

# Balancing the Risks and Benefits of Sediment Remediation Options

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# #1 – How well do we need to understand the nature and extent of contamination to pick appropriate remedies and cleanup levels for any site?

- Will more data collection significantly reduce uncertainty; i.e., nice-to-know vs. need-to-know data?
- Is dredging feasible? Capping? Any active remedy?
- If we can't reach a risk-based PCB sediment goal of 50 ppb, how important is to determine if 0.20 or 0.50 or 1.0 ppm is likely to be achieved?

#2 – How do we decide which areas to dredge vs. isolation cap vs. thin layer cap vs. MNR?

## Dredging Advantages

- Moves contaminants from a mobile environment to one which can be more easily and safely maintained and monitored
- Except for continuing fish consumption advisories, does not limit future water body uses or reduce flood control capacity
- Requires less monitoring

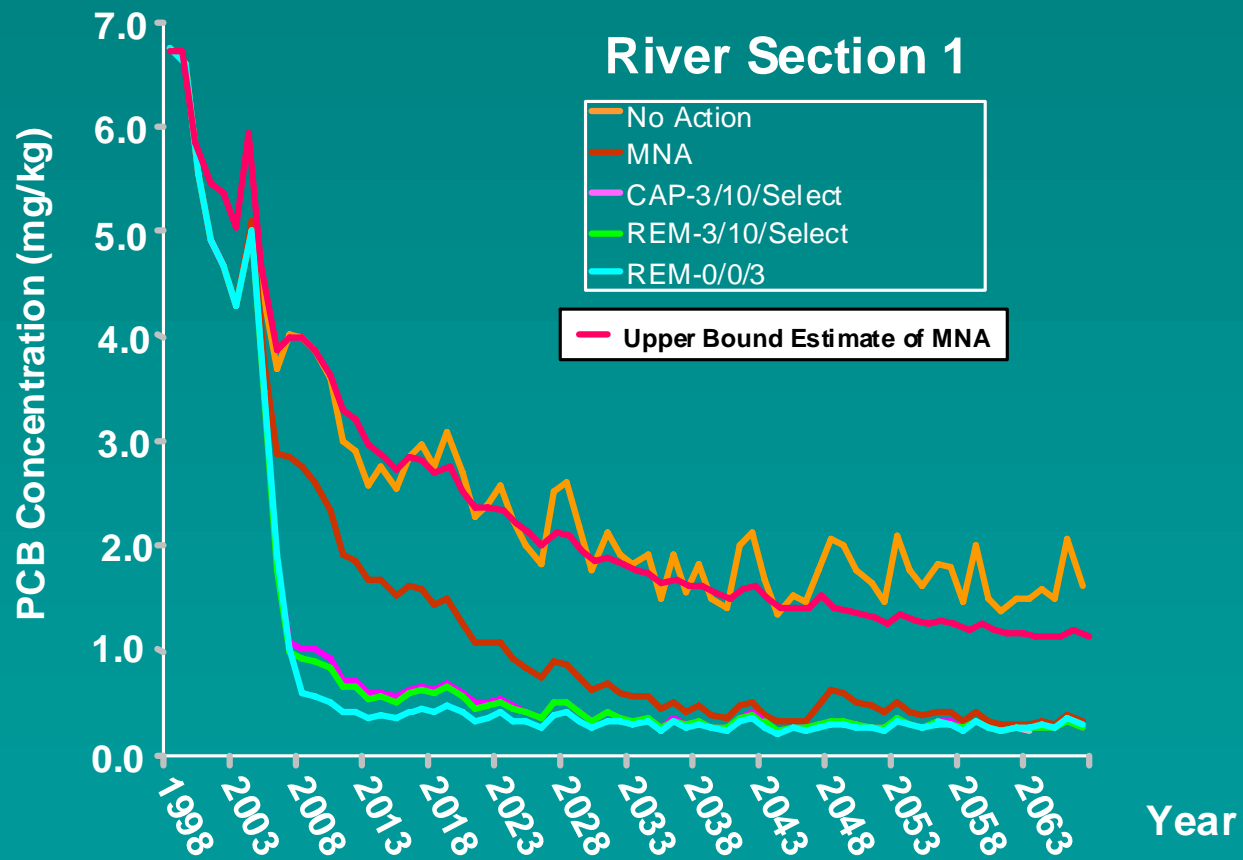
## #2 Cont. – Capping Advantages

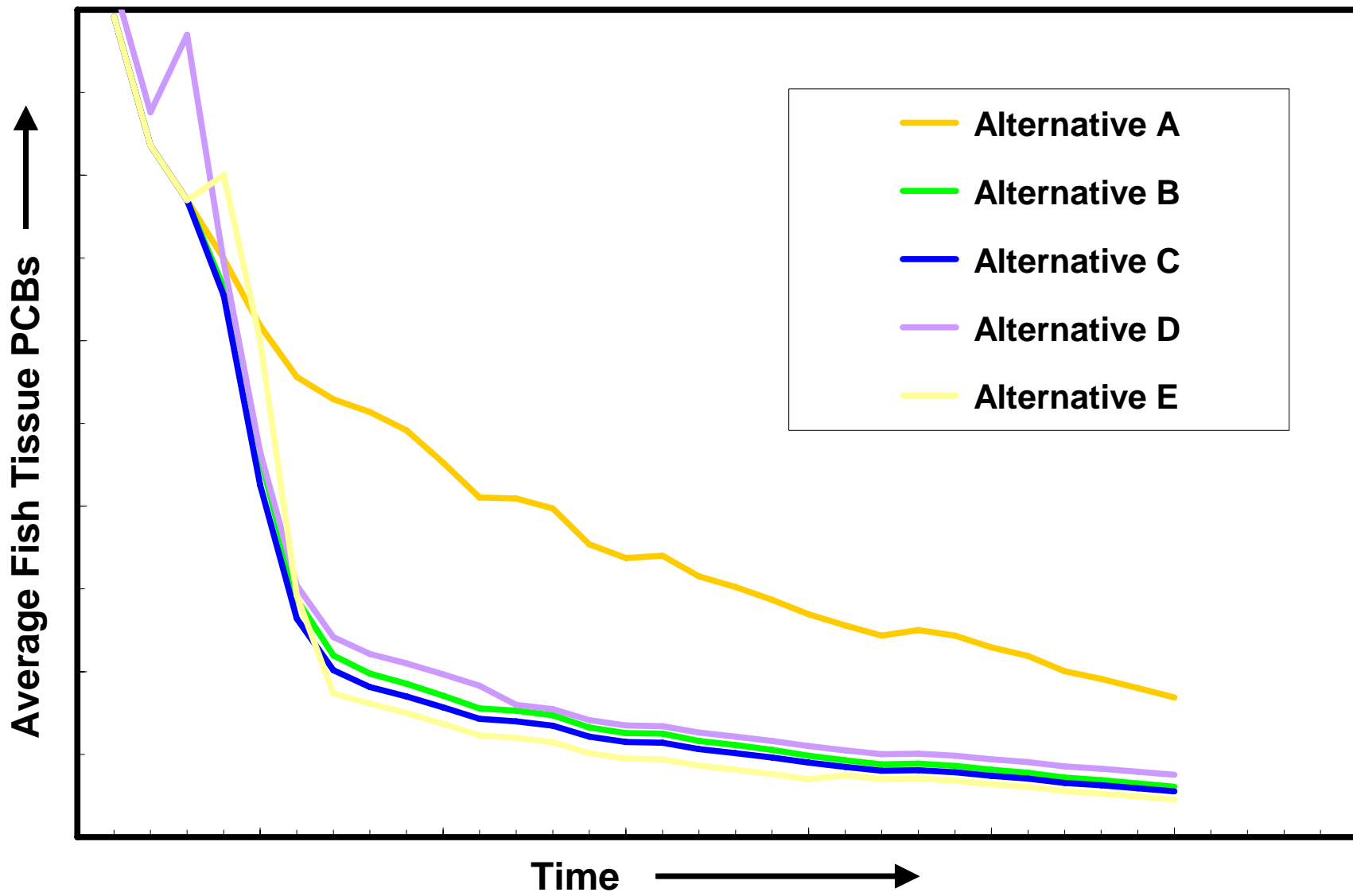
- Can achieve greater risk reduction more quickly
- Creates less short-term risk and fewer quality of life issues
- Can be implemented quicker and at less cost
- Requires much less space for staging, handling, and treatment of sediment
- Can facilitate habitat restoration by using an eco-friendly surface layer

### #3 – How do we balance creation of short-term risk, level of long-term risk reduction, waterbody use restrictions and cost ?

