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Installation of Successful Combined Denil Fishway and Eelway at Upper Mystic Lake, MA

P. Foote
University of Wisconsin - Madison

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Installation of Combined Denil & Eel Fishway, Upper Mystic Lake, MA

Peter S. Foote - The Louis Berger Group, Inc.

Chad Cox - GZA GeoEnvironmental, Inc.

Mike Galvin - MA Department of Conservation and Recreation

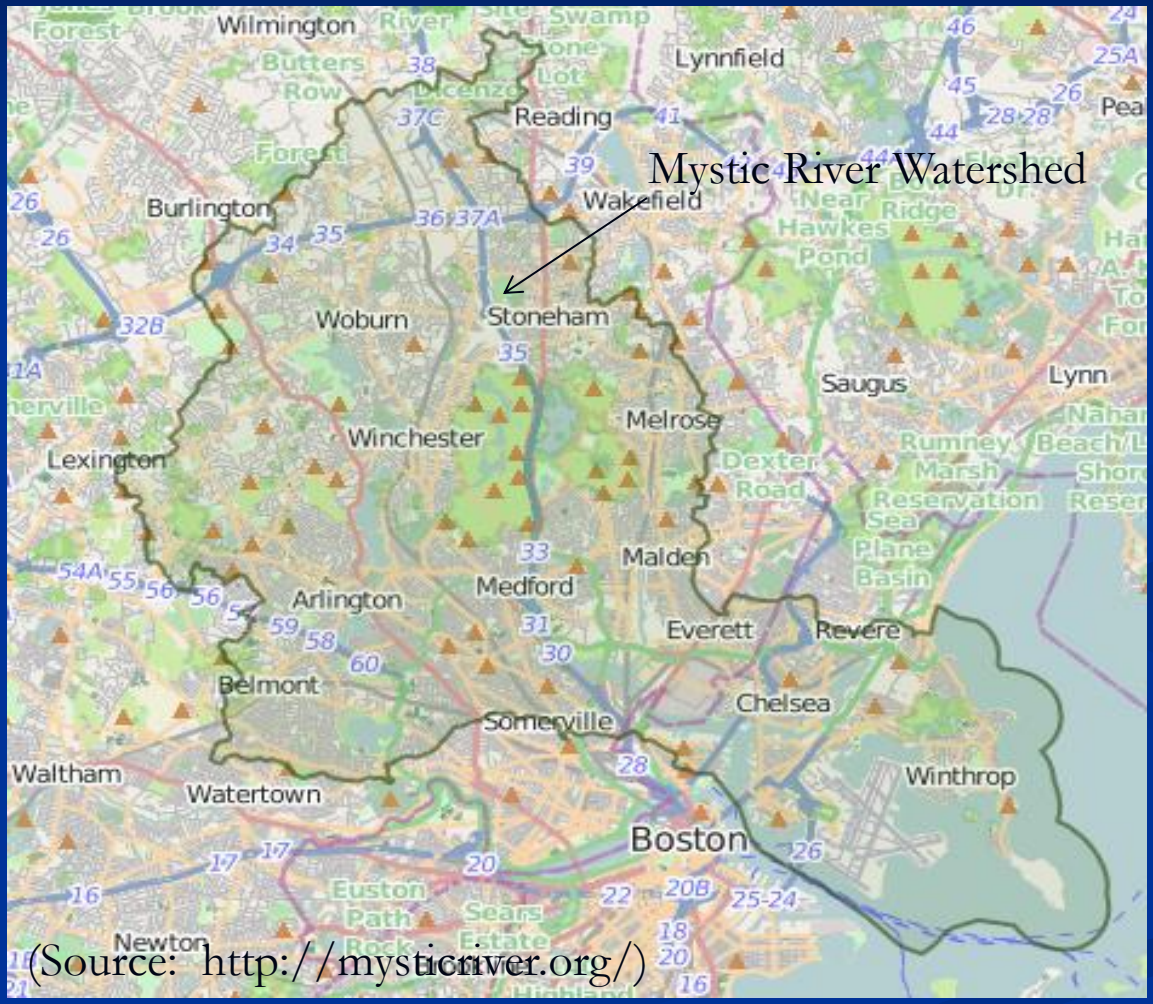
Upper Mystic Lake Fishway

- Project location and background
- Dam rehabilitation for dam safety
- Fish passage requirements
- Fish passage options
- Design process
- Project completion and fish passage results to date

