

## Record of Decision Part 2: The Decision Summary

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levels for contaminants in sediment having potential population-level effects to fish, wildlife and other ecological receptors were derived for the contaminated prey ingestion, incidental sediment ingestion and/or dermal contact exposure pathways and correspond to an acceptable exposure level to which sensitive environmental populations (including sensitive species/taxa) may be chronically exposed to without adverse population-level effects (such as reduction in number of individuals or elimination of a local population). Exposure parameters for the contaminated prey ingestion, incidental sediment ingestion and/or dermal contact exposure pathways have been described in the Baseline Ecological Risk Assessment. If a cleanup value described above is below background values, then a background value was used as appropriate for the sediment cleanup level.

As part of pre-design, additional background characterization will be conducted to extend the current limited background dataset, verify background data and statistical analysis. Background sediment samples would be analyzed for dioxin/furans, including 2,3,7,8-TCDD, Coplanar PCBs, pesticides, PCBs, VOCs, SVOCs, and metals. If necessary, sediment cleanup levels which are based on background levels will be adjusted using these data and documented in subsequent decision documents. Sediment cleanup levels based on background may result in elevated risk to receptors, since cleanup levels cannot be established below background to avoid potential recontamination.

Tables L-6 through L-9 summarize the cleanup levels for contaminants identified in Allendale and Lyman Mill Ponds Sediment.

These sediment cleanup levels attain EPA's risk management goal for remedial actions and have been determined by EPA to be protective. These sediment cleanup levels must be met at the completion of the remedial action at the points of compliance throughout the entire area of Lyman Mill Pond and Allendale Pond by confirmatory sampling using an area-weighted average contaminant concentrations approach in each Pond. This confirmatory sampling will determine the extent of a thin-layer cover, if such cover is required in these Ponds, to meet sediment RAOs. Specific criteria to be used to determine the need and extent of such thin-layer cover will be determined as part of the design and construction plans.

To monitor progress of remediation and to determine when fish are safe to eat following attainment of the sediment cleanup levels, fish target tissue concentrations for bioaccumulative contaminants were also developed using sediment cleanup levels and site-specific BSAFs.

Table L-10 presents calculated fish target tissue concentrations for the Allendale and Lyman Mill Ponds.

Sampling and analysis of fish tissue will be included in the long-term monitoring program. Fish tissue will be collected and analyzed from each individual pond on an annual or biannual basis, with fish samples number for each species and pond to be determined based on the fish sampling conducted to-date and an appropriate statistical analysis. The long-term monitoring program is expected to target the same species that have been sampled previously: largemouth bass, American eel, and white sucker. In the event that the fish community changed substantially, (as could be the case where fish ladders are constructed or dams are removed at some point in the future), then the expected new species should be monitored. Fish tissue analytical parameters

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include all fish target contaminants. The monitoring program will be conducted over a long enough timeframe to ensure that variability in fish tissue concentrations is accounted for. Data quality objectives (DQOs) developed as part of the long-term monitoring plan will consider median, mean, upper confidence level on mean or upper percentile as statistical parameters to determine when target fish tissue concentrations have been met. Fish tissue target concentrations are expected to be reached within 2-5 years following sediment excavation. Fish are expected to be safe to consume (catch and release advisory lifted) once tissue concentrations are less than or equal to fish targets for all analytical parameters and have remained as such for two subsequent sampling events. The long-term fish monitoring program will be conducted concurrently with the long-term sediment monitoring program to monitor any changes for site-specific BSAFs and the progress of remediation.

**5. Allendale Floodplain Soil (Alternative 5A)**

***Description of Remedial Components for Allendale Floodplain Soil***

Contaminated floodplain soil would be removed using conventional excavation techniques (Figure L-6 shows areas for excavation). It is estimated that contaminated floodplain soil will be removed to an approximate depth of 1 foot in ecological habitat and recreational-use areas, replaced with clean fill, and the floodplain habitat restored. A depth of 1 foot was estimated because this is generally considered the depth to which the majority of relevant ecological exposures occur as a result of foraging or burrowing activities.

