

Fisheries

- Dam removal could reveal spawning habitat currently buried by sediment in the impounded reaches.
- Habitat assessment conducted below McLane Dam- considered good quality fish/aquatic habitat.
- If dam removal were to occur and impounded sediments were mobilized, there would be a temporary impact to aquatic habitat below McLane Dam. Further downstream, near Golf Course, river becomes sinuous and is dominated by sand.



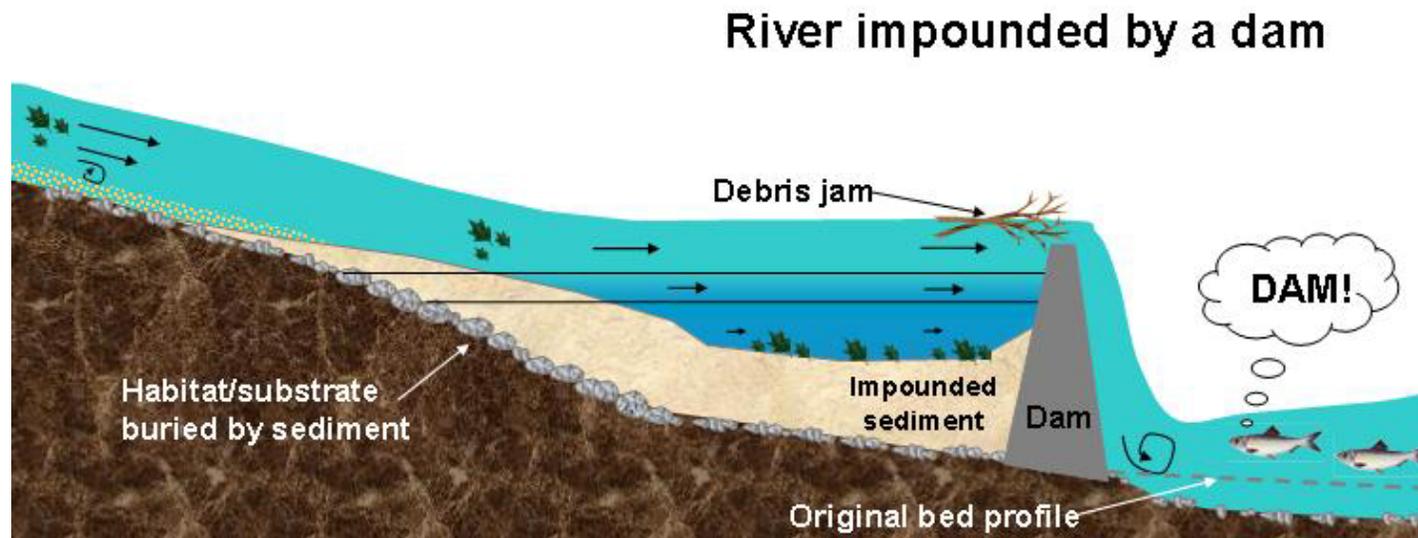
Looking upstream at McLane Dam



Souhegan River at Amherst Country Club

Sediment

- Most dams trap sediment that accumulates over time- if the dams were removed, how will the sediment be managed?
- Study evaluated the quantity, quality and management of sediment.



Source: VT Agency of Natural Resources

Sediment- Quantity and Quality (McLane Dam)

