awareness.

May 31, 1998 – Friends of Spy Pond produced the “The Spy Pond Balancing Act” with the Spirit of Spy Pond, Terry Townfolk, and Chef Slime. Performed at Town Day 9/18/99

June 10, 1998 – Presentation to Ottoson Middle School about Spy Pond to 50 eighth graders by G. Benson

Oct 22, 1998 – Meeting by John Durant of Tufts University about water and sediment monitoring for arsenic at Spy Pond

Nov 5, 1998 – Presentation on Spy Pond at the Mystic River Watershed Annual meeting

Dec 1998 – MAPC study funded by $42,000 DEP grant with a $7,500 MAPC match, “Urban watershed management in Spy Pond & Horn Pond areas, Stacey Justus, published July 2002. Submitted Dec 1997 for a Lake and Pond Management grant

Feb. 9, 1999 – John Simpson, DEP Waterways Program, discussed the water level of Spy Pond

Mar 15, 1999 – The Spy Pond Committee sent letters to landscapers, garden centers, and hardware stores on low-phosphorus, slow-release fertilizers

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

June 6, 1999 – Spy Pond Shore Rehabilitation Project with bank stabilization, plantings for wildlife, surface treatment of walkways, and mounded areas for groundwater drainage. Developed by Pat Loheed Landscape Architects

June 12, 1999 – Spy Pond cleanup by two dozen volunteers, including Rep. Paulsen. Less debris than 1998, at least on the Rt. 2 side. Finished at 11 a.m.

Sept 18, 1999 – Arlington Town Day displays about the Spy Pond and Reservoir Committees at the Vision 2020 booth

Oct 12, 1999 – shoreline survey of Spy Pond via ‘City Green’ GIS for tree cover, impervious surface, and stormwater runoff. By Stacey Justus of MAPC

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

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

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

Jan 17, 2000 – E. Leondar -Wright diagram of Spy Pond and its problems

Feb 8, 2000 – Presentation by George Ellmore of Tufts University on emergent invasive weeds

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

Mar 14, 2000 – Presentation by Baystate Environmental Consultants (BEC) on their proposed restoration of Spy Pond: dredging, sediment control for sandbar, and nutrient control

Mar 20, 2000 – Presentation to Finance Committee on Warrant Article 63 requesting $37,000 for Sonar treatment of Spy Pond. Unanimously approved.

May 16, 2000 – Presentation by John Durant of Tufts on phosphorus and arsenic in Spy Pond

June 13, 2000 – Presentation by BSCES Younger Member Group on Stormwater Management. Includes stormwater BMPs and history of the Clean Water Act of 1972 with subsequent regulations

2001 – First annual fertilizer flyer from the 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

June 9, 2001 – Spy Pond Cleanup Day with 4 volunteers on the Rt. 2 side and 12 on the Spy Pond Park side.

Sept 2001 – Abbasi, “Modeling Phosphorus Cycling and road salt effects in Spy Pond

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 (selected via Prof. Durant's data), 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, 325 hours, 4 sessions

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

July 2002 – 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 – The 2001 garden center letters on low-phosphorus fertilizer did not do much

Mar 25, 2003 – Organized an Ecological Gardening Class as part of the DEM grant. Three Tuesdays plus workshop and an ecological gardening tour

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

June 17, 2003 – 15 leaching catch basins installed on east side of pond by CEI Consultants, Inc.

July 15, 2003 – R. Overacre, thesis on chloride levels since 1998, recommended aeration

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.

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

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

Mar 31, 2009 – draft Spy Pond Management Plan, similar to the Open Space Committee's plan

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

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

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

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

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

June 8, 2013 – MassDOT, "Impaired waters assessment for Spy Pond for implementing BMP's to reduce impervious cover."

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

2015 – Arlington Conservation Commission created the Water Bodies Working Group to monitor Arlington's water bodies. The Water Bodies Group produces an annual report and manages the Water Bodies Fund.

Oct 24, 2017 – Mattingly, "Inland global warming preparedness project" (presentation for the Reservoir and Spy Pond committees). Includes a detailed, bathymetric model of Spy Pond produced with a yellow, aquatic drone on May 21, 2017

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

June 5, 2019 – Water quality sampling by the MassDEP Watershed Planning Program (WPP). They observed a lot of curly-leaf pondweed, 70-100 geese, and high conductivity (1400 µS/cm), likely due to road salting.

Feb 4, 2020 – Most of the 2002 storm drain markers were either removed or suffered serious water damage. A good marker is at the south corner of Orvis Rd and Freeman St. Almetek's steel markers may last longer.

Mar 27, 2020 – T. Petryshen rebuilt her shoreline at Kelwyn Manor with coir logs, live stacks, and erosion blankets

Jan 2020 – "Mystic Phosphorus Alternative TMDL Report," prepared by Mystic River Watershed Association, EPA, and MassDEP

Oct 7, 2020 – MassDEP's Watershed Planning Program (WPP) surveyed Spy Pond as part of a four-year study of 4 ponds in the Mystic River Watershed (2019-2022). MassDEP is measuring water quality for a TMDL (total maximum daily load of phosphorus). The previous sampling was June 5, 2019.

Water Quality Associations

https://www.umass.edu/mwwp/ -- Massachusetts Water Watch Partnership

https://mysticriver.org/ -- Mystic River Watershed Association (MyRWA)

1896 – Town of Arlington started their sewer system.

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

Dec 1970 – Environmental Protection Agency created

1977 – Clean Water Act

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

May 14, 1980 – Spy Pond Improvement Association formed, John Hill and Kevin Barbera are co-chairs.

June 24, 1980 – Spy Pond Study Committee, EPA Study Subcommittee meeting with Eben Chesebrough.

May 18, 1992 – Vision 2020 Environmental Committee proposed as Article V. 1. Preserve, expand, and revitalize the natural environment, etc. Environmental Co-chairs: Buzan, Franchi, Hartel, and Muldoon. Includes Spy Pond Site Strategies by A. Landry

June 21, 1996 – Presentation by Fugro of Northboro, MA on dredging feasibility

Aug 19, 1996 – Spy Pond Issues Group (SPIG) of the Environmental Task Force of Arlington Vision 2020, formed by J. Howard, E. Karpati and others. The issues are excessive vegetation, the sandbar, human trash, storm drain catch basins, low water flow, outlet not maintained, potential sewage

Oct. 22, 1996 – SPIG renamed as the Spy Pond Committee

1997 – Mystic Watershed Coalition formed.

Mar 15, 1997 -- Massachusetts Water Watch Partnership's Fifth Annual Clean Water Conference, UMASS Water Resources Research Center

Sept 4, 2002 – D. Kopans developed 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, DCR Lakes and Ponds Program. 17 participants

Oct 3, 2006 – "Securing the Health of Our Lakes," an evening with W. Reed, noted green architect

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

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 table 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. Minutes and archives of the Spy Pond Association.

May 30, 2015 – Spy Pond Fun day with Friends of Spy Pond Park, Spy Pond Committee, 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 – C. Miller developed the Spy Pond Committee Facebook page (spypondcomm)

Apr 12, 2020 – First version of Spy Pond Aquatic History

Apr 21, 2020 – Spy Pond Trails Day cancelled due to Covid-19 restrictions

Dec 15, 2020 – Spy Pond Committee moved from Yahoo Groups to Google Groups

Treatments

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

1902 – Arlington 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 ft to control filamentous algae

1921 – copper sulphate

1925 – Investigation of Spy Pond by legislative act. Recommendations to raise pond level by 2.2 ft and dredge to 8 ft

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

Aug 22, 1956 – copper sulfate, 0.55 ppm

Sept 1956 – copper sulfate and Phygon for 5 acres of the SE cove and other areas

Aug 1957 – copper sulfate

1960 – MA Dept. Public Health hired Northeast Weed and Brush Control for a 5-year weed control project. $17,000 authorized by chapter 604 of Acts 1959

June 6-27, 1960 – Elodea and Potamogeton in the beach area of Kelwyn Manor treated with 144 lbs of silvex (Fenoprop) 2ppm, as far as 200 ft into pond. Roots of shoreline vegetation.

June 24-27, 1960 – treated entire shoreline with Silvex 4L at 2ppm (Fenoprop) for Elodea, Potamogeton, and lilies (200 ft into the water)

June 24-27, 1960 – treated entire shoreline with Aminotriazole (3-AT) at 20 lbs/acre to control cattails, phragmites, pickerel weed. Successful for weeds

June 30, July 2, 1960 – Remaining center portions treated with 4624 gal. at 10 ppm, sodium arsenite (two doses, 2-3 days apart), to control Potamogeton. Successful.

Mid July, 1960 – No trace of either submerged weeds or fish kill.

Aug 1, 1960 – Spy Pond is weed free

Sept 21, 1960 – algae treated with copper sulfate, 0.3 ppm, by Allied Biological Control

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 – Coelosphaerium and Staurastrum algae treated with 1400 lbs. at 0.5 ppm of copper sulphate. Successful

1962 – plans to treat Cattail and Phragmites

July 18, 1962 – 30 gal of Arsenic Oxide at 4 ppm on one acre. Did not control Potamogeton.

June 1, 1963 – Chara (musk grass or stonewort) and Potamogeton treated with Arsenic Oxide 10 ppm. Dalapon and Amitrole for cattail and phragmites. By Aug 21, no aquatic weeds or fish kill.

Summer 1963 – severe decrease of fish population. Three or four of every 100 yellow perch had one or two deformed eyes or empty eye sockets. Fish and Game recommended that sodium arsenite not be used.

Aug 1965 – no treatment

Late July 1966 – copper sulfate 600 lbs. entire lake. Results not good, only top burning occurred.