Background

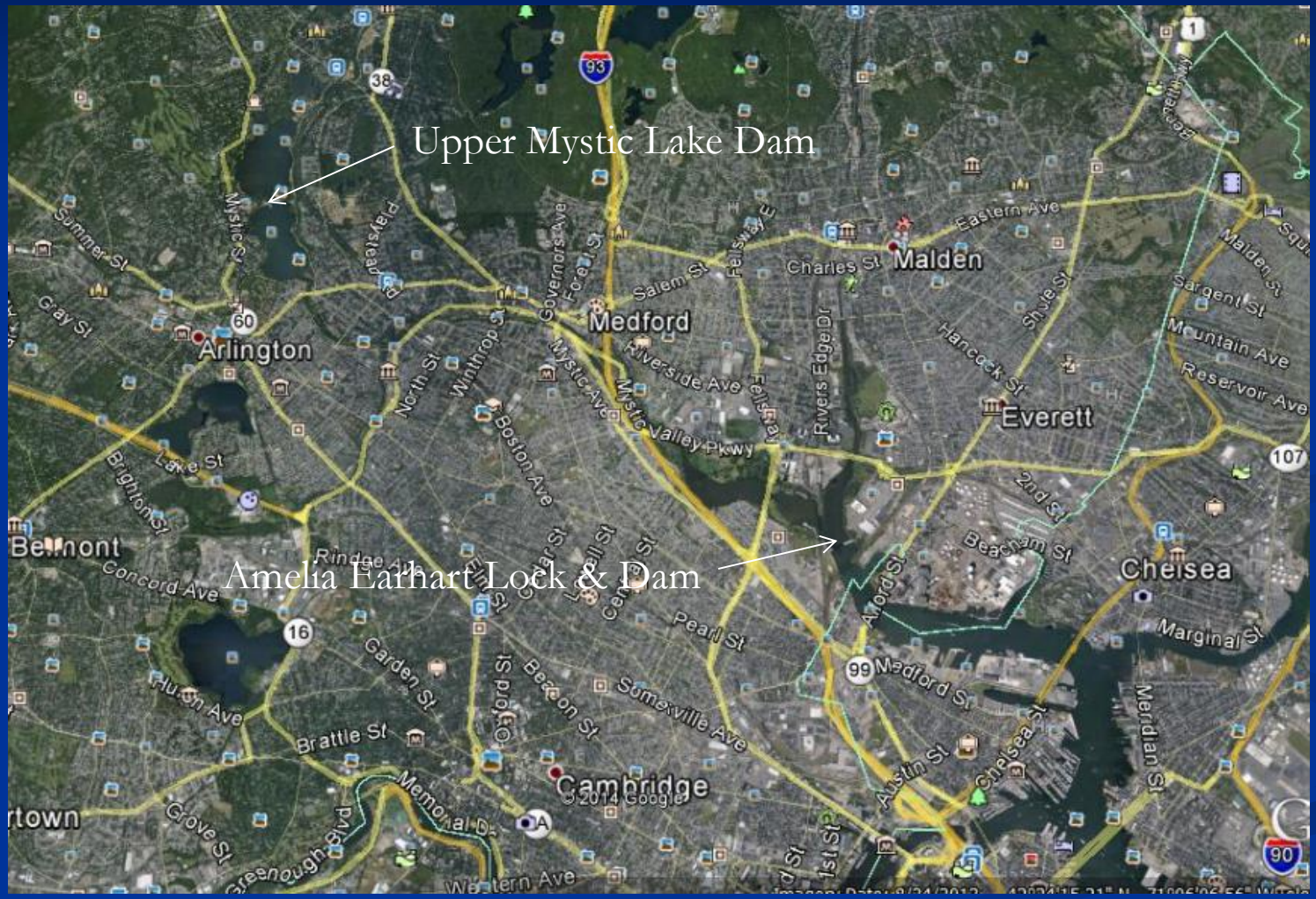
- Mystic River is small 76-square-mile mostly urban watershed, flows into Boston Harbor
- Median flow into Upper Mystic Lake – 56 to 13 cfs (April 1 to June 15)
- Amelia Earhart Lock & Dam (MA DCR) at head of tide at about RM 3
- Upper Mystic Lake Dam owned by MA DCR at RM 8