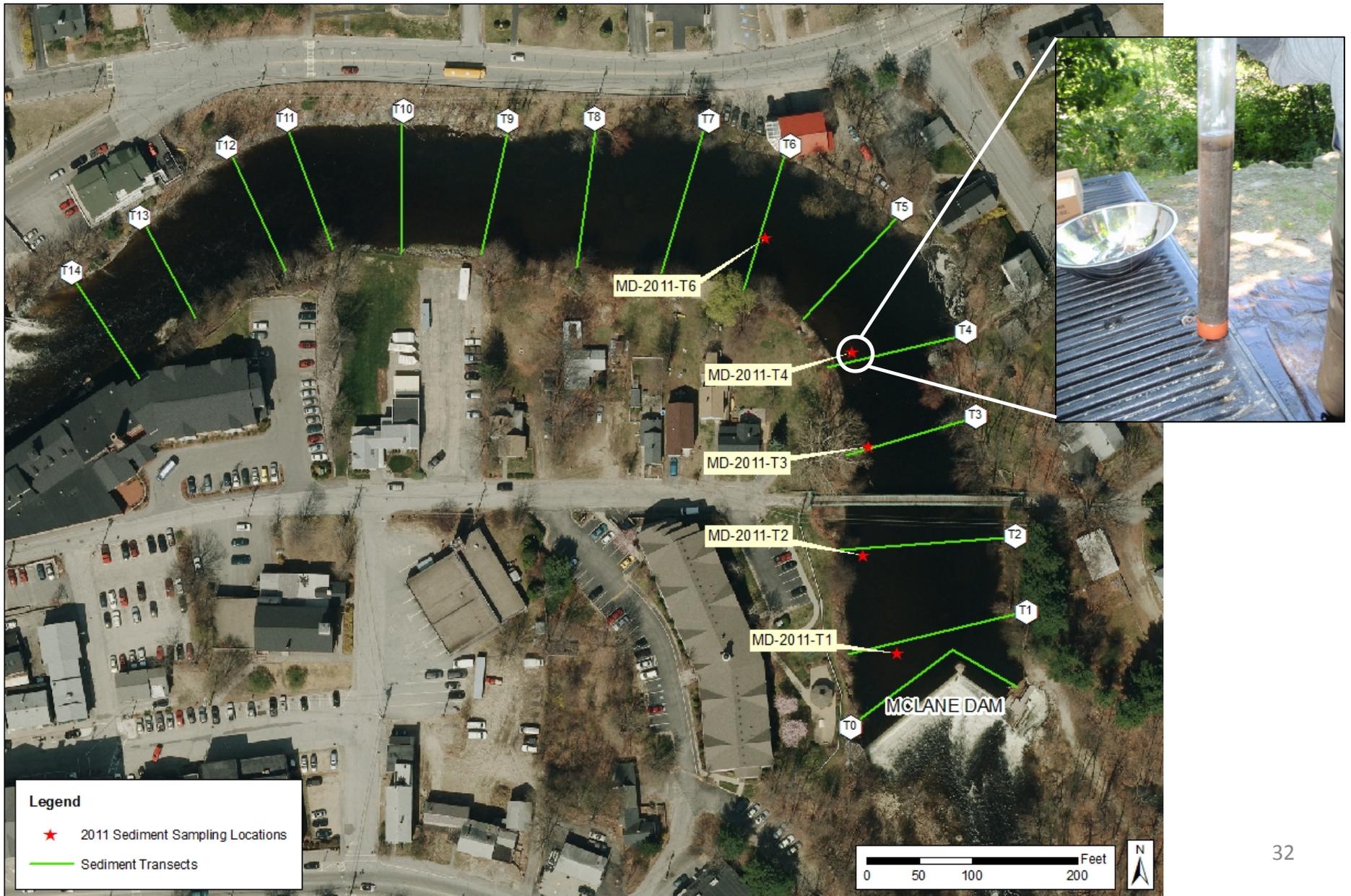
Quantity

- Sediment depth measured along 10 transects in impoundment.
- Estimated total volume of sediment: 4,700 cubic yards (CY).
Frame of reference Merrimack Village Dam had 81,000 CY (sediment did not pose ecological risk, permitted to natural transport upon dam removal).

Quality

- 7 sediment cores (5 in McLane impoundment, 1 upstream, 1 downstream) were collected; sent to EPA lab and tested for: PCBs, VOCs, SVOCs, metals, pesticides and grain size.
- Sediment consists primarily of sand.

