

# Black's Nook In-Pond Restoration Project



Fresh Pond Advisory Board  
18 March 2021



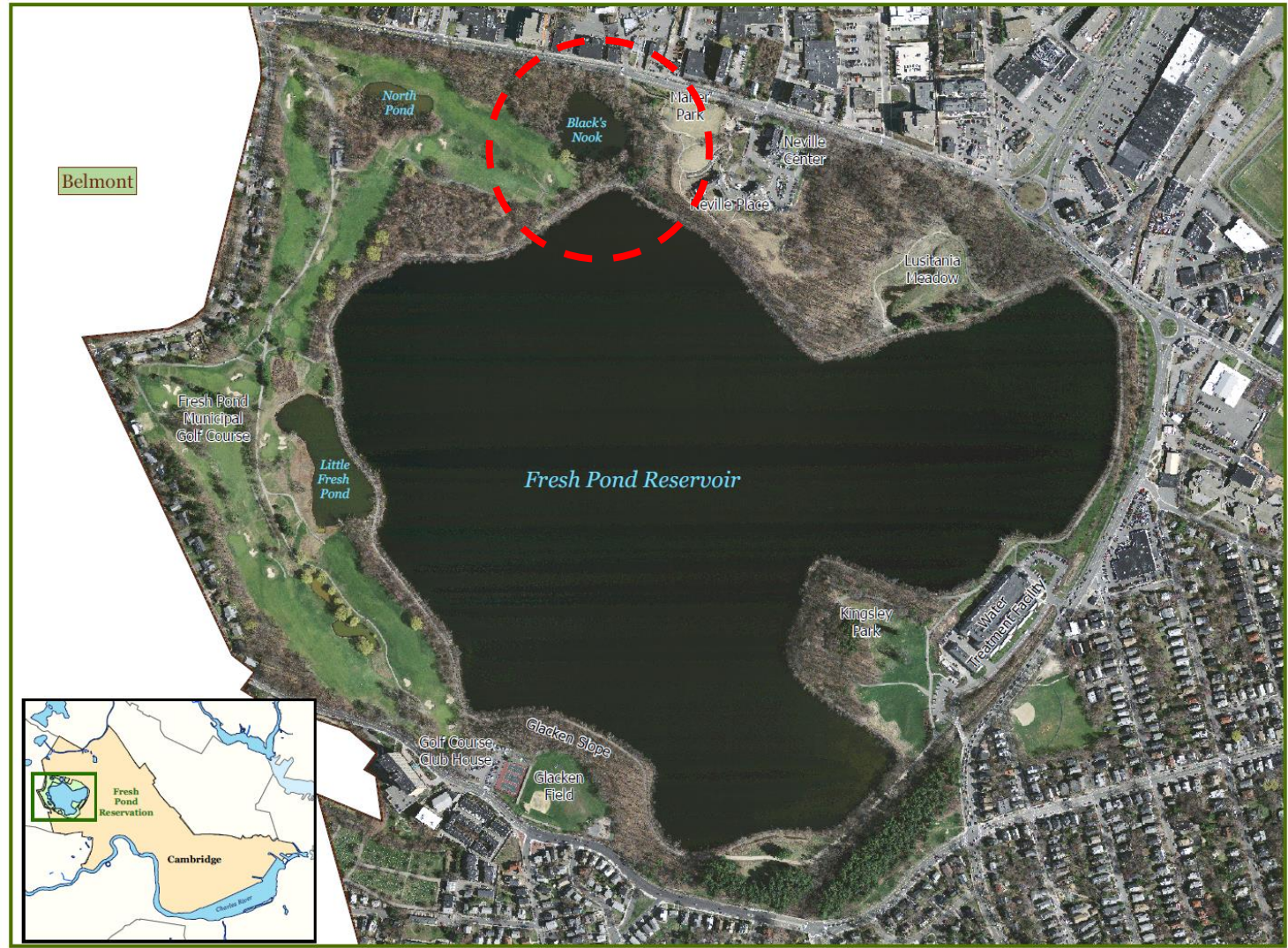
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# AGENDA

1. Questions from January FPAB Meeting
2. Rehabilitation Alternatives and Costs
3. Decision Matrix
4. Discussion
5. Next Steps