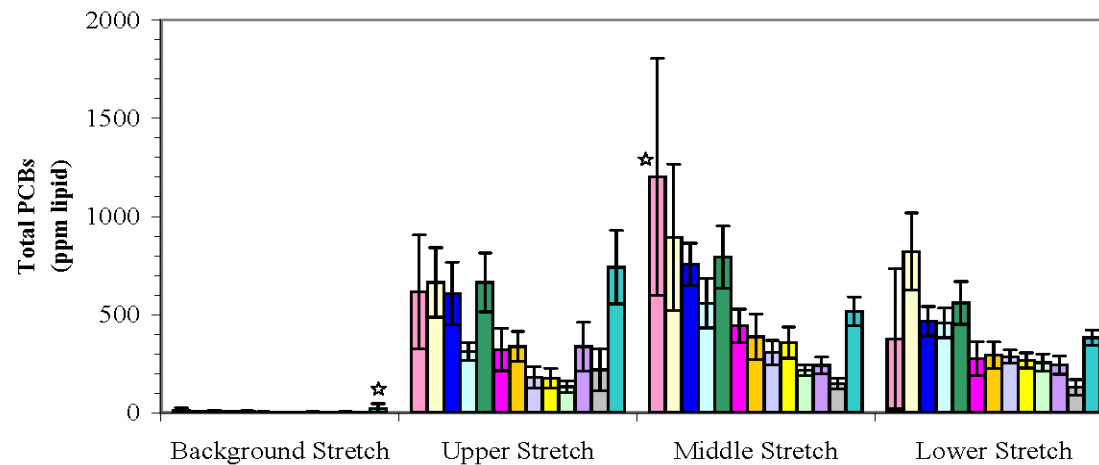
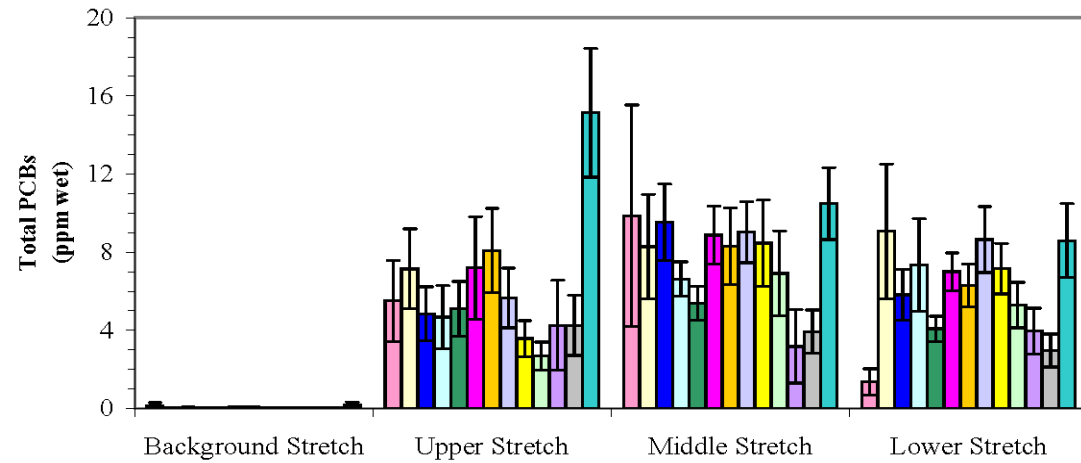
- May need a sediment-specific decision tree, but risk reduction is still the threshold criterion
- Can a quantitative NEBA-like evaluation (Net Environmental Benefits Analysis) be performed?
- Should “rules of thumb” be developed?