Aug 3, 1966 – Several acres of Potamogeton treated with 15 gallons of diquat. Only top burning of the plants occurred.

Aug 1967 – diquat on 15 acres, unsatisfactory results

May 27, 1968 – Arsenic Oxide 7.5 ppm treated, tremendous accumulation of large aquatic weeds, up to tree size. Effective for Potamogeton

May 27, 1968 – copper sulphate 0.3 ppm

June,1968 – treated spot blooms with copper sulphate 0.3 ppm

June 1969 – copper sulphate 0.3 ppm for blooms of Anabaena blue-green, Tabellaria diatoms, and Mougeotia unbranched filamentous green algae. Mougeotia also occurred after treatment

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

July 1970 – copper sulphate 0.3 ppm with additional funding by Arlington. Successful.

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

July 28 to Aug 17, 1971 – copper sulfate for filamentous algae

End of July 1972 – 200 lbs copper sulfate for green algae and 70 gallons Aquathol-K (endothall) for aquatic plants

1973 – No treatment due to no funding from the State

Early summer, 1981 – alum treatment by Town of Arlington. Clear water for several months. By mid-September the usual algal nuisance level returned due to high loading from storm water, and perhaps due to insufficient dose By Nov 1981, Spy Pond was crystal clear. Since then, treatments have been banned.

March 2000 – Maintenance of Spy Pond Field by Prescription Turf Services with description of herbicides and pesticides.

May 18, 2001 – Eurasian milfoil treated with Sonar (*fluridone*) with follow-up June 6. Problem of considerable outflow from Spy Pond.

July 12, 2001 – 25 acres of Coontail treated with diquat and K-Tea algaecide

Sept 4, 2002 – No weeds in Spy Pond

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

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

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

Apr 9, 2008 – Karro Frost survey for endangered Engl. Umbrella Sedge, found at Spy Pond Park

Nov 12, 2008 – No treatment due to endangered sedge

June 30, 2009 – 47.5 acres of Eurasian milfoil and Coontail treated with diquat. RFP too late for Sonar treatment

Oct 1, 2009 – Frances Clark survey 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 survey for Engelmann. Umbrella Sedge

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

Summer, 2011 – No treatment of Spy Pond

Sept 18, 2011 – Ted Elliman survey for Engl. Umbrella Sedge

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

May 16, 2012 – Presentation by Aquatic Control Technology on treating algae and reducing phosphorus. Methods included 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 the level of Spy Pond prior to treatment

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

Jan-Feb 2016 – SOLitude Lake Management acquired Aquatic Control Technologies. ACT had previously acquired Lycott Environmental

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 to protect Engel. Umbrella Sedge

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

Aug 13, 2018 – Snail-seed pondweed and spiny naiad treated with Reward (*diquat*) 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 ft lower)

Apr 2, 2019 – Two RFQ's for biological surveys 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. We already know that total phosphorus is too high and Spy Pond is eutrophic

July 2019 – Spy Pond Management Plan from SOLitude Lake Management

July 12, 2019 – Snail-seed pondweed treated with Reward (diquat) 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, SE cove and maybe elsewhere

May 13, 2020 – Sonar (fluridone) treatment with booster treatments June 16 and July 23

Phosphorus

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

1952 – The bottom stratum had a high organic content and a high amount of phosphorus

July-Dec 1980 – peak of total phosphorus, north basin July 180 µg/L and Dec 240 µg/L, south basin July 130 µg/L and Dec 200 µg/L. 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, Rt.2 0.22, not-Rt.2 0.0.25). Yearly retention 60 kg/yr (direct runoff 138 kg/yr, base flow 94 kg/yr, atmospheric 15 kg/yr, and discharge 187 kg/yr, times 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). Nitrogen limitation encourages blue-green algae which can utilize particulate nitrogen.

Aug 15, 1997 – Spink and Morales, "Preliminary Engineering Study, Spy Pond Hydraulics", design for watershed pressure pipe and detention and treatment tanks for first flush treatment of Spy Pond stormwater

Nov 24, 1997 – Prevent dumping of grass clippings & leaves into pond

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

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

Dec 1997 – Since flow measurements did not accompany the stormwater water-quality measurements, nutrient loading estimates could not be made from Chesebrough and Duerring 1982. Sediment samples were not collected and analyzed for phosphorus. Sediments almost certainly act as a major source of nutrients

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

Jan 24, 1999 – Highest phosphate at stormwater drain #9 (Spy Pond Lane, 0.896 mg PO_4-P/L) and stormwater drain #10 (Roanoke Street, 0.986 mg PO_4-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 µg P/L to 1,100 µg 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

Sept 2000 – North basin 10m unfiltered total phosphorus 1.1 mg/L, decreased to 0.14 mg/L by Nov 17 due to mixing. Sulfurous odor detect fall 2000 and mid-May 2001. On June 25, 2001 10m unfiltered total phosphorus was 0.51 mg/L

Sept 2000 – South basin 5.5m unfiltered total phosphorus 0.40 mg/L (9/29), decreased to 0.05 mg/L by Nov 1. A weak sulfurous order was detected late June 1001. On June 25, 2001 6.5m unfiltered total phosphorus was 1.19 mg/L

Oct 13, 2000 – Rt 2 inlet total phosphorus peaked at 0.12 mg/L, decreasing to 0.02 mg/L on Dec 18. Multiplying the Rt. 2 inlet, Spy Pond Condominium inlet, and Rt. 2 outlet by estimated inflows and outflows gives high phosphorus loads of 1.8 kg/day on Oct 18, 2000 and 0.8 kg/day on May 22, 2001. Decaying aquatic plants release phosphorus rapidly.

Sept 2001 – Abbasi's Spy Pond model suggests that in the short term, reducing phosphorus input to Spy Pond would have a negligible effect in the north basin, and somewhat decrease phosphorus concentrations in the south basin. Hypolimnetic phosphorus would remain high due to anoxia. Reducing sediment phosphorus concentrations by half (if possible) has a greater effect on hypolimnetic phosphorus levels than eliminating phosphorus input to Spy Pond (virtually impossible). Alum treatment, if done properly, might have a significant effect on water quality.

J. Durant suggested changing the outflow so that the water comes from the phosphorus-heavy bottom rather than the top. This is called hypolimnetic withdrawal (GEIR 3-42 to 47, 52, 53)

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

Oct 7, 2020 – MassDEP surveyed Spy Pond for a water quality TMDL (total maximum daily loads for phosphorus)

Water Quality

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

1855 – Spy Pond Water Company incorporated. Pond water raised by steam power to a reservoir, and piped to houses.

1867 – renamed as Arlington Lake Company

1871 – Arlington Lake Company sold to the Town of Arlington

1887 – Arlington Board of Health reported complaints about "offensive conditions" caused by plant matter accumulation.

1898 – Arlington joined the Metropolitan District Commission

1928 – The town warden reported good pond water conditions

1929 – Vegetative growth subsided. A water analysis showed that it was purer than the previous 9 years. Free of plant growth, practically no organisms and amorphous matter.

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

1951 – Traces of dissolved oxygen to 33 ft

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 ft, 0 ppm at 30 ft

Summer 1959 – Stagnant, slimy, odorous water was reported. Little or no swimming or boating

Sept-Oct 1961 – Several surveys by MA Dept Public Health showed control of algae and no recurrence of nuisance aquatic weeds

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

1970 – Sewer main burst on the Rt. 2 frontage road after relocation. Raw sewage entered Spy Pond

April 2, 1970 – Spring Valley storm water overflow with raw sewerage due to MDC trunk rupture near Hamlet St and Franklin St.

1971 – Reports of mud waves on the shores, perhaps due to Rt. 2 construction. Increased weed growth and odor. Requests made for dredging to eliminate mud and silt.

July 1972 – Spy Pond in better condition than 1971

July 1972 – North basin surface – Turbidity 5 JTU (clear), apparent color 15, total alkalinity 50 ppm, iron 0.11 ppm, manganese 0.26 ppm, salt 320 ppm, ammonia 0.30 ppm, total phosphate 0.016 ppm, coliform 130/100ml

North basin bottom – Turbidity 50 JTU (cloudy), apparent color 150, total alkalinity 90 ppm, iron 0.62 ppm, manganese 1.30 ppm, salt 380 ppm, ammonia 10.00 ppm, total phosphate 0.153 ppm

South basin surface – Turbidity 10 JTU, apparent color 30, total alkalinity 40 ppm, iron 0.18 ppm, manganese 0.20 ppm, salt 300 ppm, ammonia 0.46 ppm, total phosphate 0.013 ppm, coliform 60/100ml

South basin bottom – Turbidity 10 JTU (cloudy), apparent color 20, total alkalinity 60 ppm, iron 0.15 ppm, manganese 0.75 ppm, salt 310 ppm, ammonia 1.00 ppm, total phosphate 0.010 ppm

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

Early 1997 – 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. 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

Sept 13, 2000 – North basin 1m 23.3 C, bottom 8.9 C. North basin surface DO 9.4 mg/L, pH 8.9. bottom DO 0.1 mg/L, pH 6.4. North basin surface specific conductance 755 µS/cm, 11m specific conductance 884 µS/cm.

Sept 13, 2000 – South basin 1m 23.5 C, bottom 10.9 C. South basin surface DO 8.7 mg/L, pH 8.8, bottom DO 0.2 mg/L, pH 6.5. South basin surface specific conductance 801 µS/cm, 6m specific conductance 2790 µS/cm.

Feb 23, 2001 – Rt. 2 inlet specific conductance 12,980 µS/cm after two days below freezing and 0.05 cm precipitation. Spy Pond Condo inlet had a high of 10,400 µS/cm on Jan 16.