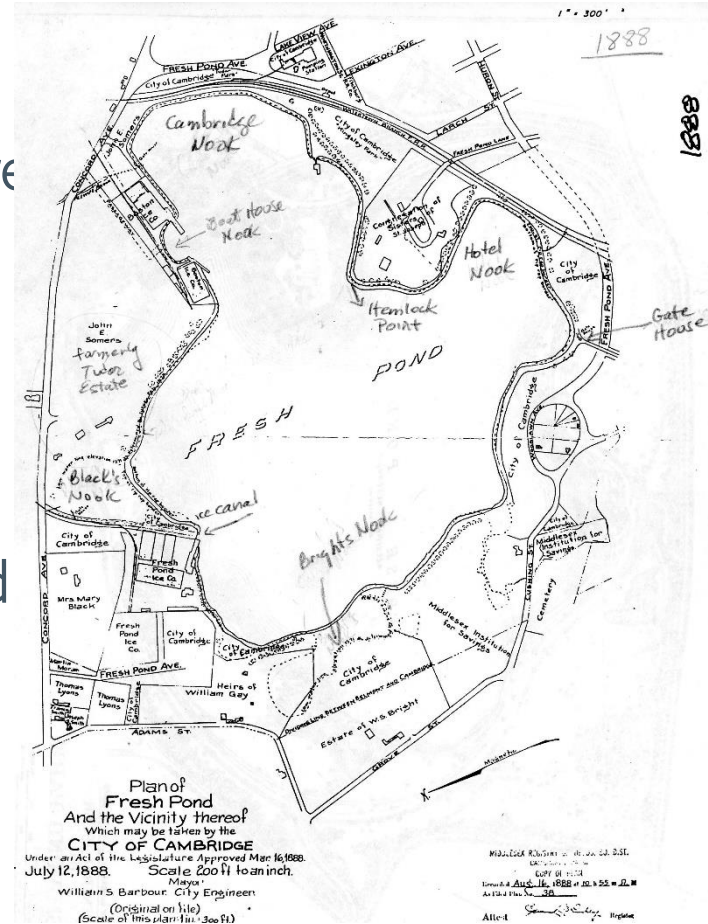


# BLACK'S NOOK PROJECT AREA



# QUESTIONS AND COMMENTS FROM OUR JANUARY FPAB MEETING

1. Can we show Combined Alternatives where it makes the most sense?
2. Timelines for pond rehabilitation?
3. What are the additional impacts when removing 2' vs. 4' of sediments?
4. Are there relevant Case Studies of dredged ponds related to sensitive resource areas?
5. How can we minimize impacts during construction (dredging options)?



# REHABILITATION ALTERNATIVES - ORIGINAL

1. Do Nothing.
- 2A. Manage Aquatic Vegetation – Benthic Barriers.
- 2B. Manage Aquatic Vegetation Mechanically (Hydro Rake).
- 2C. Manage Aquatic Vegetation – Chemical Treatment.
3. Phosphorus Inactivation.
- 4A. Shallow Dredging – 2' Depth.
- 4B. Deeper Dredging – 4' Depth.



# REHABILITATION ALTERNATIVES - REVISED

1. Manage Aquatic Vegetation – Hydro-Rake and Benthic Barriers.
2. Manage Aquatic Vegetation – Chemical Treatment and Phosphorus Inactivation.
3. Shallow Dredging – 2' Depth.
4. Deeper Dredging – 4' Depth.



# DECISION MATRIX FOR ALTERNATIVES

No.	ALTERNATIVE	WATER QUALITY IMPROVEMENTS			HABITAT IMPROVEMENTS					Special Considerations	20-Year Life Cycle Cost
		Returns BN to Open Water Body	Meet Class B Water Quality Standards	Address Category 5 Impaired Water Body Status	Benthic Community	Fishery	(Avian) Birds	(Anuran) Amphibians	Bats		
1	Hydro Rake and Benthic Barriers	Y	P	P	P	P	P	P	P	Will limit plants where applied but would not cover whole pond due to impacts on benthic community; requires maintenance.	\$170,000
2	Chemical Treatment and Phosphorus Inactivation	Y	P	P	P	P	P	P	P	Would need more than one herbicide for range of species present.	\$80,000
3	Shallow Dredging (2')	Y	Y	Y	Y	Y	Y	Y	Y	Affects all aspects of the pond, allows for overall restoration and enhancement.	>\$300,000
4	Deeper Dredging (4')	Y	Y	Y	Y	Y	Y	Y	Y	Same as for shallow dredging but provides longer benefits and will expand habitat for some species and limit regrowth of plants.	>\$600,000

## KEY



Y = YES

P = PARTIAL

# ALTERNATIVE 1 – MANAGE AQUATIC VEGETATION w/ HYDRO RAKE AND BENTHIC BARRIERS

## Pros:

1. Returns Black's Nook to Open Water Body.
2. Eliminates Emergent and Floating-Leaved Species.
3. Partially Meets Class B WQ Standards and Addressing Impaired Water Body Status.
4. Partial Improvements to Benthic and Wildlife Communities.