# Species-Weighted Fish Fillet Average PCB Concentration





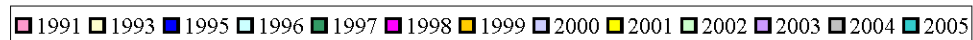
# Historic PCBs Trends in Brown Bullhead



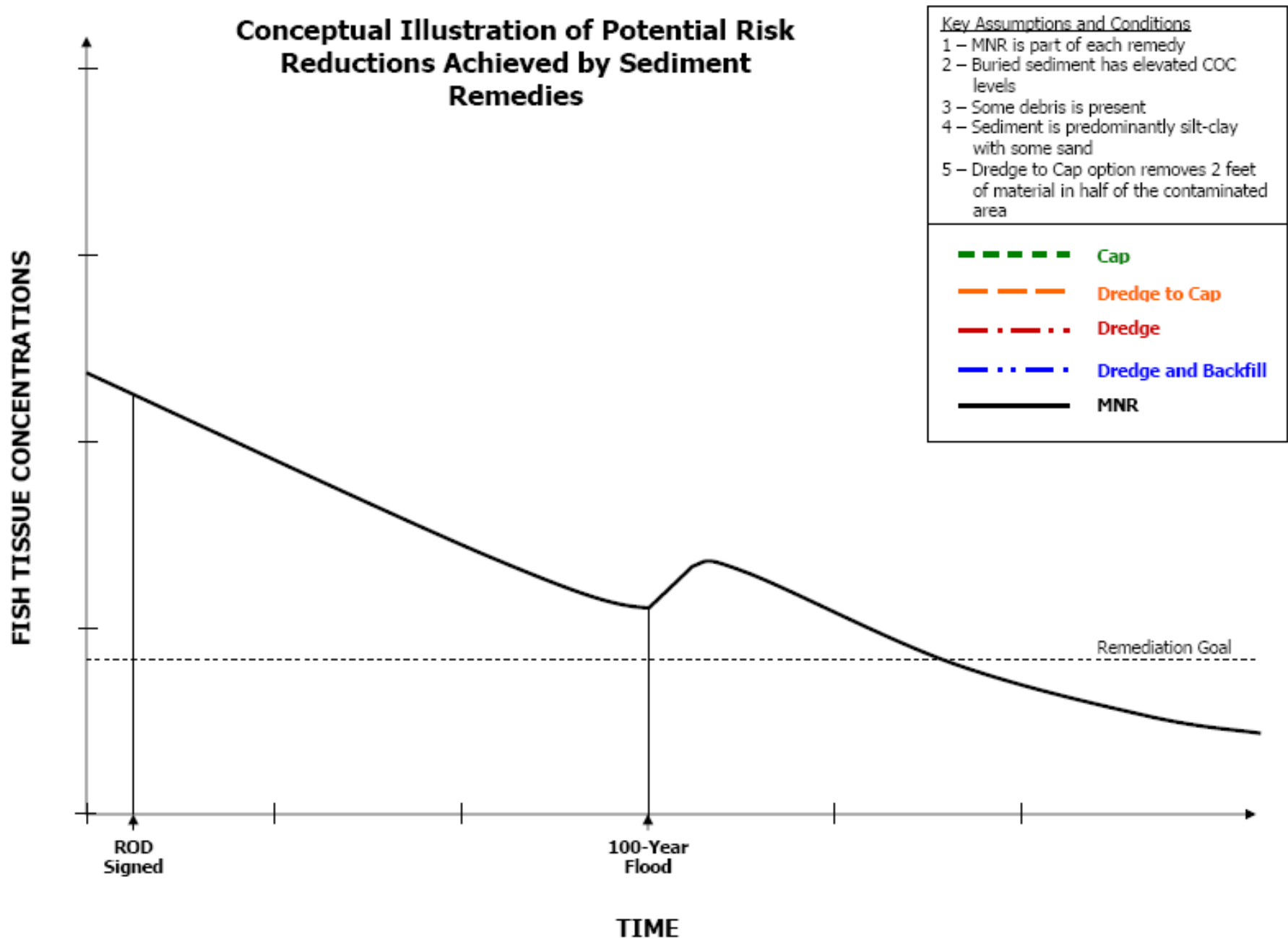
## Average Aroclor-based PCB Levels in Brown Bullhead (1991-2005)

Data are arithmetic means  $\pm$  two standard errors of the mean.