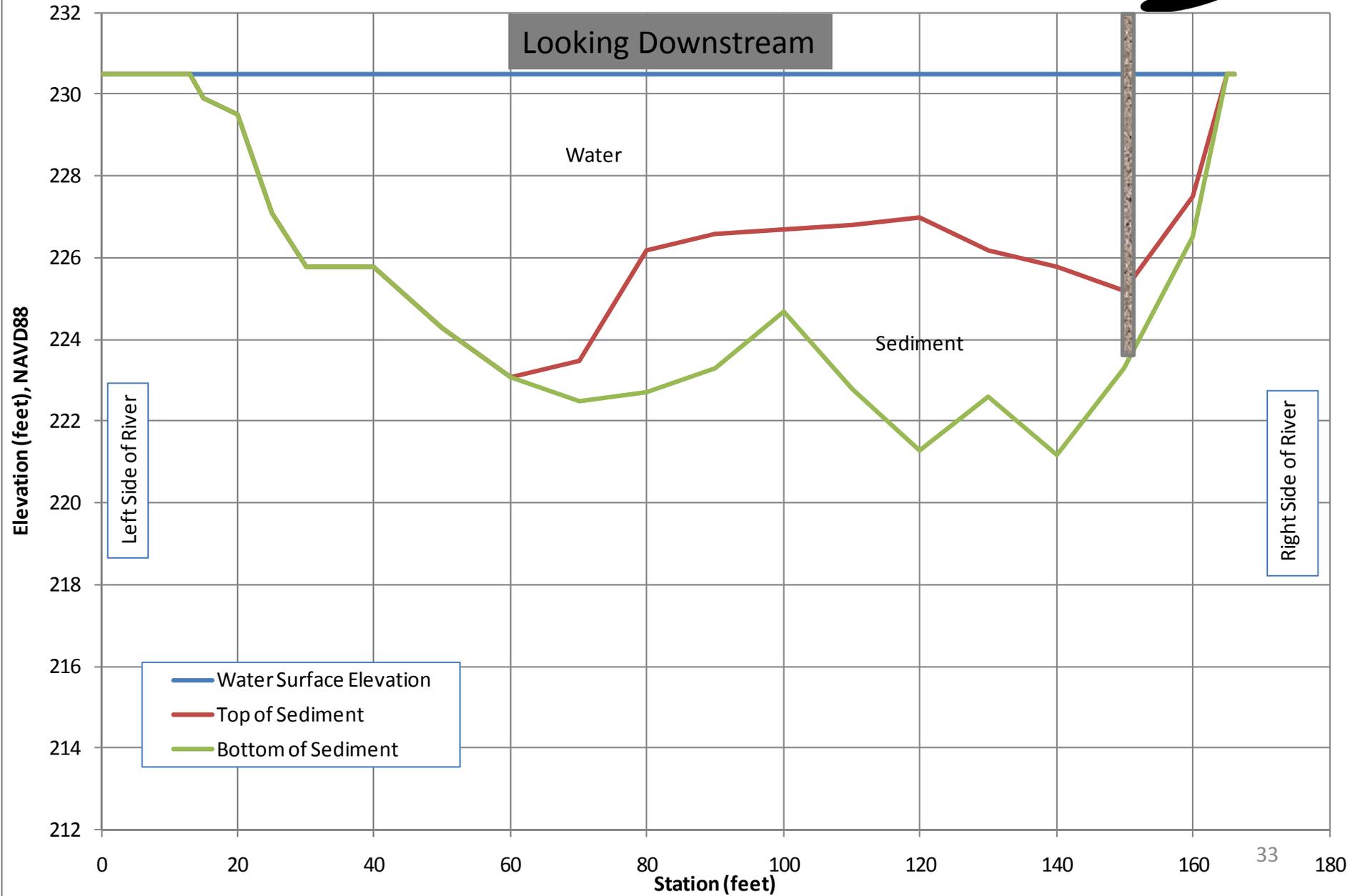
Sediment- Quantity and Quality (McLane Dam)



Sediment- Quantity (McLane Dam)



Transect T-1: Sediment Depth Mapping above McLane Dam



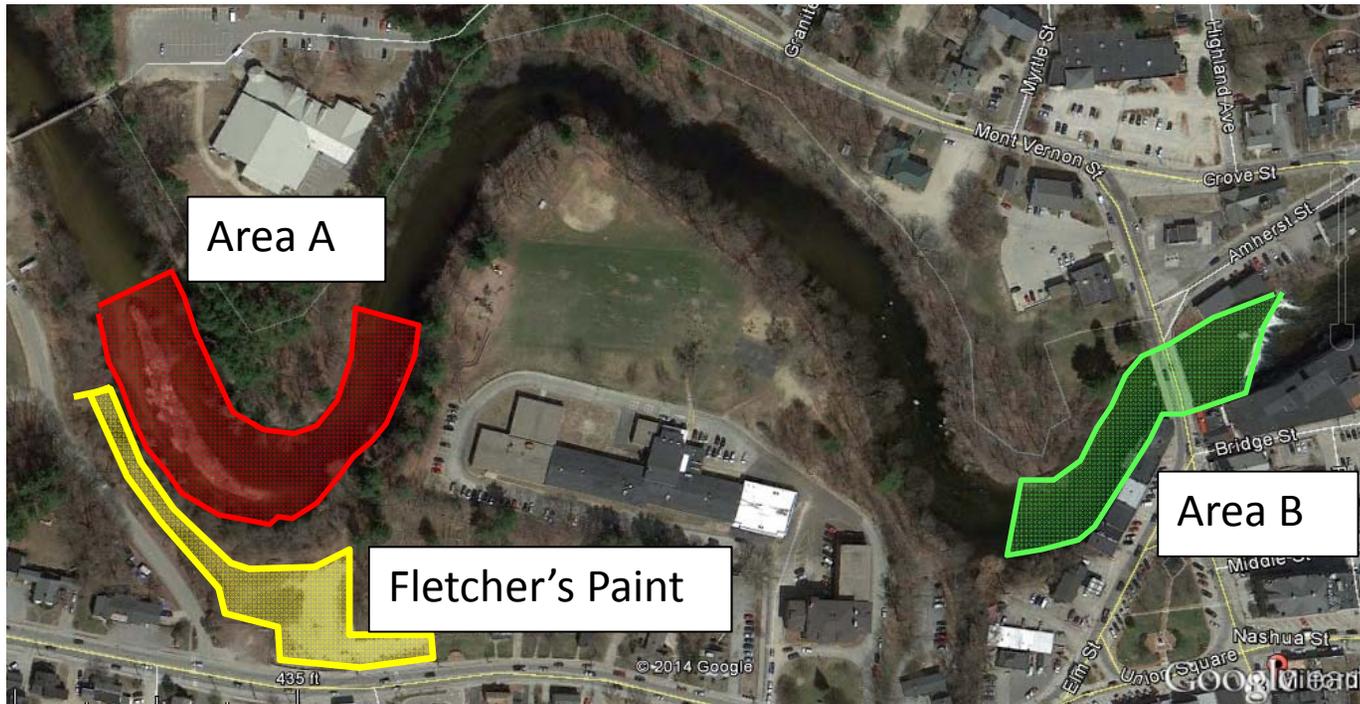
Sediment- Quality (McLane Dam)