Mystic River Watershed

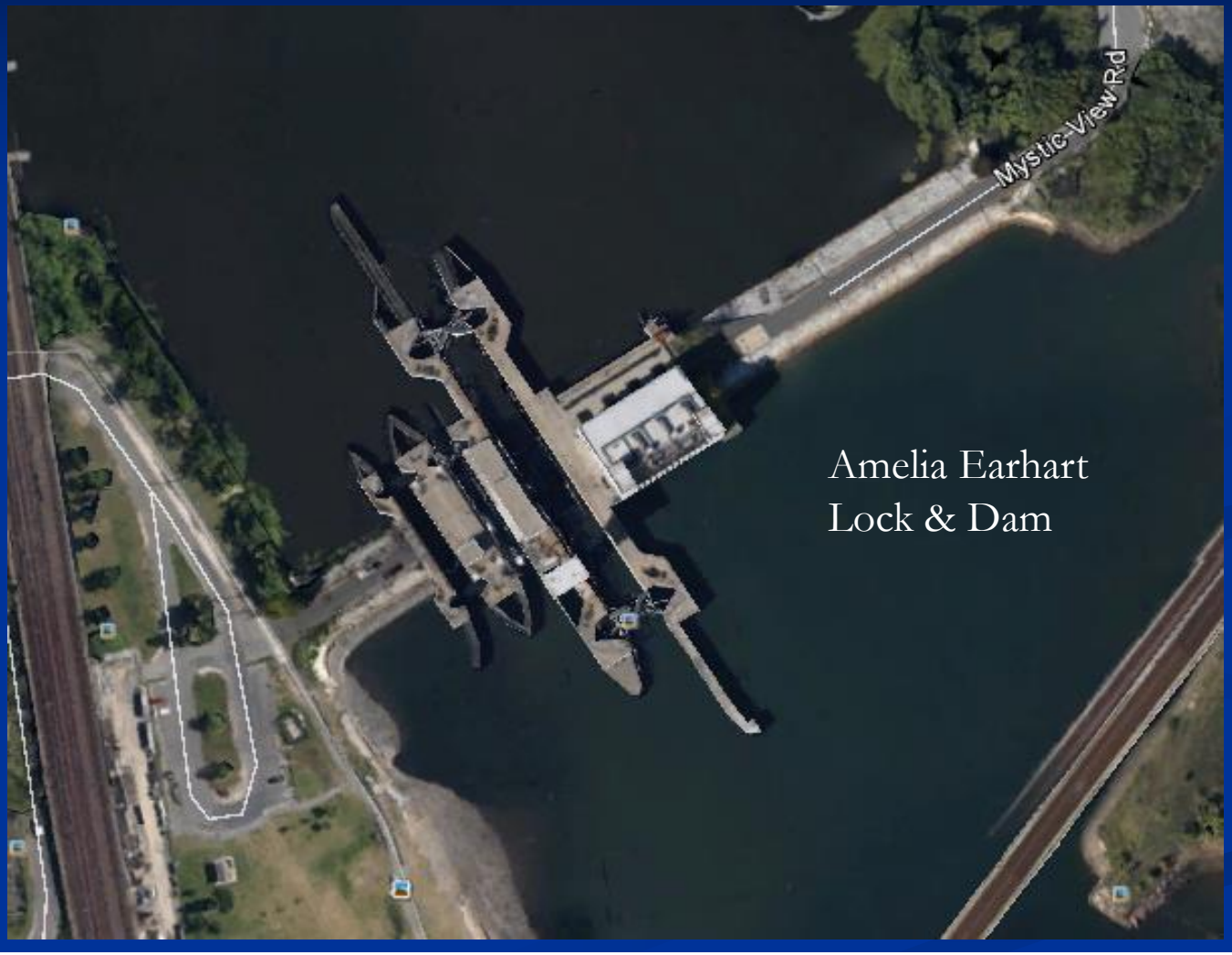


(Source: http://mysticriver.org/)