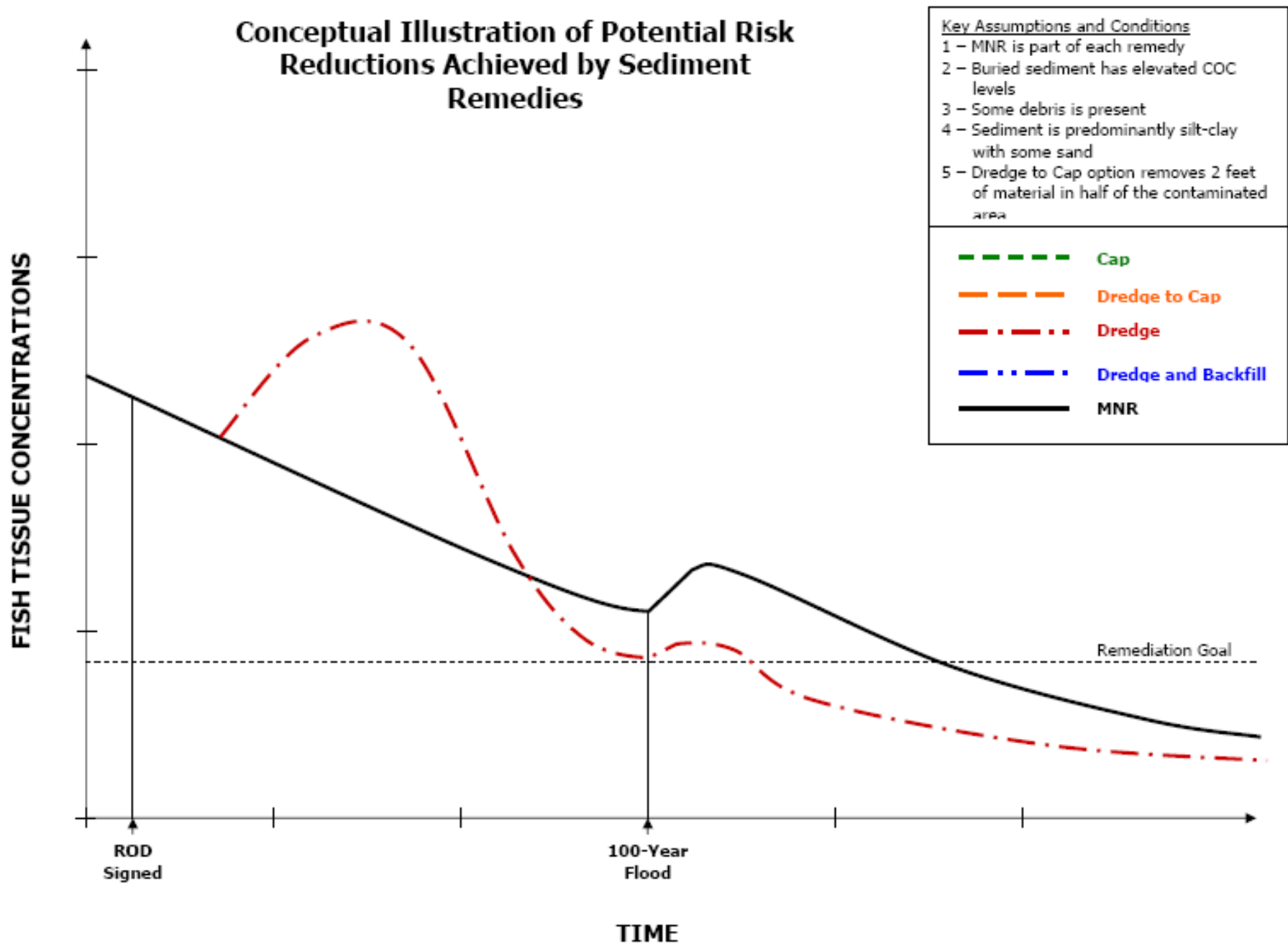
★ One 1991 and one 2005 sample were excluded due to unreasonably low lipid content (<0.1%).