Quality

- Findings were compared to screening level criteria – Threshold Effects Concentration (TEC) and Probable Effects Concentration (PEC) to determine the effects to freshwater ecosystems.
- TEC values are screening thresholds below which adverse effects to freshwater systems are unlikely.
- PEC values are screening thresholds above which adverse effects to freshwater systems are likely.
- Test results showed no exceedences of the PEC; some exceedences of the TEC for PCBs (impoundment), pesticides (impoundment), SVOCs (throughout), VOCs (impoundment).

Sediment- Quantity and Quality (Goldman Dam)

- 1988- Fletcher's Paint Superfund Site (Fletcher's) was identified by EPA. Clean-up incomplete. Numerous studies (including sediment quality/quantity) conducted by EPA and others.
- Soil and sediment testing conducted in 1991, 1993, 1994, 2004, 2006, 2007, 2012 in upland areas, Area A and Area B for various chemicals. Primary chemical of concern: PCBs.



Sediment- Quantity and Quality (Goldman Dam)

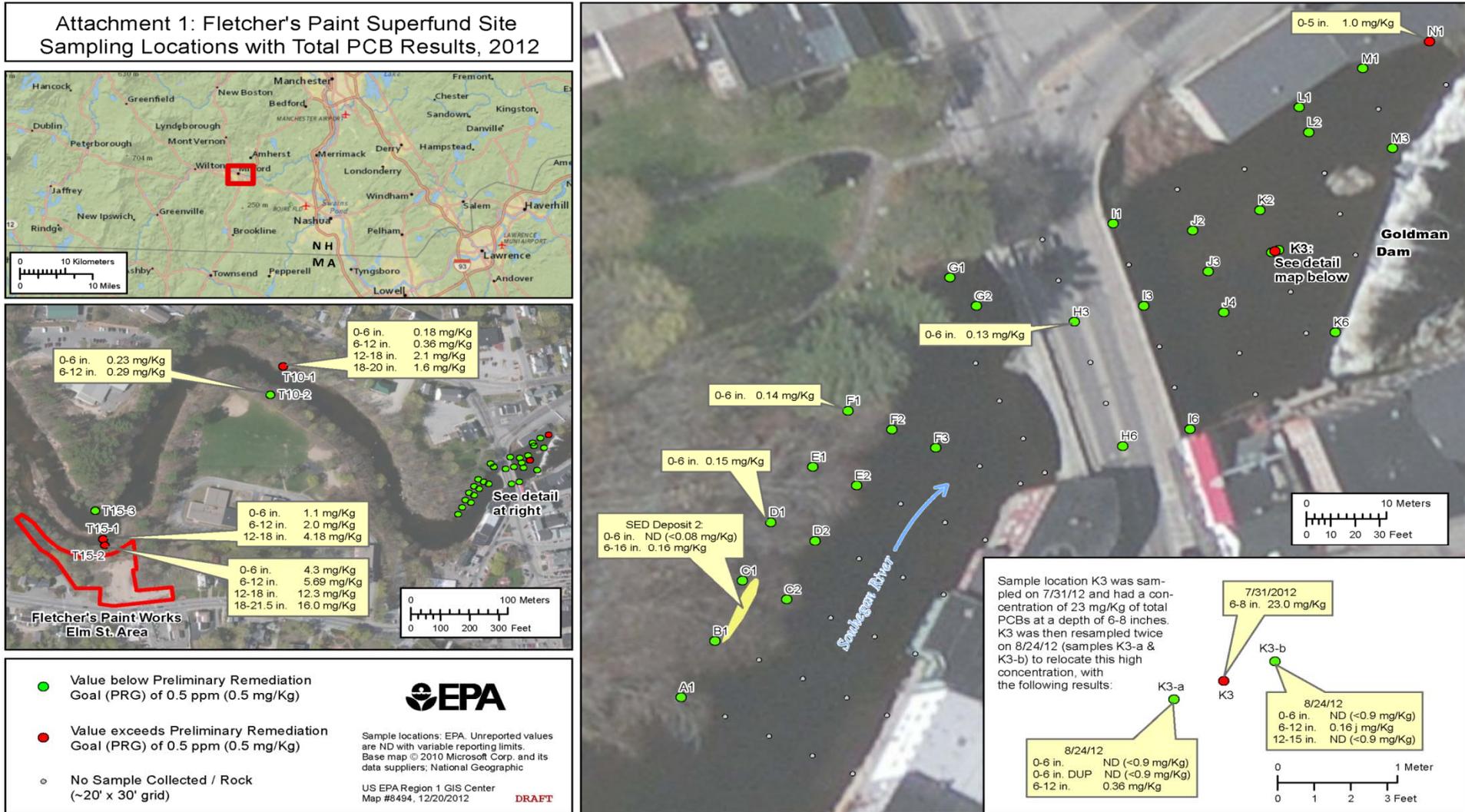
Quantity