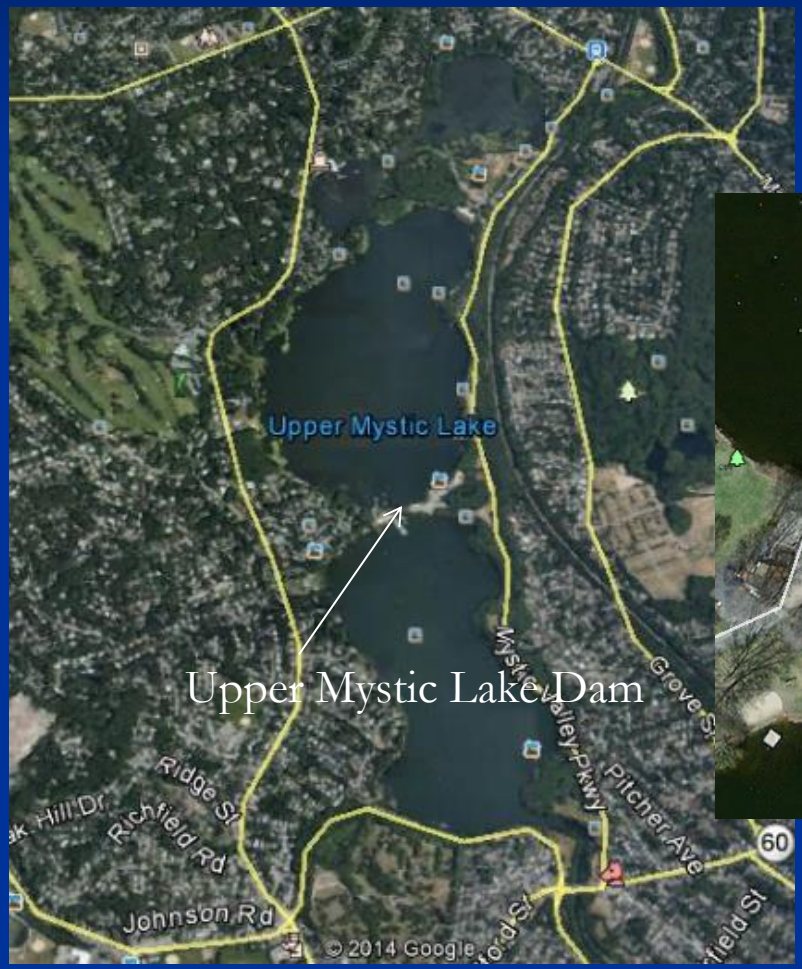
Mystic River



Amelia Earhart Lock & Dam



Upper Mystic Lake Dam



Dam Rehabilitation

- Dam safety issues for Upper Mystic Lake Dam
- Required construction of new spillway and tree removal from dam embankment
- Fish passage requirement for river herring and American eel
- River herring passage through Earhart Dam and fish reach Upper Mystic Lake Dam
- Bucket brigade organized by MyRWA

Historic Spillway

Spillway Apron

Bucket Brigade Release

Fish Passage Design Requirements

- MA DMR: Need fishway for alewife, blueback herring, American shad, and American eel
- Require minimal maintenance (MA DCR)
- Maintain aesthetics at the site (MA DCR)
- Site security (MA DCR)

Fish Passage Alternatives

- Standard Denil fishway
- Alaska steeppass
- American eel ramp using aluminum or PVC troughs
- American eel ramp in more permanent structure