As part of pre-design, a background characterization will be performed using an estimated 20 floodplain soil samples to confirm floodplain soil contaminant concentrations upstream from the Site (Greystone area). Soil cleanup levels which are based on background levels will be adjusted based on this data. Background soil samples would be analyzed for dioxin/furans, Coplanar PCBs, pesticides, PCBs, VOCs, SVOCs, metals, percent solids, grain size and organic content. Background soil data will be used for both Allendale Floodplain Soil and Lyman Mill Stream Sediment and Floodplain Soil (including Oxbow).

The actual depth of excavation will extend deeper within the vadose zone to meet RAOs as necessary, and will be determined during design based on sampling and analysis of deeper soil samples. Design and pre-design activities will include physical and ecological surveys and collection of an estimated 20 soil samples that will be analyzed for dioxins and other contaminants. For residential-use properties where excavation depth throughout the vadose zone (depth less than 10 feet) is required, incremental composite soil sampling will be conducted on each property to determine properties requiring excavation, consistent with *User Guide - Uniform Federal Policy Quality Assurance Project Plan Template For Soils Assessment of Dioxin Sites (September 2011)*. Precautionary interim measures to prevent exposure, such as fencing or spreading a cover (e.g., mulch or clean soil) will be taken in the interim. Such measures will be considered on an individual property basis, to be coordinated with residents and/or property owners.

Removal of floodplain soil will likely be carried out concurrently with the sediment excavation in the Allendale Pond, as pond water levels will be below the normal water level so that all work

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**Table L-10. Calculated Fish Target Tissue Concentrations**

Contaminant	Current Background (Greystone) <sup>a</sup> Fish Tissue Concentration	Current Allendale and Lyman Mill Fish Tissue Concentration <sup>b</sup>	Fish Target Tissue Concentration <sup>c</sup>	Basis <sup>d</sup>	Anticipated % Reduction in Concentration from Current Conditions <sup>e</sup>
Benzo(a) pyrene	0.00099	0.0035	0.0015	HH	58
4,4'-DDE	0.033	0.057	0.018	HH	69
4,4'-DDD	0.013	0.020	0.0062	Eco	100
Aroclor-1254	0.18	2.0	0.037	HH	98
Aroclor-1268	0.085	0.024	0.011	HH	55
Aroclor Total	0.33 <sup>e</sup>	3.1 <sup>e</sup>	0.076	Eco	92
Dieldrin	0.0027	0.0073	0.0011	HH	85
Technical Chlordane	0.21	0.74	0.13	Eco	71
2,3,7,8-TCDD	0.0000014	0.00034	0.0000022	HH	99
Dioxin/Furans TEQ	0.000054 <sup>f</sup>	0.00060 <sup>e</sup>	0.000044	Eco	99

Notes:

Units are in mg/kg (wet weight – tissue)

- a. Current background fish tissue concentration in a Woonasquatucket River reach upstream of the Site (Greystone); values are based on the Combined Fish Diet Exposure Point Concentrations (EPCs; i.e., arithmetic average of American eel, white sucker/brown bullhead, and largemouth bass concentrations where available) unless noted otherwise.
- b. Current (existing) fish tissue concentrations – calculated as the arithmetic mean of the Allendale and Lyman Mill Pond Combined Fish Diet Exposure Point Concentrations (EPCs) unless noted otherwise.
- c. Presented in the Interim Final FS
- d. With the exception of 4,4'-DDD and dioxin/furan TEQs, the sediment cleanup levels for these contaminants were established at the sediment background concentrations for Greystone Mill Pond. The basis for the 4,4'-DDD cleanup level was protection of dietary exposures in piscivorous birds (e.g., belted kingfisher) and for dioxin/furan TEQ, the basis was protection of residue-based effects (embryonic survival) in insectivorous birds (e.g., tree swallow).
- e. Calculated as a difference between the current (existing conditions) Combined Fish Diet concentrations averaged for Allendale and Lyman Mill Ponds and the tissue concentrations anticipated following remediation, divided by existing conditions.
- f. Aroclor Total and Dioxin/Furan TEQ values are arithmetic means of white sucker and largemouth bass EPCs

Key: HH - Human Health-based fish target tissue concentration, Eco - Ecological Risk-based fish target tissue concentration

**REGION 1**

**RECORD OF DECISION**

**CENTREDALE MANOR RESTORATION PROJECT  
SUPERFUND SITE  
NORTH PROVIDENCE, RHODE ISLAND**

**SEPTEMBER 2012**



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