- Sediment depth measured along 18 transects in impoundment-dam to Gregg Footbridge.
- Estimated total volume of sediment: 24,400 cubic yards (CY) from dam to Gregg Footbridge.
- Estimated total volume of sediment: 1,800 CY from dam to Great Brook confluence.

Quality

- Based on most recent sampling in 2012--- 5 sediment samples exceed the PEC threshold for PCBs.

Sediment- Fletcher's Paint Site- 2012 Samples > PEC for PCBs



Source: USEPA

Sediment- Goldman Dam, EPA Assessment

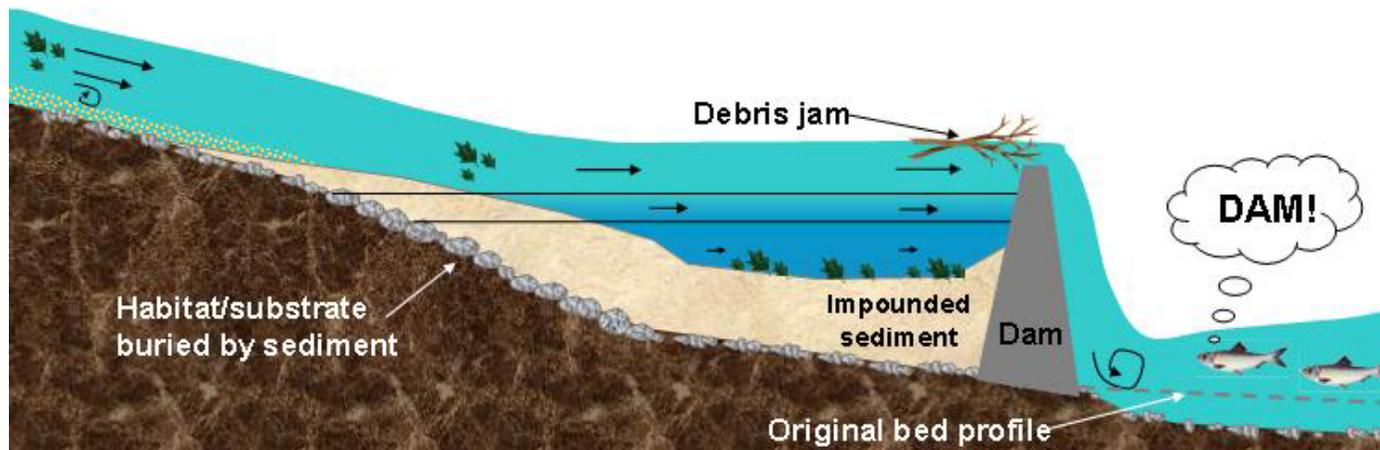
- EPA is currently evaluating alternatives in Areas A and B; no decisions have been made.
- Area A alternatives:
 - No action;
 - Limited action;
 - Isolation cap with limited sediment removal;
 - Removal of all sediment to one foot of depth and isolation cap;
 - Total sediment removal.
- Area B alternatives:
 - No action;
 - Limited action with monitored natural recovery (MNR), which would entail allowing for natural erosion of sediment regardless of whether the dam remains or is removed.
 - Sediment removal of ~ 250 CY that exceed EPA's remediation goal.