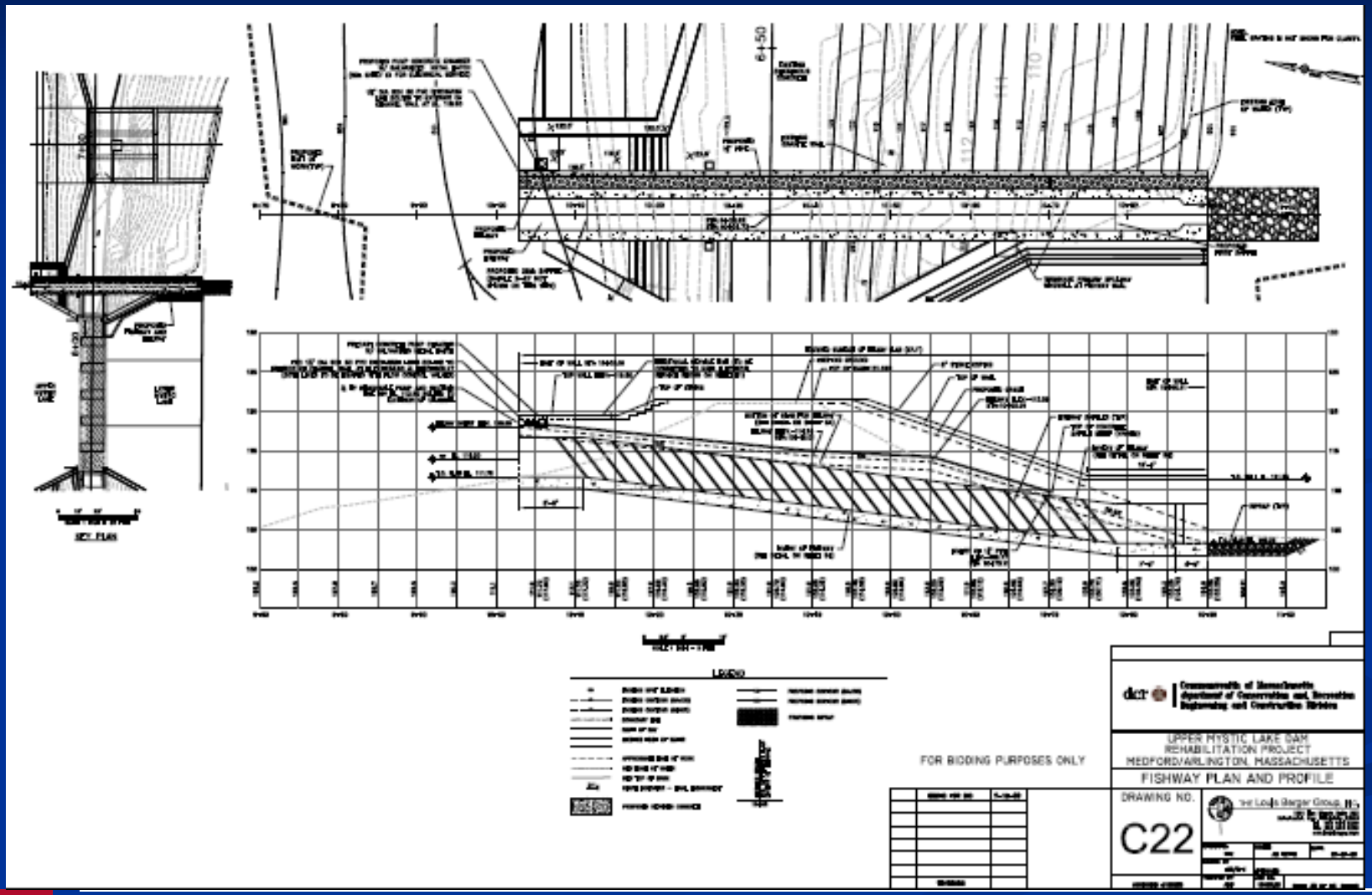
Selected Alternatives

- Standard 4-ft.-wide Denil fishway for river herring/shad
- Permanent American eel ramp with Enkamat incorporated within Denil fishway structure
- MA DCR concern about annual installation/removal/flood damage with typical temporary eel ramp, and aesthetics at site