Sept 2001 – North basin filtered samples range 25-43 nM arsenic throughout the water column. Unfiltered samples peaked at 100 nM, 9m, on Oct. 18, 2000, and less than 55 nM from Nov 17, 2000 to June 11, 2001.

Sept 2001 – South basin filtered samples range 20-30 nM arsenic throughout the water column. Unfiltered samples peaked at 730 nM, 5.5m, on Sept 29, 2000, and less than 55 nM from Nov 17, 2000 to May 17, 2001. The Rt. 2 storm drain peaked at 43 nM on Oct 4, 2000.

Sept 2001 – Aquatic plants tolerate high levels of arsenic. They usually store a few percent of the total available arsenic. Decaying plants may not release arsenic as fast as phosphorus due to organic arsenolipids. Aqueous inorganic arsenic is first taken up by algae

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

Sept 4, 2007 – pH 7.02 bottom of south basin, pH 8.52 bottom of north basin (normal). Low to moderate turbidity on the surface and bottom of basins: 0.98-2.0 NTU on July 30 and 0.85-1.0 NTU on Sept 4.

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 pH 6.6-7.8. Low to moderate turbidity at surface, high turbidity at bottom of basins (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%)

Feb 25, 2017 – Oil sediment and sheen at Rt. 2 inlet

June 5, 2019 -- MassDEP observed a high conductivity, 1400 µS/cm, likely due to road salting.

Sept 8, 2019 – Secchi depth North 1.7m, South 1.2m

Oct 17, 2019 – Soil test of Spy Pond sediment pH 5.8, P 3.9 ppm, K 54 ppm, Ca 1117 ppm, Mg 111 ppm, S 97.4 ppm, Sodium 649 ppm, soil organic matter 10.4%. Sorbed Metals Pb 56.9 mg/Kg, Cu 33.6 mg/Kg, As 16.3 mg/Kg. Sodium is 20x normal, optimum levels P 4-14 ppm, K 100-160 ppm, Ca 1000-1500 mg/Kg, Mg 50-120 ppm, S >10

Jan 2020 – the estimated annual total phosphorus SSO loads 2006 15.6 lbs/yr, 2007 0.5 lbs/yr, 2008 3.8 lbs/yr, 2010 31.5 lbs/yr, 2011 15.0 lbs/yr. (p. 78)

The average, modeled stormwater TP Load was 308 lbs/year, Groundwater TP load was 27 lbs/year (p. E-161-162)

The estimated annual total nitrogen SSO loads 2006 124.5 lbs/yr, 2007 4.1 lbs/yr, 2008 82.0 lbs/yr, 2010 252.0 lbs/yr, 2011 119.6 lbs/yr. (p. 78)

July 9, 2020 – Secchi Dipin North 3.1m, South 2.1m, water 27C

Treatment advice

http://ccetompkins.org/environment/aquatic-invasives/hydrilla/management-options/herbicides/fluridone/fluridone-faq

1904 – Ludlow MA was first use of copper sulphate as an algaecide in Massachusetts

1950s-1960s many tons of an arsenic compound were sprayed to kill aquatic weeds, including many lakes in Wisconsin

1952 – sodium arsenite 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

Dec 4, 1957 – Study of herbicides for aquatic weeds and algae. Sodium arsenite, Kuron (Sylvex), and Benoclor (a chlorinated hydrocarbon) controlled submerged aquatic weeds. 2,4-D and 2,4,5-T also show promise. Benoclor has a high toxicity to fish. Sodium arsenite in a 40% aqueous solution contains 4 pounds of arsenic trioxide AsO_3 at 4 parts per million. Sodium arsenite is toxic to fish at 27 parts per million for 72-hours. Copper sulphate was inadequate for spot control of algae in small areas. Used a motor-driven pumping unit on an ‘Airboy’ as in the Florida Everglades.

1985 – Dredging and cleanup of minimal depth, muck floored, weed infested, Dunn Pond. Gardner, M (25 acres). MDCR removed 220,362 cubic yards of muck and peat to a

maximum depth of over 20 ft. It is now a "jewel in the landscape" of Gardner. It is stocked with trout. It remains a popular destination (GEIR 2-26-27; mafishfinder 2011; yelp.com)

1993 – Dredging of Bulloughs Pond in Newton MA (9 acres) to control flooding and eliminate mats of filamentous green algae. Despite incoming water rich in nutrients, it eliminated the substrate that harbored the resting stages of these algae and early growths.

1995 – Hills Pond (3 acres above Spy Pond) was dredged, with a wetland detention basin and Vortechnics swirl concentrator to handle primary storm water discharge. Measured phosphorus declined tenfold.

1996 – Rooted plant density should be assessed twice a year, in late spring and late summer. [DEM Coursebook, p. 3-42]

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 can be controlled by fluridone, 2,4-D granular, diquat, and endothall

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

June 2004 – Hand pulling of Eurasian milfoil on Dudley Pond, Wayland, MA, was most efficient when coverage was by widely scattered plants at less than 400 plants/acre. (GEIR 2-41).

June 2004 – Dredging of lakes (GEIR 2-23 to 2-29, 3-80 to 3-103)

June 2004 – Drawdown is likely to reduce plant species that depend on vegetative propagation (most perennials). Species that depend on seed reproduction (most annuals) are not affected and germination may be stimulated. Rooted plants need to be exposed to drying and freezing for at least a month (GEIR 4-13, 4-16, 4-11 to 4-29)

June 2004 – Piscivorous fish like largemouth bass eat small fish (planktivorous). Large-bodied zooplankton may increase and clear the water of algae (Dettmers and Stein 1996 and others; GEIR 4-45).

June 2004 – Six inches of sand or other material will inhibit macrophyte growth. If the bottom is organic muck, the sand may settle into the muck and be covered with new silt and organic material. The DEM beach at Walden Pond has a 1:3 slope and quickly loses applied sand (GEIR 4-72, 74)

June 2004 – For algaecide treatment, track the types and density of algae for appropriate treatment type and timing. (GEIR 4-98)

June 2004 – Copper sulfate is often effective at 0.1 ppm, with some algae controlled at 0.01 mg/L. Blue-green algae is more sensitive than green algae. Higher doses may be needed to control blooms. Bright sunlight enhances the effectiveness. Mat-forming, filamentous green algae is resistant to copper. The zooplankton *Daphnia* is highly sensitive to copper. Most algaecide applications in Massachusetts are 0.25 to 0.30 ppm. Fishkills are rare and due to decomposing algae. Copper algaecides may release blue-green toxins as the algae disintegrates. Copper algaecides should be the last line of defense. Apply before a bloom develops. (GEIR 4-98 to 4-104)

June 2004 – Diquat is a relatively non-selective, contact herbicide. Treatment with diquat is recommended early in the season, but can be applied at any time. Diquat rapidly sorbs

to the sediments. The normal rate is 1 gallon/acre. Diquat is toxic to Daphnia at 1 ppm. The half-life of diquat in water is 2 weeks or less. Diquat is biologically unavailable in sediments. The recommended application rate is 1-2 gallons/acre, maximum concentration is 0.71 ppm (0.5 ppm in NY state) (GEIR 4-104 to 4-107)

June 2004 – 2,4-D is particularly effective against Eurasian milfoil (GEIR 4-107)

June 2004 – Glyphosate is effective against emergent and floating leaf species such as Phragmites and Purple loosestrife. It is not effective against submerged aquatic plants due to dilution in water. Glyphosate needs 4-6 hours (at least 2) of dry conditions after application. Avoid strong winds. (GEIR 4-110 to 4-113)

June 2004 – Fluridone (Sonar) needs 40-60 days of contact time. If dilution is limited, the liquid formulation is preferred. The pelletized formulation may be less effective on highly organic, loose sediments. Multiple treatments may be better. Fluridone is particularly effective against Eurasian watermilfoil and curly leaf pondweed, at 0.007 to 0.015 ppm, preferably April or early May. Fanwort needs higher dosages. Fluridone has a high diffusion and dilution factor requiring limno-curtains to sequester a section of a lake (GEIR 4-113 to 4-119).

June 2004 – The macroalgae *Chara* and *Nitella* are highly desirable, as are carpet forming species of *Najas*, and most *Potamogeton* species.

June 2004 – Triclopyr is a systemic herbicide that is effective for Eurasian watermilfoil and other dicotyledonous plants. Dosage is 1 to 2.5 mg/L, recommended dose is 1 mg/L. It has no effect on naiads and pondweeds. Apply it during the active growth phase of young plants (GEIR 4-122 to 4-124, A-116 to A-125))

June 2004 – No other technique than dredging will set a lake back in time. It restores depth and eliminates nutrients, contaminants, vegetation, and seed beds. Dredging should be thorough with ongoing, follow-up management. (GEIR 4-137)

June 2004 – Alum coagulates and settles most algae and many other particles. (GEIR 4-138)

June 2004 – The greatest impacts of any lake management technique may relate to habitat changes, bottom-dwelling benthic invertebrates and tiny zooplankton. (GEIR 5.4)

June 2004 – “In very shallow lakes with nutrient-rich sediments and abundant plant growth, the only long-term solutions maty be the two extremes of dredging or letting nature run its course. The only other alternative is continuous management, which implies continuous costs, impacts, and cumulative effects of such management.” (GEIR 5-6)

June 2004 – Applications for the License to Apply Chemicals should include the target species of vascular plants and algae, the chemicals used, the application rate, the number of days between application, the maximum environmental concentration of the active ingredient, and water chemistry such as pH, alkalinity, and hardness. (GEIR 5-9)

June 2004 – Due to funding cuts to the Clean Lakes Program, no rigorous follow-up studies are performed. What are the impacts on non-target organisms, benthic invertebrates, zooplankton, fish fry, and phytoplankton? (GEIR 5-11)

June 2004 – K-Tea algaecide is most effective at the first sign of an algal bloom. (GEIR A-37)

June 2004 – Decaying vegetation after a diquat treatment of dense vegetation may deplete the oxygen content of water. Treat 1/3 to ½ of such an area, waiting 14 days between treatments. (GEIR A-54)

June 2004 – Apply glyphosate in late August to October for most perennial and rhizome-bearing species such as phragmites and purple loosestrife. Glyphosate is the only herbicide know to interfere with the plant's shikimic acid metabolic pathway, leading to the inability to synthesize protein and produce new plant tissue (Kantrud 1992, GEIR A-76, A-78).