Sediment- Transport Analysis

McLane Impoundment

- Hydraulic model used to predict the net volume of sediment transported below McLane Dam if allowed to naturally transport after dam removal under 2007 flood (~50-yr flood) and 100-yr flood.

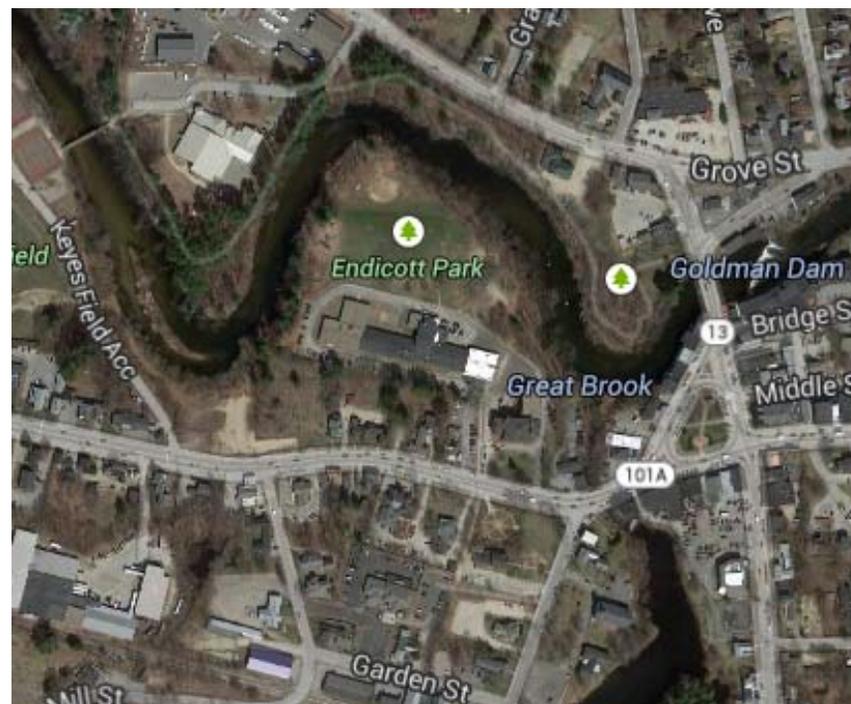
Flood	Estimated Loss of Sediment from McLane Impoundment with Dam Removed
50-yr	~2,012 CY out of 4,700 CY
100-yr	~3,585 CY out of 4,700 CY



Sediment- Transport Analysis

Goldman Impoundment

- No detailed sediment transport analysis conducted.
- Based on hydraulic modeling, sediments most likely to mobilize are located between Goldman Dam and Great Brook confluence due to increased velocities: 1,800 CY (total volume).
- Above Great Brook confluence, velocities increase less than 0.5 ft/sec between dam-in and dam-out conditions under 100-year flood.
- Example: under 100-year flood, river velocities near Fletcher's Paint site would increase from 3.4 ft/sec (dam-in) to 3.5 ft/sec (dam-out).



Sediment- Ecological and Human Risk Assessment

- Ecological/Human Risk Assessor directly involved to evaluate potential impacts to aquatic biota (such as macroinvertebrates, crayfish, fish) and humans if sediments were allowed to transport downstream following dam removal.
- Proposal is to allow sediments to mobilize and transport downstream following dam removal. Federal/State agencies have not acted upon proposal; further consultation needed, if dam removal were pursued.
- Ecological Risk Assessor Findings
 - *...if McLane sediments are allowed to naturally transport downstream upon removal, risks to downstream higher trophic organisms, aquatic invertebrates and humans are all acceptable.*
 - *The anticipated course of action by the USEPA is to not remove the sediments in the Goldman Dam impoundment, either with or without monitored natural attenuation. This is because the risk posed by the contaminant levels in those sediments to human health by all exposure routes, including fish consumption, is considered acceptable.*