## Cons:

1. Can Disturb Benthic Community.
2. Allows other Species like Coontail to Expand.
3. Does not Operate in Less Than 12" of Water.
4. Control only Lasts 3 – 5 Years.
5. Requires Shoreline Access and Maintenance.

Cost per 20 Years: \$170,000.





# ALTERNATIVE 2 – MANAGE AQUATIC VEGETATION CHEMICALLY

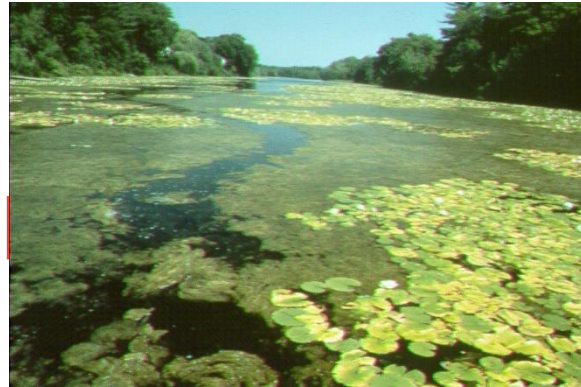
## Pros:

1. Returns Black's Nook to Open Water Body.
2. Eliminates Emergent and Floating-Leaved Species.
3. Partially Meets Class B WQ Standards and Addressing Impaired Water Body Status.
4. Partial Improvements to Benthic and Wildlife Communities.

## Cons:

1. Requires Use of Multiple Herbicides based on Species.
2. Control Only Lasts 1-3 Years.
3. Requires Shoreline Access for Boat.

Cost per 20 Years: \$80,000.



Ware's Cove,  
Charles River

# ALTERNATIVE 3 – SHALLOW DREDGING (2')

## Pros:

1. Returns Black's Nook to Open Water Body.
2. Meets Class B WQ Standards and Addresses Impaired Water Body Status.
3. Improves Benthic and Wildlife Communities.
4. Limited Future Maintenance.

## Cons:

1. Temporary Disruption to Pond's Ecology.
2. Management of Surface Sediments may be Required (Algal Blooms).
3. Dredged Material may need to be Disposed of Off-site.
4. Higher Permitting Costs.

Cost per 20 Years: >\$300,000.



# Black's Nook Water Depth (ft) and Proposed Dredge Area\*

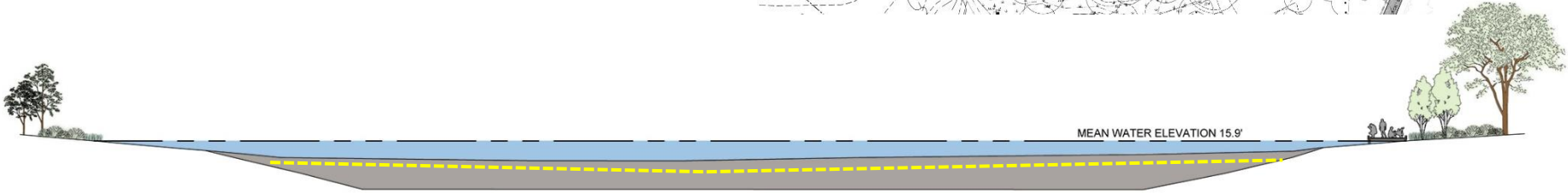
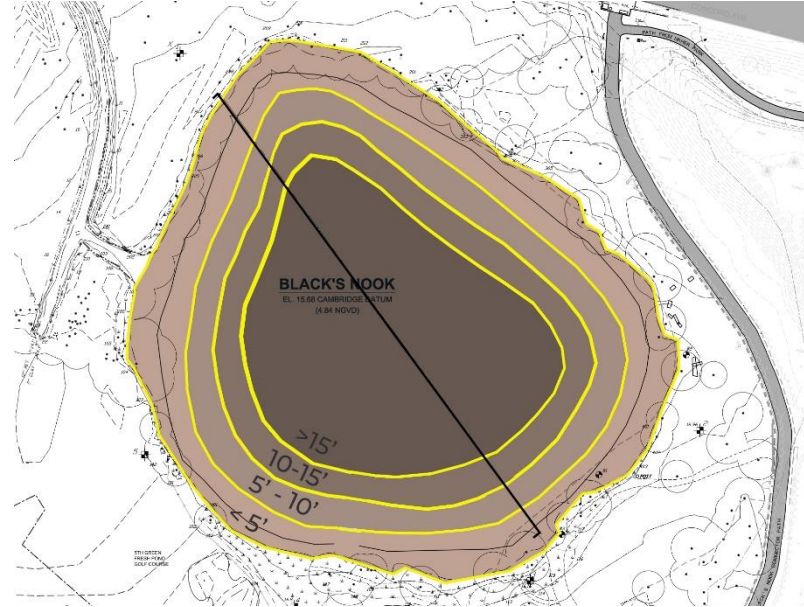
\*Proposed Dredge  
Area Starts  
approximately 20 ft  
off of Existing  
Shoreline