June 2004 – Glyphosate has very low mammalian acute oral or dermal toxicity. Subchronic and chronic laboratory studies indicate that it is not very toxic. It has very low toxicity in aquatic fish and invertebrates. (GEIR A-76 to A-85)

June 2004 – Fluridone inhibits synthesis of carotenes that protect chlorophyll from photodegradation, thus bleaching the plants. Plants die slowly, avoiding sudden decomposition and oxygen depletion. Fluridone degrades with sunlight. It is taken up by fish tissue, clearing as concentrations decline. Fluridone has very low toxicity to birds and low toxicity for mammals. At 1 ppm it affects benthic organisms and decreased the growth rate of catfish fry; at 8-13 ppm it affects microscopic crustaceans. Chronic exposure to 0.2 to 0.5 ppm had no significant effects on daphnids, amphipods, midge larvae, and catfish fry. (GEIR A-86 to A-95)

Aug 6, 2020 – A volunteer with Ipswich River Wildlife Sanctuary has a license to apply AquaPro to control Glossy Buckthorn

Phosphorus advice

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 1973 – Sources of phosphorus: nutrient runoff from soil and fertilizer, dumped leaves and lawn trimmings, car and boat detergents

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

April 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

1996 – Fertilizers are often cited as the most important source of phosphorus leading to cultural eutrophication of lakes in rural areas. Feedlots and manure piles are significant sources of nitrogen and phosphorus pollution to surface and ground waters. For septic systems, the most significant phosphorus loadings are those within 100 meters of the lake. With heavy phosphorus loading, binding sites may saturate, allowing transport further than 100 m [DEM Coursebook, p. 2-32, 2-33, 2-37, 2-38]

1996 – Rooted aquatic plants derive the vast majority of the nutrition from the sediment; improving water quality will not reduce plant growth once they are established [DEM Coursebook, p. 3-11]

1996 – 10-30% of fertilizer leaches from lawns to ground water. With steep slopes and poorly drained soil, surface run-off may be of concern. Leave turfgrasses at least two inches high. Do not apply fertilizer before a rain storm. Maintain a 100 meter phosphorus buffer zone around the shoreline. Consider conservation easements. [DEM Coursebook, p. 4-41, 4-66, 4-67]

1996 – For New Hampshire lakes, phosphorous load due to motorized watercraft increased by 8-80 ug/L. Watercraft can resuspend settled nutrients when internal loads are high. [Schloss 1990, DEM Coursebook, Forest Land Erosion Control, p. 11]

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

Dec 1997 – Sediment sample collection and analysis for phosphorus requires the installation of seepage meters/sample collectors. Field program of several weeks duration (Lee 1977)

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

Mar 1998 – In Lake Cidra, Puerto Rico, accumulation rates of decomposed hyacinth was 2-3 inches/year.

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

June 2004 – When there are abundant aquatic plants, total phosphorus should be collected in early spring (GEIR, p. 1-14)

June 2004 – Empirical eutrophication models of nutrients, chlorophyll, and Secchi disk depth work poorly for lakes with abundant plant growth (GEIR 1-58)

June 2004 – Ground water is typically not a major source of phosphorus (GEIR 2-3)

June 2004 – Alum treatment is effective when algae blooms are a direct result of internal recycling of phosphorus from the sediment, otherwise watershed management is necessary (GEIR 2-4)

June 2004 – Most rooted aquatic plants get most of their nutrition from the sediment (GEIR 3-1; Barko and Smart, *Aquatic Bot.*, 10:339-352, 1981)

June 2004 – Residential use of fertilizer can be a substantial source of nutrients (Sharpley et al 1994; GEIR 3-10)

June 2004 – Buffer strips need to be at least 25 ft. wide for nutrient removal; optimum is 100 ft. wide. A well-designed buffer can be less than 100 ft. (Dennis et al, 2003; Lee et al, 2003; GEIR 3-17).

June 2004 – Wisconsin farms have excessive phosphorus due to fertilizing with manure and inorganic fertilizers. Manure handling from livestock operations is particularly troublesome (Wedepohl, 1995; GEIR 3-19,20)

June 2004 – Even sand will capture much of the phosphorus load from a leach field if the soil is aerated and retains its adsorptive capacity. (GEIR 3-21). If sandy or gravelly soil has a poor cation exchange capacity, transport to a water body can occur. (GEIR 3-26)

June 2004 – Urban areas exports the most phosphorus per unit area (0.1 g/m^2/yr), followed by agriculture (0.05 g/m^2/yr) and atmospheric deposition (0.025 g/m^2/yr). (Rast and Lee 1983, GEIR 3-27)

June 2004 – Storm water flows are notoriously variable; effective treatment must account for its variability. Flow considerations include total volume, peak flows, and the distribution of nutrient loads. Undersizing non-point-source (NPS) controls is the primary cause of failure. (GEIR 3-28)

June 2004 – Drinking water may be treated with calcium phosphate to inhibit corrosion. If so, concentrations of P may range from 1 to 5 mg/L (GEIR 3-36). MRWA uses sodium carbonate and CO_2 to reduce corrosion. (MRWA Monthly Water Quality Test Results).

June 2004 – If enough alum is added, a layer of 1 to 2 inches of aluminum hydroxide floc will cover the bottom and significantly retard the release of phosphorus, and thus the internal load. If external loads are sufficiently low, the treatment will reduce algal blooms. Nutrient controls generally do not reduce rooted plant abundance (GEIR 3-53 to 3-68, Welch and Cook 1999, Mesner and Narf 1987).

June 2004 – Kettlehole lakes have a small watershed to lake area (usually less than 10:1) and a great water depth (maximum >30 ft., ave. >15 ft) relative to lake area (usually <100 acres). As the impervious area of the watershed exceeds 25%, water quality impacts due to storm water runoff are usually obvious.

June 2004 – Nutrient content is very low in most plants. Harvesting is unlikely to reduce nutrient loads (GEIR 4-35, 4-29 to 4-44)

June 2004 – management of nutrient inputs should be implemented for all watersheds (GEIR 5-4).

Sept 30, 2020 – NALMS webinar “Understanding and Managing Internal Phosphorus Loading in Lakes”

Water Quality advice

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

1996 – The shift from mesotrophy to eutrophy maybe very rapid (decades to hundreds of years). It is accelerated by increasing shallowness, enlarged littoral zone, and development of large macrophyte communities. [DEM Coursebook, p. 1-36]

1996 – Water quality analyses have inherent error and accuracy is sometimes limited. The results of precision testing tend to be lab-specific. Ideally all samples for a given parameter go the same lab, even the same technician. For example, the average percent difference for total phosphorus was 45-55%. Flow data is required for inlets and outlets, otherwise mass balance budgets cannot be constructed [DEM Coursebook, p. 3-30]

1996 – Petroleum discharged in the surface waters usually disappears rapidly, but hydrocarbons in the sediment may last for years. [DEM Coursebook, p. 4-70]

1996 – Depth of the euphotic zone is approximately three times the Secchi disk depth [DEM Field Manual, p. 5]

June 2004 – Problems with rooted aquatic plants are due to adequate light and suitable sediment, not current water quality. Management requires in-lake activity; watershed management is not sufficient. (GEIR 2-4)

Sources

Primary Sources

arlingtonma.gov/spypond -- Spy Pond reports, minutes, etc.

spypond.arlington.ma.us/SPCMinutes.htm – Spy Pond minutes 2001 to 2007

www.arlingtonma.gov/vision2020 -- Vision 2020 minutes

1999-2013 – Annual report on Spy Pond from Aquatic Control Technology. Missing report 2004. Missing reports probably due to no treatment: 2000, 2002, 2003, 2006, 2008, 2011, 2014, and 2015

2016-date – Annual report on Spy Pond from SOLitude Lake Management

ACT – Aquatic Control Technology

Advocate – Arlington Advocate

CBB – Brad Barber email

ConComm – Arlington Conservation Commission

Cortell73 – Cortell, J., Report of Conditions in Spy Pond, Arlington, Massachusetts; a historical synopsis, Jason M. Cortell & Associates, July 1973. In 1970, Cortell was with Allied Biological Control Corporation. They treated Spy Pond in the 60's.

GEIR 2004 – Mattson et al, Eutrophication and Aquatic Plant Management in Mass (GEIR), June 2004

EK – Elizabeth Karpati notebooks

KM – Kelwyn Manor mailing list

MA – State of Massachusetts

MyRWA – Mystic River Watershed Association

SLM – SOLitude Lake Management

SPA – Spy Pond Association

SPC – Spy Pond Committee mailing list, minutes.

SPC archives – Collected by E. Karpati, W. Eykamp, B. Barber. Includes SPC minutes for 1996-2000

Vision-2020 – Vision 2020 committee, minutes

Missing and Pending Sources

1873 Town of Arlington legislative acts -- 1873 #242 Water in Arlington, 1910 #64 Spy Pond athletic field, and G.L. #140 Sections 194-196 inc. Renting Boats, Bathing Suits, etc, accepted Sept. 8, 1921

1880-1980 – Annual reports of the Town of Arlington

1960 – contour map and results of surveys

1972 -- Burnett “Proposal to study the eutrophication problem of Spy Pond”

1980 – Barko, J.W., Smart, R.M., Mobilization of sediment phosphorus by submersed freshwater macrophytes, Freshwater Biology 10:229-238.