Wetlands and Rare, Threatened and Endangered Species

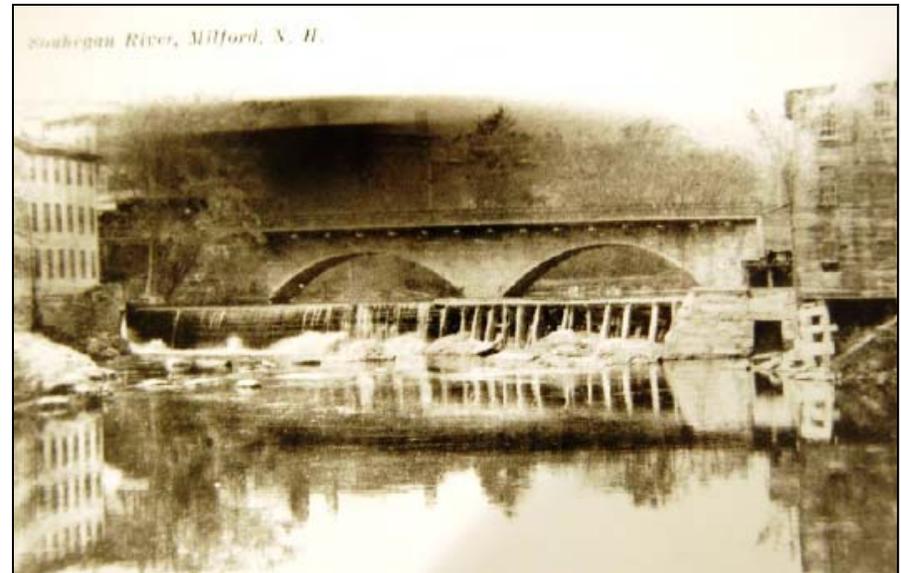
- NH Fish and Game, US Fish and Wildlife Service, and NH Natural Heritage Bureau were contacted re: any rare, threatened or endangered species that have been known to occur in project area. Response: No species present.
- Wetland delineation conducted from just below McLane Dam to Gregg Footbridge.
- Limited wetlands detected.

Cultural Resources (archaeology and historic structures)

- Any project involving federal funding or requires a federal permit is required to go through Section 106 of the National Historic Preservation Act (NHPA).
- Section 106 requires federal agencies to take into account the effects of their undertaking (such as dam repair/dam removal) on historic properties.
- All federal agencies are responsible for addressing Section 106; for this feasibility study the lead federal agency (LFA) is NOAA. As LFA, NOAA must coordinate with the State Historic Preservation Office (NH Division of Historic Resources).

Historic Structures

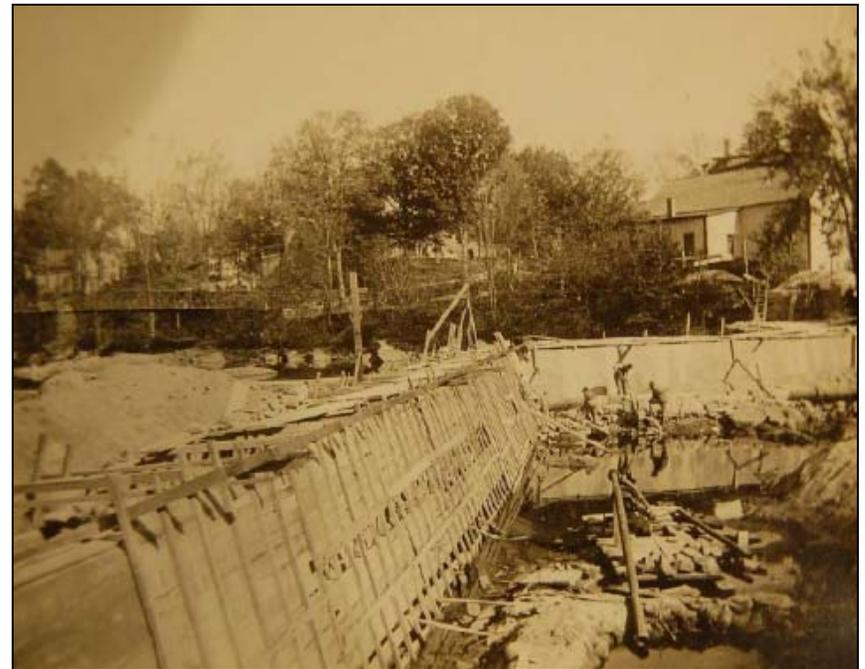
- Public Archaeological Laboratory (PAL) conducted all cultural resources work.
- PAL conducted Phase I Historic Structures assessment.
- PAL Findings- both dams are not eligible for individual listing on the National Register of Historic Places (NRHP) because:
 - Current Goldman Dam is less than 50 years old
 - McLane Dam was reconstructed in 1992 resulting in the loss of integrity of the 1846/1909 structure



Goldman Dam- between 1884 and 1924
Source: Milford Historical Society

Historic Structures

- NH Department of Historic Resources (NHDHR) reviewed PALs Phase I report and believes that both dams are eligible for the NRHP as *contributing elements of the Downtown Milford Commercial, Civic and Historic District*.
- NOAA, as lead federal agency, has determined the two dams are not individually significant as historic structures. The impoundments they create, however, contribute to the significance of the surrounding district, which has determined eligible for listing in the National Register of Historic Places.