# SEDIMENT CHARACTERIZATION

## Field Survey and Metrics:

1. Bathymetric Survey.
2. Sediment Characterization.



Soft Sediment Section A-A'

# ALTERNATIVE 4 – DEEPER DREDGING (4')

## Pros:

1. Returns Black's Nook to Open Water Body.
2. Meets Class B WQ Standards and Addresses Impaired Water Body Status.
3. Improves Benthic and Wildlife Communities.
4. Expanded Habitat and Limited Growth Based on Species.
5. Longer-term Benefits and Limited Maintenance.

## Cons:

1. Temporary Disruption to Pond's Ecology.
2. Management of Surface Sediments may be Required (Algal Blooms).
3. Dredge Material may need to be Disposed of Off-site.
4. Higher Permitting/Disposal Costs; Longer Construction period.

Cost per 20 Years: \$600,000.

City Hall Pond,  
Newton



Dunn Pond,  
Gardner



# DREDGING EXAMPLE (HILLS POND, ARLINGTON MA)



Hills Pond was drained and excavated by long-reach equipment, but a treaded tractor was used to “plow” soft sediment in harder to reach areas to the edge for removal.



# DREDGING EXAMPLE (HILLS POND, ARLINGTON MA)



The containment area for dredged material was filled and allowed to stand for some months before final cover, grading and seeding. The pond was restored to an open water habitat with parkland surrounding it.

# SEDIMENT DISPOSAL – ON SITE OPTION





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# SEDIMENT DISPOSAL OPTION – ON SITE

## Existing Conditions:

1. Existing Vegetation: Norway Maple; Black Cherry; Slippery Elm; and Garlic Mustard.
2. No Understory Vegetation (except Garlic Mustard).
3. Construction debris.
4. Depth of sediments 12” to 24” based on shrinkage (dewatering).
5. Restoration strategy includes native canopy trees, understory trees and shrubs, and groundcovers.

# TYPICAL TIMELINE AND IMPACTS – ON SITE DISPOSAL – 2' DREDGING

## Winter Dredging:

1. Excavate 2' upper muck and peat layers.
2. 2.5 months (50 days estimate) to excavate and place within FPR.
2. Assume 50% shrinkage rate due to dewatering (in place).
3. Wait to compact before amending soil and seeding/planting.

# TYPICAL TIMELINE AND IMPACTS – ON SITE DISPOSAL – 4’ DREDGING

## Winter Dredging:

1. Excavate 4’ upper muck and peat layers.
2. 5 months (100 days estimate) to excavate and place within FPR.
2. Assume 25% shrinkage rate due to dewatering (in place) for mostly peat.
3. May have to find additional on-site storage area(s).
4. Wait to compact before amending soil and seeding/planting.

# DREDGING ALTERNATIVE TIMETABLE

DREDGING AND RESTORATION ACTIVITIES	WINTER 2023	SPRING 2023	SUMMER 2023	FALL 2023	WINTER 2024	SPRING 2024
<b>Remove and Place Dredged Materials</b>						
<b>Plant Aquatic Vegetation</b>						
<b>Restore Upland (Riparian) Habitat</b>						
<b>Black's Nook Water Elevation Normalizes</b>						

# REGULATORY PERMIT REQUIREMENTS

## Alternative 1 – Hydro Rake and Benthic Barriers

- ✓ Notice of Intent (Cambridge).

## Alternative 2 – Chemical Treatment and Phosphorus Inactivation

- ✓ Notice of Intent (Cambridge); WM04 Herbicide Application (DEP).

## Alternatives 3 and 4 – Dredging

- ✓ Notice of Intent (Cambridge); 401 Water Quality Certification (DEP); CWA Section 404 (USACE); Chapter 91 License.

# NEXT STEPS

## 2021 and 2022:

1. Recommend Preferred Alternative.
2. Resource Area Delineation and Permit Agency Coordination, as Necessary.
3. Develop 35% DD Drawings and Cost Estimate.
4. FPAB Meeting (April 2021).
5. Develop Phased Approach (if appropriate).



# QUESTIONS & INPUT



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