1994 – Sharpley et al, Managing agricultural phosphorus for protection of surface waters: Issues and options, Environ. Qual. 23:437-451 GEIR 3-10

1995 – Harman, C.R., Use the registered aquatic herbicide Fluridone (Sonar) and Use of the registered aquatic herbicide Glyphosate (Rodeo and Accord) in the state of New York, Final generic impact report, NY Dept. Environ. Conservation, Albany, NY

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

2004 -- ACT Annual Report

Sources before 1960

1666 – Balazs, 1997, p. 14

1676 – Cortell73, p. 4.

1703, Aug 14, 1716, 1730 – Balazs, 1997, p. 15, 25

1734 – Margaret and Bernard Hutchinson interview, 1987. P. 15-17 in Plimpton G., July 2017.

1740-41 – Balazs, 1997, p. 15

1800s, 1880s – Daniel Purcell interview by J.F. Crowley, June 1976. P. 19-32 in Plimpton G., July 2017.

About 1825, 1871, 1876 – Balazs, 1997, p 18, 27-29

1840-1920’s – Cortell73, p.4

1845-1850 – Abner Wyman interview by J.F. Crowley, Nov. 1975. P. 40-49 in Plimpton G., July 2017.

1850s – Advocate, 6/28/84, “A place in the country” by C. Kosak (Arlington High), p. 11, SPA archives

1850, 1867 – Spy Pond History http://spypond.arlington.ma.us/History.htm

1855, 1871, 1887 – Cortell73, p. 5

1871, 1880 – Sanitary Condition of Spy Pond 1952, p. 11

late 1800’s, early 1900’s, 1898 – Chesebrough and Duerring, Spy Pond: A diagnostic study Dec. 1982; Balazs 1997, p. 41

1896 – Mass. Legislative Act 283, “Sewers in Arlington”

1900s, 1920s – MacLaughlin, 6/99, p. 6

1902, 1911, 1914 – Sanitary Condition of Spy Pond 1952, p. 11

1904 – Kempe, New England Water Supplies – A brief history, J New England Waterworks Assoc, Sept 2006, MWRA, p. 61

1907 – Chesebrough and Duerring, Spy Pond: A diagnostic study Dec. 1982, p. 9

Spring 1913 – Cortell73, p. 6

1915 – Stories of Early 20th

1918 – Cortell73, Appendix C

1920s-1950s – SPC Minutes 3/9/99

1920 – Cortell73, Appendix C

1921 – Cortell73, Appendix B, Appendix C

1921, Aug-Sept 1956, Aug 1957 – MacLaughlin, 6/99, p. 82

1921, 1924, 1925 – Sanitary Condition of Spy Pond 1952, p. 12

1922, 1923, 1924, 1926, 1927, 1929 -- Cortell73, Appendix C

1926, 1928, 1929 – Cortell73, p. 7

1926, 1928, 1929, Mar 31, 1929 – Town of Arlington annual report, Dec 31, 1929; Robbins Library, Internet Archives

May 1926 – Petition of Town of Arlington to build a dam in Spy Pond, approved 6/21/26, attached to Jun 18, 1999 letter to lower Spy Pond by 6"

1931, 1936 -- Cortell73, Appendix C

1932-1951, Aug 1951, 1951 – Sanitary Condition of Spy Pond 1952, pl 12, 13

1932 – Stories of Early 20th; Reprinted Plimpton, July 2017, p. 49.

July 16, 1934 – The Surface Water Level of Spy Pond, 1997, SPA archives

1941, 1945, 1947, 1949 -- Cortell73, Appendix C

1945, 1945-1952 – Sanitary Condition of Spy Pond 1952, p. 16, p. 37

1950s – Balazs, 1997, p. 43, 44

1950s-1960s – Dauffenbach, Past, Present and future of mechanical harvesting, Lakeline, March 1998, p. 16

1950, 1957, 1958 -- Cortell73, Appendix C

1951 – MacLaughlin, 6/99, p. 75

1951, Aug 1951 – Cortel73, p. 7-8, Appendix A

Aug 7, 1951 – Sanitary Condition of Spy Pond 1952, p. 23

1952, 1953 – Sanitary Condition of Spy Pond 1952, p. 10-11; Cortell73, p. 9

1952, Aug 8, summer, 1952 – Sanitary Condition of Spy Pond 1952, p. 13, 14, 16, 21, 23, Graph 3, Graph 4

Nov 25, 1952 – Sterling, C.I, Jr., Special Report of the Metropolitan District Commission of the Sanitary Condition of Spy Pond in the Town of Arlington, House Document No. 2208, Jan 1953

1955 – Balazs, 1997, p. 76-79

1955 – Oct. 1994 neighbor news

Aug, Aug 22, Sept 4. 1956 – Control of submerged weeds, Dec 4, 1957, p. 33-34; Cortell73, p. 9-10, 14, Appendix B; Shanahan et al, Review of Recommendations, Dec. 1997

Aug 16, 1957 – Balazs, 1997, p. 139-141

1957 – Chesebrough and Duerring, Spy Pond: A diagnostic study Dec. 1982, p. 23

Dec 4, 1957 – Report of the Department of Public Health, the Department of Public Work, and the Department of Natural Resources Relative to the Study of the Elimination or Control of Submerged weeds in certain great ponds of the Commonwealth, House bill No. 3041, p. 10-12, p. 21, 33-34, p. 49

1959 – Chute, N.E., Glacial geology of the Mystic Lakes-Fresh Pond Area Massachusetts, Geological Survey Bulletin 1061-F, Washington D.C.

Summer, 1959 – Cortell73, p. 11

July 3, 1959 – letter to State Representatives, W.J. Flynn and 43 neighbors, SPA archives

July 17, 1959 – Notice of meeting for elections 4/10/62, SPA archives

August 9, 1959 – letter to J.P. Buckley, State Representative, W.J. Flynn, SPA archives

Oct 9, 1959 – letter to Arlington Advocate, W.J. Flynn and Advocate article attached to July 3 letter, SPA archives

Sources 1960 - 1989

1960 – Boston Herald, 2/16/62 "'Tree Trunk' in Spy Pond Tusk of Extinct Monster"

1960, Summer, June 6, June 24, June 30, July 2, mid July, Sept 26 1960 -- Cortell73, p. 11-12, Appendix B

Sept 9, 1960 – Cortell73, Appendix A

Spring, June 27, July 2, Sept. 9, Sept 26-Oct 7, 1960 – Boston Globe 11/29/1960 "Health Dept. Clears Spy Pond"

June 6, June 27, June 30-July 2, Sept 21, Sept 26-Oct 7, 1960 – Spy Pond Assoc., 3/10/61 letter from M.M. Boschetti in red folder #1, contour map and results of surveys [missing]

Aug 1, 1960 – Spy Pond Assoc. created, red folder #1

Aug 24, 1961 – Letter from Chief Sanitary Engineer, red folder #1

Aug 24, 1961 – Cortell73, Appendix A, Appendix B

Sept-Oct, 1961 – Cortell73, p.12

1962, July 12, July 18, 1962 – Cortell73, p. 13, Appendix A, Appendix B

July 18, 1962 – MacLaughlin, 6/99, p. 82

1963, April, June 1, Summer 1963 – Cortell73, p. 13, Appendix A, Appendix B, Appendix C

June 1, 1963 – Spy Pond Assoc. 4/23/63 minutes, 4/15/1964 minutes

Summer 1963 – "Boat Patrol – To all motorboat owners and operators", summer 1963, SPA archives

1964 – Cortell73, p. 14, Appendix A

1965, Aug 1965 – Cortell73, p. 14, Appendix A, Appendix C

1966 – Spy Pond Assoc. 2/22/66 minutes

1966 – Advocate 3/2/1972 "Arlington Environment is concern", SPA archives

1966, Late July, Aug 3, 1966 – Cortell73, p. 15, Appendix A, Appendix B

Late July 1966 – MacLaughlin, 6/99, p. 82

Aug 3, 1966 – SPA letter, M. Boschetti, 1/4/67, red folder #1

1967 – Annotated plans for Outfall at Spy Pond, MHD File 66447 sheet #93/600, SPA archives

1967 – email R. Noyes 3/21/14 "How Lake Ice Melts"

1967-1968 – Durant, J.L., et al, "Elevated levels of arsenic…", *Water Research*, 2004

1967-1968 – Advocate 3/6/80 "Spy Pond to Get Pollution Study

1967, 1968-1971 – Advocate 3/2/1972 "Arlington Environment is concern", SPA archives

Apr 21, 1967, 1967-1968 – Boston Herald, 4/21/67 "Justice Kirk halts filling of Spy Pond"

1967, July, Aug, late Aug 1967 – Cortell73, p. 15-16, Appendix A, Appendix B

Aug 1967 – MacLaughlin, 6/99, p. 82

1968 – MacLaughlin, 6/99, p. 75

May 1, May, May 27, Summer 1968 – Cortell73, p. 16, Appendix A, Appendix B

May, July 26, 1968 – Advocate, 8/1/1968, “State Officials Treat “Spy” Algae”

May 1, 1968 – Spy Pond Assoc. minutes 5/1/68

June 1968 -- MacLaughlin, 6/99, p. 82

1969, June 1969 – Cortell73, p. 16, Appendix A, Appendix B

June 1969 – MacLaughlin, 6/99, p. 82

1970, Apr 2, July 1970 – Cortell73, p. 16-17, Appendix A

Apr 2, 1970 – SPA. minutes 4/2/70

June 1970 – Cortell73, p. 16-17

July, End of July 1970 – Cortell73, p. 18, Appendix B

End of July 1970 – MacLaughlin, 6/99, p. 82

1971 – Advocate 3/2/1972 “Arlington Environment is concern”, SPA archives

1971 – EK handwritten minutes on SPC/Mass Hgwy meeting 11/30/00

May 27, 1971 – Notice from Div. of Fisheries & game, red folder #1, SPA archives

1971, May, July 28 to Aug 17, 1971 – Cortell73, p. 17-18, Appendix B

Oct 15, 1971—Advocate 10/7/15 “Moderator Names 15 to Spy Pond Study Committee”

1972 – Burnett, Christopher D., “Proposal to study the eutrophication problem of Spy Pond”, Habitat, Inc., Belmont, MA [missing]

1972 – Stumm and Stumm-Zollinger in R. Mitchell (ed), *Water Pollution Microbiology*, Wiley-Interscience; Shanahan et al, Review of Recommendations, Dec. 1997, p. 10.