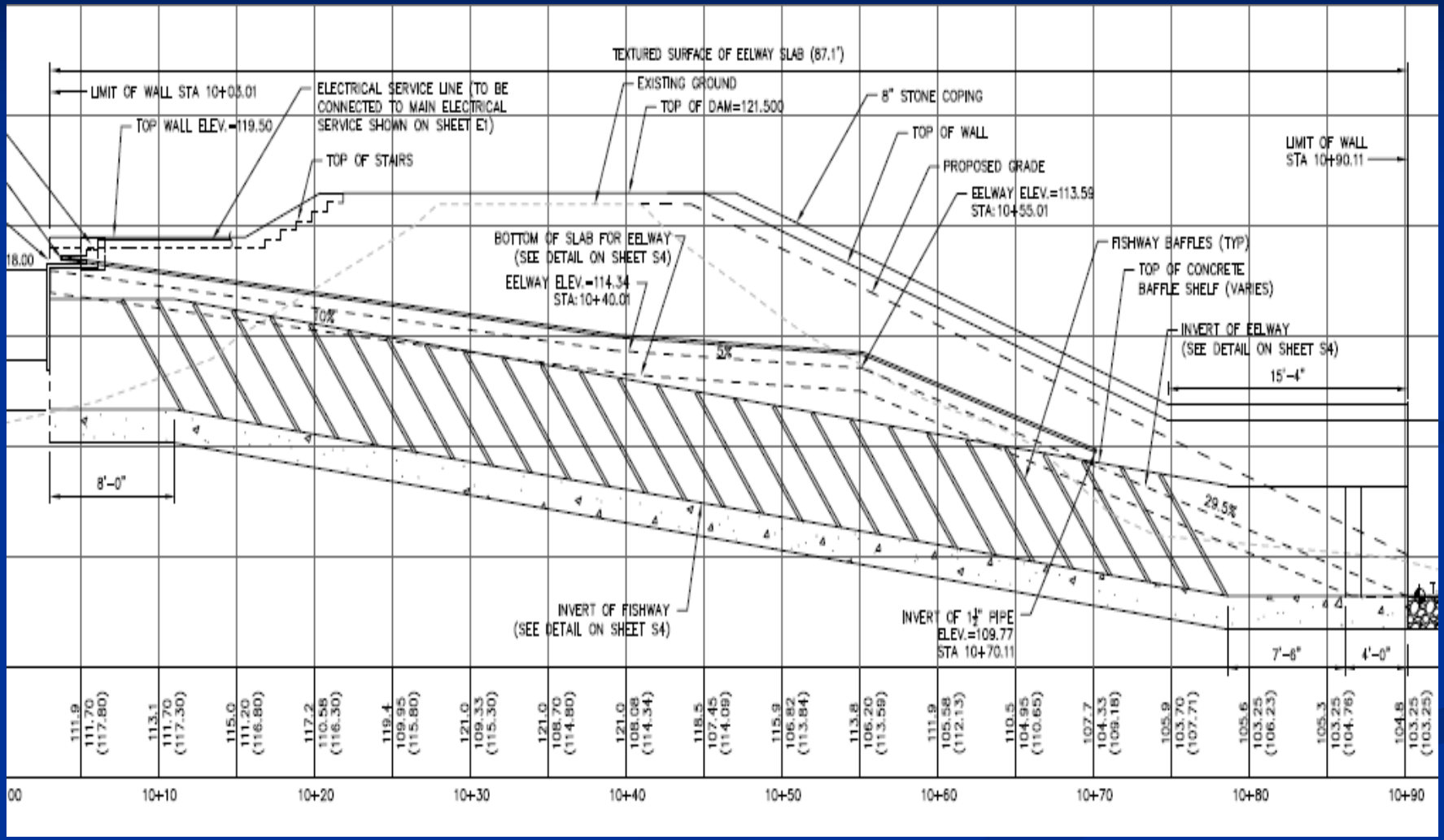
Fishway design process

- Preliminary design/layout by Berger
- Consultation with Dick Quinn (FWS) on Denil fishway
- Consultation with Dr. Alex Haro (Conte Lab) on eel fishway
- Final design drawings by Berger

Final Plans


FOR BIDDING PURPOSES ONLY
UPPER MYSTIC LAKE DAM
REHABILITATION PROJECT
MEDFORD/ARLINGTON, MASSACHUSETTS
FISHWAY PLAN AND PROFILE
DRAWING NO.
C22

Final Plan Details



Post-construction

Denil
Eelway

Denil
Eelway

Enkamat
Substrate

Eel Collection Box

River Herring Counting

Photo by David Mussina

Final Site Layout

Fishway Entrance Jet

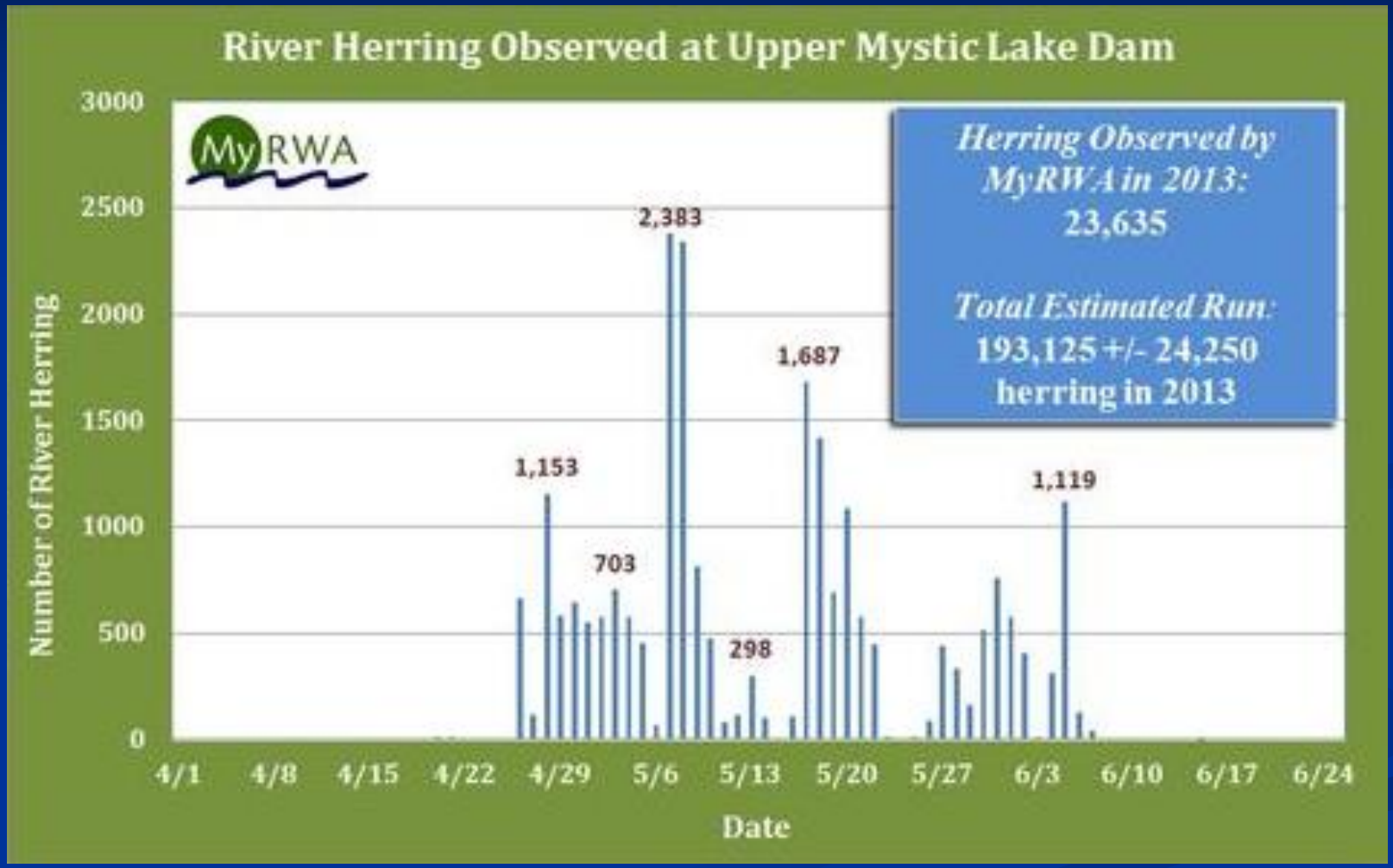
Fish passage data to date:

- Herring counts by MyRWA using MA DMR sampling protocol
- 2012: 198,932 +/- 18,062
- 2013: 193,125 +/- 24,250
- 2014: 24,112 counted to date – total run size not estimated yet

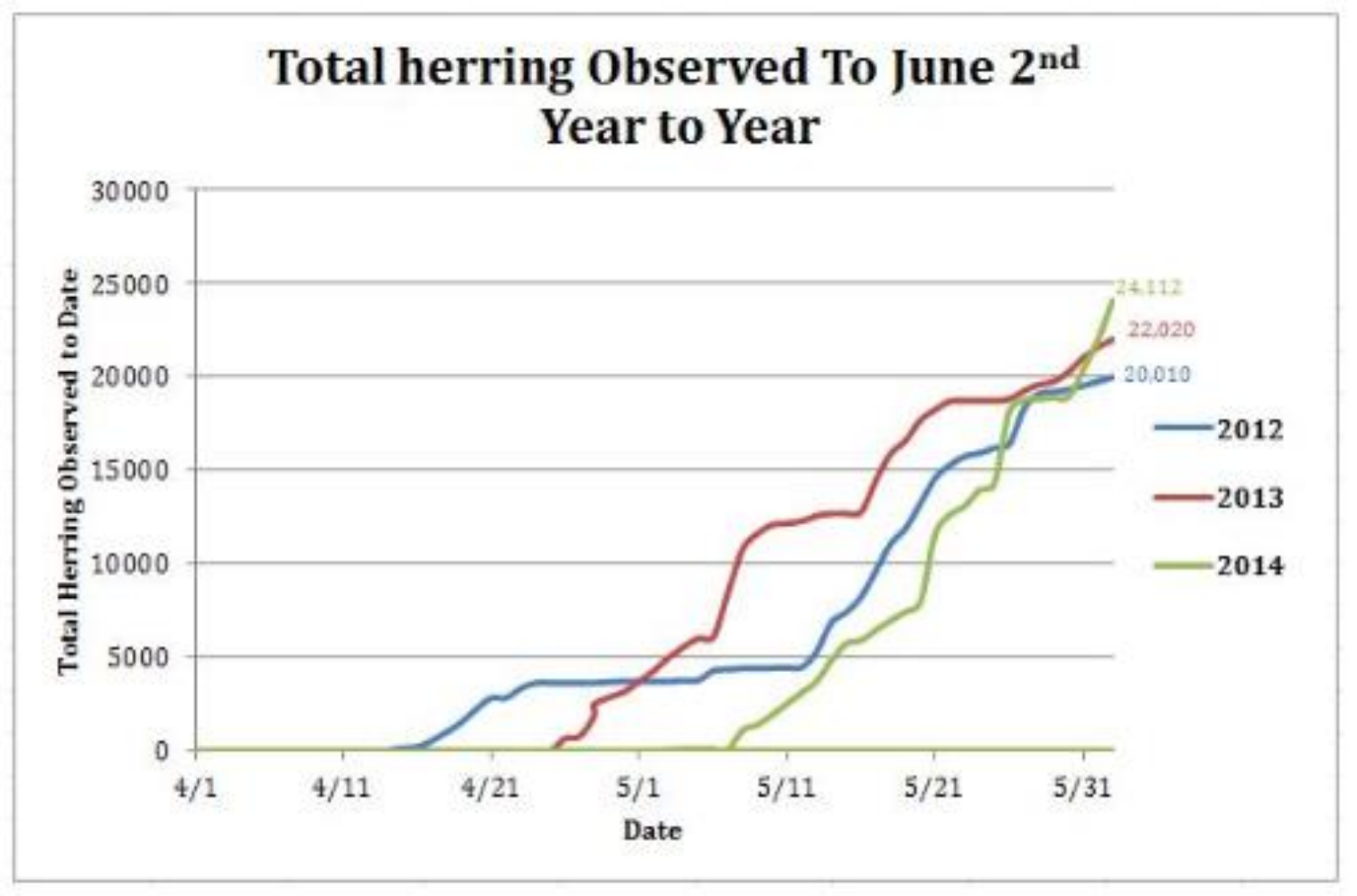
American eel passage data to date:

- Eel monitoring also by MyRWA
- 2012: 2,908
- 2013: 12,965
- 2014: NA

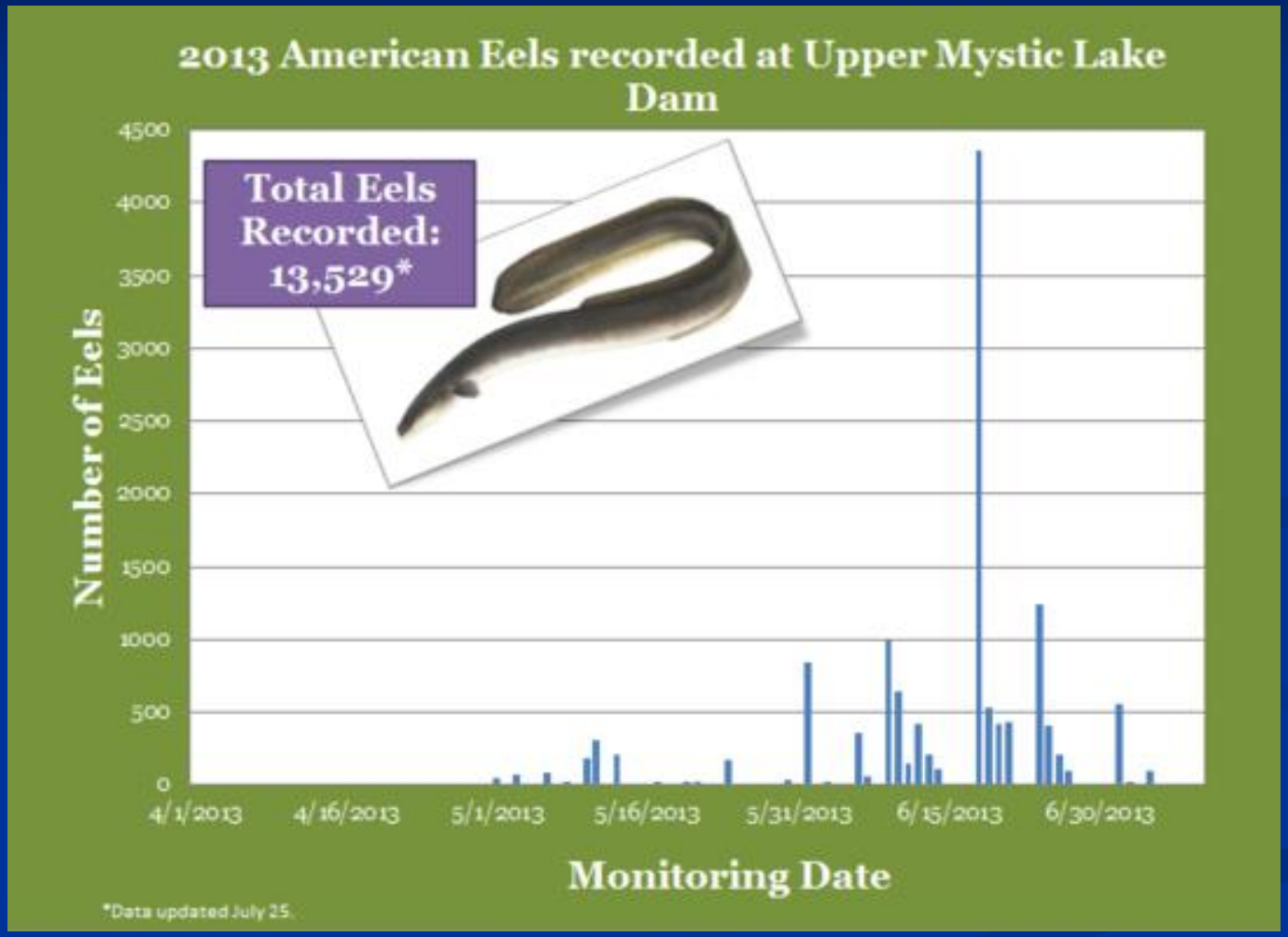
River Herring Timing



River Herring Timing



American Eel Timing



Questions?