McLane Dam- Circa 1909
Source: Milford Historical Society

Archaeological Resources

- PAL conducted Phase IA Archaeological Surveys.
- PAL recommended that Phase IB testing (subsurface testing) be conducted.
- Typically subsurface testing is conducted in areas of ground disturbing activities or along riverbanks subject to potential erosion.
- NHDHR reviewed PALs recommendation; agreed that Phase IB work is required if dam removal occurred. NOAA, as lead federal agency, concurred.



Source: Merrimack Village Dam Project

Recreation Resources

- No site-specific recreation study conducted.
- Based on numerous field visits throughout the seasons and discussions with Town personnel recreation observations include:
 - No on-water (canoes, kayaks, etc.) observed on either impoundment (Goldman impoundment is shallow; McLane impoundment in urban setting).
 - People observed walking in the river near the Gregg Footbridge.
 - Anglers observed in Emerson Park and below McLane Dam.
- Dam removal will result in reducing the river depth and width and convert the impounded reaches to free-flowing conditions, which may increase fish use and hence angler activity.
- Dam removal could result in restoring migratory fish for additional angling opportunities.
- Heavy trout stocking in Milford (over 2,385 in 2013).

Aesthetic Resources

- *Beauty is in the eye of the beholder*– some view a dam and impoundment as aesthetically pleasing; others view a free-flowing river as aesthetically pleasing.
- Visual Impact:
 - Dam removal will result in reducing the river's width/depth primarily between the two dams; less change above Goldman Dam.
 - Exposed sediments along the shoreline will become vegetated. Bedrock is present above/below Goldman Dam and above McLane Dam.
 - During the dam removal process there would be a temporary visual impact.
- Auditory Impact:
 - When flows are high, water spills over dam creating sound. When flows are low, water passes through gates; no sound and top of dams are exposed. Dam removal will result in sound of free-flowing river.
 - During the dam removal process there would be a temporary impact on noise levels based on the removal methods and time of year (summer, windows down).
- What could area look like absent dams?

Aesthetic Resources



Looking upstream from McLane Dam



Low flow pictures taken when water is passed through gate at both dams



Looking downstream from Gregg Footbridge



Budgetary Cost Estimates

- Budgetary estimates to remove the dams were developed assuming sediment is permitted to naturally transport downstream.
 - McLane Dam Removal Estimate: *\$493,000
 - Goldman Dam Removal Estimate: *\$285,000 to \$332,000
 - Lower estimate assumes access from Milford Mill Parking Lot, Higher estimate assumes access from Emerson Park and beneath Rte 13 Bridge
 - Other Costs
 - Phase IB archaeological survey (assumes no Phase II survey) \$17,000
 - Memorandum of Agreement \$5,000
 - Mitigation Costs Associated with Cultural Resources \$10,000
 - Further Feasibility Assessment \$16,000
 - Letter of Map Revision \$10,000
 - Post Dam Removal Monitoring \$20,000
- Total **\$78,000**

* Includes engineering, permitting, design, bid document, and contractor

Funding

- Numerous funding sources available for dam removal projects.
- Town applied and was successful at obtaining grants to pay for this study.
- Higher likelihood of obtaining grants if:
 - the grant monies are used for the actual dam removal (vs. feasibility study),
 - dam removal restores migratory fish runs,
 - the grant application includes letters of support from dam owner and local community.
- Grants generally require a 50-50 match.

Next Steps

Step	Approximate Timeline
*Due Date for Written Comments	Sep 30 , 2014
Review Comments, Finalize Report and Post to Town Website	Oct 30, 2014
Final Report provided to 5-person Town Selectboard and Helen Goodwin Estate	Fall 2014
Selectboard and Helen Goodwin Estate make recommendations	Winter 2014/15
If Dam Removal Alternative Selected, Town Meeting Deliberations and Decision	March 2015

*Written comments should be sent to:

Mark Wamser
 Gomez and Sullivan Engineers, DPC
 41 Liberty Hill Road, PO Box 2179
 Henniker, NH 03242

Questions & Answers

Reminder: Please introduce yourself