June, June 26, 1972 – Cortell73, p. 18, Appendices D, E, F

July, end of July 1972 – Cortell73, p. 18, Appendix A, Appendix B

July 1972 – MacLaughlin, 6/99, p. 82

1973 – Cortell73, p. 18

July 1973 – Cortell, Jason M. and Assoc., Report of conditions in Spy Pond, Arlington MA, A historical synopsis, Wellesley Hills, MA (Biologist for Allied Biological Control, summarized by Shanahan 1997 and MacLaughlin 6/99)

Apr 3, 1975 – Advocate 4/3/75 “Motor Boat Regulations Approved”

1977 – Lee, D.R., A device for measuring seepage flux in lakes and estuaries, *Limnology and Oceanography*, 22.1:140-147

1978 – Wagemann et all, “Arsenic in sediments, water, and aquatic biota from lakes in the vicinity of Yellowknife …”, *Arch Environ Contam Toxicol*, 1978;7:169– 91. Referenced in Durant et al, 2004

Jan 20, 1978 – Murphy, E.F., Review of EOEA #0011, Draft Environmental Impact Report, MA Environ. Affairs, in GEIR 2004, p. xxvii-xxxiii

1980 – Advocate 3/6/80 “Spy Pond to Get Pollution Study, SPA archives

1980 – MA Fish &Wildlife on Spy Pond, April 1993. SPA archives

May 14, 1980 – Newsletter, “Spy Pond Improvement Association”, 5/14/80, SPA archives. Letter from Kevin Barbera announcing the meeting, SPA archives

June 24, 1980- Spy Pond Study Committee, EPA Study Subcommittee, SPA archives

summer, early July, July 7, late July, July-Aug, Sept, Nov 13, 1980 – Chesebrough and Duerring, Spy Pond: A diagnostic study, Dec. 1982, p. 23, p. 71, 73, 80, 102, 104

July-Aug 1980 – Chesebrough and Duerring, Spy Pond: A diagnostic study 4/81 and Chen and Chesebrough, Feasibility Study, 9/82, p. 3-4

July-Aug 1980 – Shanahan et al, Review of Recommendations, Dec. 1997, p. 20, and Chesebrough, Sept 1982

July-Dec 1980 – Shanahan et al, Review of Recommendations, Dec. 1997, p. 17-18 from Chesebrough and Duerring data

Dec 4, 1980 – Advocate 12/4/80 "State Plans Spy Pond Project … Stone Wall", SPA archives

Apr 3, 1981 – Chesebrough and Duerring, Spy Pond: A diagnostic study Dec. 1982, Appendix F, Algal Assay Results, https://archives.lib.state.ma.us/bitstream/handle/2452/50493/ocm10503798.pdf

Early summer, 1981 – Chen and Chesebrough, Feasibility Study, 9/82, p. 8-1; Kotsatos, A., letter to SPC, 2/17/97, SPC archives; Spy Pond Assoc. neighbor news, 10/1994, SPA archives, GEIR 2-19

Oct-Nov, Oct 18, Oct. 26, 1981 – Chen and Chesebrough, Feasibility Study, 9/82, p. 4-4, Figures 4-4 to 4-15, Table7-1 and 7-5, Figure 8-11

Oct 26, Nov 6, 1981 – Chen and Chesebrough, Feasibility Study, 9/82, Figures 5-3 to 5-7

1982 – Shanahan et al, Review of Recommendations, Dec. 1997, Wang and Harleman,, p. 9

Sept 1982 – Chen, J., Chesebrough, E., Feasibility Study for Restoration of Spy Pond, Environmental Design and Planning, Inc (EDP), Allston, MA, 3-1, Table 6-5

Oct 1982 – MA Dept. Environ. Quality Engineering, "Upper Mystic Lake watershed urban runoff project (Summary)", Commonwealth of Massachusetts, part of U.S. EPA's Nationwide Urban Runoff Program (NURP).

1984 – "Spy Pond Issues Meeting", Aug 19, 1996, SPC Archives

Before 1985, 1985-87, 1987-1996 – Annotated plans for Outfall at Spy Pond, MHD File 66447 sheet #93/600, SPA archives

Sept 1985 – Lisco, "Lowering of Spy Pond", 1/22/97

April 1988 – Whitman & Howard, Spy Pond – Phase II Restoration, Arlington, Massachusetts, Draft Environmental Impact Report, EOEA #6408 [MEPA, DEIR]. Includes engineering plans for Little Pond storm drainage conduits, first flush diversion, and stormwater treatment system. Summarized by Shanahan et al, Review of recommendations, 12/97, p. 34, 54

Sources 1990 - 1999

1990s -- Advocate, 7/27/2000, "Sailboats collect spider webs on pond", p. 13, SPC archives

Aug 8, 1991 – Advocate 8/8/91 "Spy Pond issues stagnate", SPA archives

Aug 24, 1991 – Advocate 9/5/91 "Spy Pond area residents work to clean cove…", SPA and SPC archives

May 18, 1992 – "Executive Summary of Vision 2020 Environmental Committee, SPC archives

Sept 24, 1992 – Advocate 9/24/92 "Pond cleanup now town's concern", SPA archives

Oct 1992 – Schueler, T.R., *Design of Stormwater Wetland Systems*, Metropolitan Washington Council of Governments, Shanahan et al, 12/97, p. 40

1993 – Cooke et al, *Restoration and Management of Lakes and Reservoirs*, 2nd edition, Lewis publishers, Boca Raton, Florida, Shanahan, 12/97, p. 34

April 1993 – MA Fish & Wildlife on Spy Pond, SPA archives

1994 – Clayton, J.S. and Tanner, C.C. in Nriagu, J.O. (ed.) *Arsenic in the environment: cycling and characterization*, JJ. Wiley and Sons, 1994

1995 – Fugro East, Inc., Summary report of the restoration of Hills Pond in Menotomy rocks Park, 1996. Summary in GEIR 2004, p. 2-8, 2-28, 4-136, and 4-137.

1996 – MA Dept Environmental Management, Lake and Pond Management, Field Manual and Coursebook, prepared by Horsley & Witten for the 1996 New England Conference, MA Publication 17556-183-100-5/94-5.63-C.R. (field manual), 16621-434-100-3-91-C.R. (coursebook)

1996 – SPC Minutes 3/5/97

1996 – SPC Minutes 12/4/96

June 21, 1996 – Fugro, Dredging Feasibility Study, SPC archives

Summer, 1996 – Vision 2020 Report to Town Meeting 1998, SPC archives

Aug 16, 1996 – Balazs, E., 1997, p. 213; "Meeting to explore the issues around the condition of Spy Pond" and "Spy Pond Issues Meeting," SPC archives

Summer 1996, 1997 – SPC Minutes 8/19/97

Oct 22, 1996 – SPC Minutes, 10/22/96, SPC Archives

Oct 22, 1996 – Annotated plans for Outfall at Spy Pond, MHD File 66447 sheet #93/600, SPA archives

1997 – Balazs, E., *Spy Pond Stories continued*, 3rd edition.

1997 – Shanahan et al, Review of Recommendations, 1997, p. 20

Early 1997 – Ivushkina, T., Toxic elements in the sediments, 1999

Jan 22, 1997 – SPC Minutes, 1/22/97, 11/12/96, 3/5/97, 4/2/97, 6/3/97, 8/19/97; HydroAnalysis, letter, 3/26/97, SPC archives; https://www.umass.edu/mwwp/; Lisco, T., "Review of Spy Pond Restoration Report Draft", 9/29/97, SPC archives

Jan 22, 1997 – Lisco, T., "Lowering of Spy Pond: Project Description", attached to letter to the Board of Selectman, 6/18/99, SPC Minutes 1/22/97; Shanahan et al, 12/97, p. 52

1997 – Environmental Task Group report to Town Meeting, Apr 27, 1998, SPC archives

Mar 15, 1997 – SPC Minutes 3/5/97, 5/6/97; Clean Water Conference, SPC archives;

Apr 1997 – SPC Minutes 5/6/97; Advocate 10/30/97, "Environmental issues attract many dedicated activities," p. 17; "What will Spy Pond be like in 5 years?", SPC archives

June 21, 1997 – SPC Minutes 5/6/97; Advocate 6/26/97 "Spy Pond Cleanup …"

July 1997 – "Secchi Dip In – Massachusetts 1997", SPC archives

July 17, 1997 – Advocate 7/17/97 p. 3, "Spy Pond Festival promises fun, with an environmental message" SPC archives

Aug 15, 1997 – Spink J., Morales, A., "Preliminary Engineering Study, Spy Pond Hydraulics, Spy Pond Water Quality Report," MNS Consultants, Wellesley, MA, appendix to August draft of Shanahan et al, Review of Recommendations, Dec. 1997.

Oct. 15, 1997 – Karpati, E. "Birds seen at Spy Pond"; SPC Minutes 10/15/97

Nov 11, 1997 – Leondar-Wright, E., updated "Goals, Objectives, and Plans Log", SPC archives

Nov 24, 1997 – Karpati, E. "Spy Pond Goals and Action Timetable", SPC archives

Dec 1997 – Shanahan et al, Review of Recommendations, HydroAnalysis, Inc. of Acton, MA, SPC archives, p. 7, 13, 15, 20, 21, 36-37, 40-46, 47-49,

Dec 4, 1997 – Conservation Commission, letter to Arlington Board of Selectman on Spy Pond water level, SPC archives

Dec 7, 1999 – SPC Minutes 7/21/99, 12/7/99

Dec 12, 1997 – Eykamp, W. and Spy Pond Committee, Letter to MA Office of Environmental Affairs supporting the Massachusetts Watershed Initiative and Massachusetts Water Watch Partnership, SPC archives

Feb 4, 1998 – Advocate 2/8/98 p. 3, "Report raises agenda, hopes for Spy Pond revival"; SPC agenda 2/11/98

March 1998 – Smith, G., Water Hyacinth harvesting at Lake Cidra, Puerto Rico – a big operation, Lakeline p. 20, 44. Special issue on aquatic harvesting

March 1998 – Wilson and Carpenter, Making the weedline work for your lake, Lakeline p. 18, 38. Special issue on aquatic harvesting

April 27, 1998 – Town Meeting Warrant Article 30, Goals for Spy Pond; Vision 2020 Standing Committee Report to the 1998 Annual Town Meeting SPC Archives

May 31, 1998 – Friends of Spy Pond Park, "The Spy Pond Balancing Act", six scenes, from a 5/31 workshop, SPC archives; SPC minutes 6/9/98, 7/21/99

June 10, 1998 – SPC Minutes 6/9/1998

Sept 18, 1999 – SPC Minutes 9/14/99

Oct 1998 – J. Durant email from W. Eykamp, 1/4/05, EK Spy Pond notebook, "Corresp January 2005"

Oct 7, Oct 22, 1998 – SPC Minutes 10/7/98

Nov 5, 1998 – SPC Minutes 10/7/98

Dec 1998 – SPC Minutes 12/9/98; EK minutes for Vision 2020 Standing Committee 10/13/99; Spy Pond Goals Nov 24, 1997 SPC archives; Project Narrative, "Urban watershed management in the Mystic River Basin", Dec 1997 SPC archives

Dec 1998 – Justus, "Urban watershed management in Spy Pond & Horn Pond areas", July 2002

Dec 1, 1998, Feb 19, 1999 – MacLaughlin, 6/99, p. 55-57

1999 – Ivushkina, T., Toxic elements in the sediments of the Alewife Brook and Mill Brook Watersheds, MS Thesis, Tufts U, summarized in MacLaughlin, 6/99

Jan 6, 1999 – Baseline aquatic vegetation survey at Spy Pond, Aquatic Control Technology

Jan 24, 1999 – MacLaughlin, 6/99, p. 42 (doesn't match fig. 3-9)

Feb 1999 – Gawel et al, Characterization and Cycling, 1/00, p. 16

Feb 9, 1999 – SPC Minutes 2/9/99

Feb 19, 1999 – Gawel et al, Characterization and Cycling, 1/00, p. 16-37

Mar 15, 1999 – Draft letters to Kerbie Landscaping and Wilson's Farm along with Phosalert addresses, SPC archives

Mar 17, 1999 – Gawel et al, Characterization and Cycling, 1/00, p. 12

June 1999 – MacLaughlin, K.J. An investigation of arsenic in Spy Pond, Master's Thesis, MIT

June 6, 1999 – Friends of Spy Pond Park, "Spy Pond Shore Rehabilitation Project", SPC archives; SPC Minutes 3/9/99, 9/14/99; Friends of Spy Pond Park Newsletter Nov 1999 SPC Archives

June 12, 1999 – SPC Minutes 7/21/99

June 19, 1999 – Letter to Arlington Board of Selectman on lowering Spy Pond by 6", SPA archives, SPC archives; SPC Minutes 7/21/99

July 21, 1999 – SPC Minutes 7/21/99, 12/7/99

Oct 12, 1999 – SPC minutes 10/12/99, 10/15/2001 on 'City Green' GIS

Nov 5, 1999 – letter by M.J, Amorello, Mass Highway to Board of Selectman, SPC archives

Nov 9, 1999 – SPC Minutes 11/9/99

Nov 24, 1999 – ACT 1999 Report, 1/6/00

Sources 2000 - 2004

2000 – EK Vision 2020 minutes 11/14/01, Upcoming events

Jan 2000 – http://spypond.arlington.ma.us/Birds.htm

Jan 2000 – Gawel, J.E., Senn, D.B., Lukacs, H., MacLaughlin, K.J., Durant, J.L., Characterization and Cycling of Phosphorus and Arsenic in Spy Pond, Mass Lakes and Ponds Program and Town of Arlington, p. 6, 16, 24, 27, 33, 35, 37, 39, 44

Jan 6, 2000 – ACT 1999 report, Baseline aquatic vegetation survey at Spy Pond, Aquatic Control Technology

Jan 17,2000 – Leondar-Wright, E., "Spy Pond's Problems", diagram of Spy Pond with problems: erosion, goose droppings, fallen willows, polluting storm drains, sandbar, oil slick, litter, weeds, concrete ruins, phragmites

Feb 8, 2000 – SPC minutes 2/8/00

Mar 2000 – EK minutes Vision 2020 3/8/00

Mar 14, 2000 – Baystate Environmental Consultants (BEC), "Restoration of Spy Pond Arlington MA", SPC minutes 3/14/00

Mar 20, 2000 – SPC minutes 3/20/2000; Warrant Article 63, "Overview of Spy Pond", SPC archives

March 2000 – Undated notes "I began investigating the chemical treatment of Spy Pond Field last fall", SPC archives. Treatment begins week of April 1.

Apr 7, 2000 – SPC minutes 5/16/00, 10/15/01, 12/10/02, 2/11/04

Apr 4, 2000 – Arlington Town Bylaws, Title IV Public Spaces, Article 5, Section 2. Advocate 7/20/00, "Canada geese driving Spy Pond users batty," p. 1

May 16, 2000 – SPC minutes 5/16/2000

June 13, 2000 – Christine Wallace and the BSCES Younger Member Group, Stormwater Management, Boston Society of Civil Engineers SPC archives; SPC Minutes 11/9/99

July 27, 2000 – Advocate, 7/27/2000, "Sailing sinks in pond's southern basin," p. 1

Sept, Sept 13, 2000 – Abbasi Master's thesis Sept 2001, p. 26, 30, 32, 34, 39, 41, 45, 46

Nov 30, 2000 – E. Eykamp from EK handwritten minutes on SPC/Mass Hgwy meeting 11/30/00

2001 – E. Karpati email, EK Spy Pond Notebook, "Corresp Nov 2005"

2001 – CBB email 11/26/14 "Spy pond fish stocking"

2001 – EK Vision 2020 minutes 4/10/01 and 5/6/02, SPC minutes 3/20/02, 4/17/02, 1/8/04, 4/12/05, 3/3/09, CBB email 2/28/20 R. Terry "2020 fertilizer flyer…"

2001 – EK Vision 2020 minutes 8/8/2001, Upcoming events

Feb 23, 2001 -- Abbasi Master's thesis Sept 2001, p. 35

May 18, 2001 – 2001 ACT Report

June 9, 2001 – SPC minutes 6/19/01

July 12, 2001 – 2001 ACT Report

Sept 2001 – Abbasi, Kalsoum A., Modeling Phosphorus Cycling and Road Salt Effects in Spy Pond, Master's thesis, Tufts Univ. Water quality study of Spy Pond and a detailed model of phosphorus loading. Model results on p. 80, 82. Groundwater p. 85. Arsenic 158, 161-165, Clayton & Tanner 1994, Maeda 1994. Phosphorus p. 159. Dry-water discharge in Durant et al 2004, p. 2991.

Oct 15, 2001 – SPC minutes 10/15/2001, EK Spy Pond Notebook "Corresp October 2004"

Oct 17, 2001 – SPC minutes 10/15/01, 11/13/01 and 12/11/01, 9/5/02, http://spypond.arlington.ma.us/DEM.htm

Dec 11, 2001 – SPC minutes 12/11/01

2002 – SPC minutes 5/11/04, EK Spy Pond Notebook, Advocate 5/6/04 “Warning issued”, EK Open Space Management Plan for Spy Pond 1/09

Feb 6, 2002 – Meierdiercks, K., Bathymetry of Spy Pond, Tufts, http://spypond.arlington.ma.us/Water%20Depth%20Map.htm

April 17, 2002 – SPC minutes 4/17/2002

Apr 27, 2002 – BSCES newsletter, 6/02 and http://spypond.arlington.ma.us/Storm.htm, EK Vision 2020 minutes 3/19/02, SPC minutes 3/20/02, 9/5/02

June 15, 2002 – SPC minutes 5/21/02

July 2002 – Justus. S. “Urban watershed management in the Mystic River Basin, Spy Pond & Horn Pond areas", MAPC study (funded Dec 1998)

Sept 4, 2002 – SPC minutes 9/4/02

Nov 13, 2002 – EK handwritten SPC minutes 1/16/01, SPC minutes 6/19/02, 12/10/02, EK Vision 2020 minutes 11/13/02

Jan 22, 2003 – SPC minutes 1/22/03

Mar 5, 2003 – SPC minutes 2/26/03, 6/17/03

Mar 25, 2003 – SPC minutes 2/26/03, 7/15/03

Mar 19, 2003 – SPC minutes 3/19/03

Apr 15, 2003 – SPC minutes 4/15/03, 12/13/05

May 3, 2003 – SPC minutes 5/20/03

June 17, 2003 – SPC minutes 6/17/03, 7/15/03, 11/4/03, Advocate 6/12/03 “Spy Pond gets leaching catchbasins”, EK folder “Spy Pond Grant” on Installation of Leaching Catch Basins, EK archives

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 – SPC minutes 7/15/03, 9/3/03

Nov 4, 2003 – SPC 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 – SPC minutes 1/8/04, 1/13/04

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

Apr 13, 2004 – SPC 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”, SPC minutes 5/11/04

June 2004 – Mattson, M.D., et al, “Eutrophication and aquatic plant management in Massachusetts,” Final Generic Environmental Impact Report (GEIR), Massachusetts DEP and DCR.

June 15, 2004 – SPC minutes 6/15/04

July 9, 2004 – 2005 ACT Report

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

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

Sources 2005 - 2014

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

June 10, July 13,2005 – 2005 ACT Report

Dec 2005 – Durant, J., Quality Assurance Plan (QAPP) for DEM grant

Dec 13, 2005 – SPC minutes 12/13/05

Jan 10, 2006 – SPC 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

Sept 27, Oct 3, 2006 – “Spy Pond Committee Presents Two Fall Programs”, EK Spy Pond notebook, SPC minutes 11/14/06

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

Apr 10, 2007 – SPC 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, SPC 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 – SPC 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 – SPC minutes 10/17/07

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

May 11, 2008 – SPC minutes 5/11/08

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

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

May 13, 2008 – SPC minutes 5/13/08

June 10, 2008 – SPC minutes 6/10/08

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

Aug 21, 2008 – SPC 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 – SPC minutes 11/12/08

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

Mar 3, 2009 – SPC minutes 3/3/09

Mar 31, 2009 – SPC minutes 3/31/09

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

Apr 28, 2009 – SPC minutes 4/28/09

June 30, 2009 – SPC minutes 6/9/09

July 15, 2009 – KP SPC notebook

July-Aug, 2009 – See Feb 2, 2012

Summer 2009 – SPC 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 – SPC 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 – SPC email, W Eykamp “Spy Pond Level

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

Mar 27, 2010 – SPC 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 – SPC minutes 5/3/11

Mar 18, 2011 – SPC 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, SPC minutes 9/6/11

Sept 6, 2011 – SPC minutes 9/6/11

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

Oct 1, 2011 – SPC minutes 10/4/11

Oct 5, 2011 – SPC email “Phragmites treatment”

Feb 2, 2012 – CBB email, W. Eykamp “BOH meeting tonight” and “Meeting with Board of Health regarding blue-green algae”. And 12/6/11 “Some data…” and “Microcystis MDPH Spy Pond Data 2009-2011”

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

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

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

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 – SPC/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 – SPC minutes 3/5/13

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

Apr 30, 2013 – SPC minutes 4/2/13

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

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

May 23, 2013 – SPC minutes 5/23/13

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

June 8, 2013 – MassDOT, Impaired waters assessment for Spy Pond (MA71040) – Final Report; CBB email D. White 4/15/20 “Emailing A12.5DOTSpy Pond-assessmt.pdf”

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

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

Sept 3, 2013 – SPC minutes 9/3/13

Nov 5, 2013 – SPC 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 – SPC 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 – SPC minutes 6/3/14

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

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

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

Sept 2, 2014 – SPC minutes 9/2/14

Oct 28, 2014 – SPC minutes 10/28/14

Sources 2015 - 2019

2015 – “Water Bodies Management” at www.arlingtonma.gov

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

Mar 3, 2015 – SPC 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 – SPC minutes 10/6/15

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

Oct 27, 2015 – SPC minutes 10/27/15

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

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

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

Jan 13, 2016 – SPC 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 – SPC/KM email “carp die-off on Spy Pond”

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

Feb 2, 2016 – SPC 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 – SPC minutes 9/6/16

Oct 4, 2016 – SPC minutes 10/4/16

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

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

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

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

Feb 25, 2017 – CBB email J Cogswell 2/26/17 “Oil leak into Spy Pond?”

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

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

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

July 2017 -- Plimpton G., Market Gardens, Arlington Massachusetts 1800s-1940. Excerpted from Plimpton, G., Stories of Early 20th Century Life, Arlington Arts Council, 1992 and Plimpton, G., Robbins Farm Park, A local history from the revolutionary war to the present, Friends of Robbins Farm Park, 3rd ed., 2007

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”, SPC minutes 11/7/17

Oct 24, 2017 – Mattingly, E., “Inland global warming preparedness project: Drone assisted watershed mapping & management,” MIT-Lincoln Laboratories Venture Crew 1775, presentation to the Arlington Reservoir Committee

Nov 7, 2017 –Mattingly Oct 24, 2017, p. 20-22, 5/21/17; SPC minutes 11/7/17

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

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

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

Apr 10, 2018 – SPC minutes 4/10/18

May 1, 2018 – SPC 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 – SPC/KM email “water chestnuts, brittle naiad, and treatment plan for Spy Pond”

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

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

Sept 4, 2018 – SPC minutes 9/4/18

Sept 15, 2018 – SPC minutes 10/2/18

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

Nov 15, 2018 – SPC minutes 11/6/18

Dec. 4, 2018 – SPC minutes 12/4/18

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

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

Feb 2,2019 – SPC minutes 2/5/19

Apr 2, 2019 – SPC 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”

June 5, 2019 – CBB email M. Reardon 6/18/2019, “Mystic Lakes and Ponds Monitoring Update”

June 7, 22, 29, 2019 – CBB field journal

July 2019 – SpyPond2019ManagementPlan.pdf, SPC 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”, SPC email 8/1/19

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

Sep 8, 2019 – CBB email Eykamp 9/8/19 “Secchi today”

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

Oct 1, 2019 – SPC minutes 10/1/19

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

Oct 30, 2019 – email “Cormorants”

Sources after 2020

Jan 2020 -- Mystic Phosphorus Alternative TMDL Report, prepared by Mystic River Watershed Association, EPA, and MassDEP. https://www.epa.gov/sites/production/files/2020-05/documents/mystic-phosphorus-tmdl-development.pdf

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

Jan 7, 2020 – SPC minutes 1/7/20

Feb 4, 2020 – SPC minutes 2/4/20

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

winter 2020 – SPC email 1/8/21 “Draft, Spy Pond Committee Annual Report 2020”

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

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

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

Mar 27, 2020 – CBB email 3/27/20 “shoreline plantings”

Apr 12, Apr 21, 2020 – SPC Minutes 4/21/20

Apr 23, 2020 -- KM email "coyote sighting"

May 13, 2020 – SPC/KM email 5/12/20 and 7/20/20, CBB email Lacasse 6/17/20 and 7/1/20, “Treatment of Spy Pond on Wednesday May 13”

May 18, 2020 – CBB field journal p. 15.

May 22, 2020 – SPC email Eykamp 5/23/20, Ricci 5/24/20, “a first!”

May 26, 2020 – SPC email CBB 5/26/20, “eastern king bird, no barbecue”

June 30, 2020 – CBB field journal p. 15.

July 7, 2020 – SPC email 7/8/20, “carp”

July 8, 2020 – CBB email Winkler 7/8/20, “Pond report”

July 9, 2020 – SPC email 7/13/20, “Secchi Dipin”

July 12, 2020 – CBB field journal p. 16, SPC minutes 9/1/20, CBB email 7/13/20, “Secchi Dipin”

July 25, 2020 – CBB field journal p 17

July 29, 2020 – SPC email 7/29/20, “Spy Pond is turning light green”

Aug 2, 2020 – CBB field journal p 20

Aug 5, 2020 – CBB email B. Loosian 8/5/20, “Any news on Spy Pond sandbar”

Aug 6, 2020 – CBB email Jeanne Li 8/6/20, “Buckthorn management” regarding Ipswich River Audubon article “In your words”

Aug 8, 2020 – CBB field journal p. 21

Aug 12, 2020 – SPC email 8/12/20 “swan passed away”

Aug 14, 2020 – SPC email 8/14/20 “Three eagles”

Aug 22, 2020 – SPC email Hibbett 8/22/20 “What makes a lake tick?”

Aug 27, 2020 – CBB email P. Shanahan 8/27/20 “Spy Pond aquatic history”

Sept 11, 2020 – CBB email K. Atkinson 9/11/20, “Last Hurrah, Spy Pond SW Restoration, Phase 1. Also arlingtonma.gov/spypond “Native Planting 2019 for Rt. 2 Path”

Sept 16, 2020 – CBB email D. Welch 9/16/20, “unresponsive cormorant at Kelwyn Manor Park”

Sept 23, 2020 – CBB email J. Cordeiro 9/22/20, “possible Alewife Floater”

Sept 26, 2020 – CBB field journal p. 23

Sept 30, 2020 – SPC email 9/30/20 “Last chance to register for the phosphorus webinar”

Oct 7, 2020 – CBB email E. Sullivan 10/9/20, SPC email 10/7/20, “MA surveying Spy Pond”

Nov 6, 2020 – SPC email 11/4/20 “Friday at 2pm on oriental bittersweet and vinegar”

Nov 28, 2020 – KM email 11/15/20, 11/28/20 “Coyote”, “Coyote on cheswick”,

Dec 15, 2020 – SPC email 12/11/20 “Spy Pond Committee moving from Yahoo to Google Groups”

Jan 2, 2021 – CBB field journal p. 2

Jan 9, 2021 – KM email 1/9/21 “Fox on bay state road”; KM email 12/20/20 “Fox in backyard”; Eykamp

Jan 30, Jan 31 2021 – CBB field journal p. 2-3