## Conceptual Illustration of Potential Risk Reductions Achieved by Sediment Remedies



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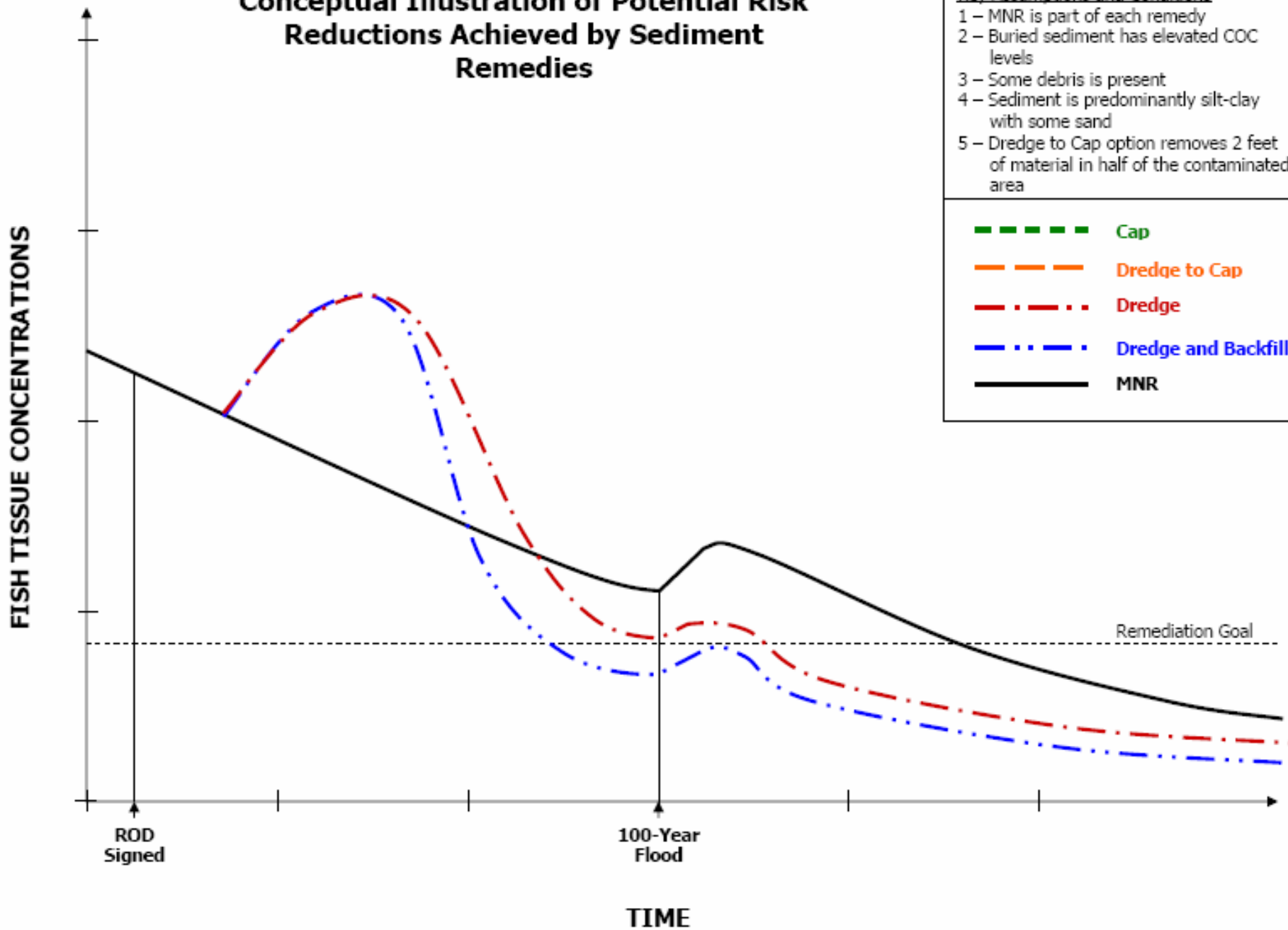
## Conceptual Illustration of Potential Risk Reductions Achieved by Sediment Remedies

**Key Assumptions and Conditions**

- 1 – MNR is part of each remedy
- 2 – Buried sediment has elevated COC levels
- 3 – Some debris is present
- 4 – Sediment is predominantly silt-clay with some sand
- 5 – Dredge to Cap option removes 2 feet of material in half of the contaminated area

**Legend:**






- Cap (Green dashed line)
- Dredge to Cap (Orange dashed line)
- Dredge (Red dash-dot line)
- Dredge and Backfill (Blue dash-dot-dot line)
- MNR (Black solid line)

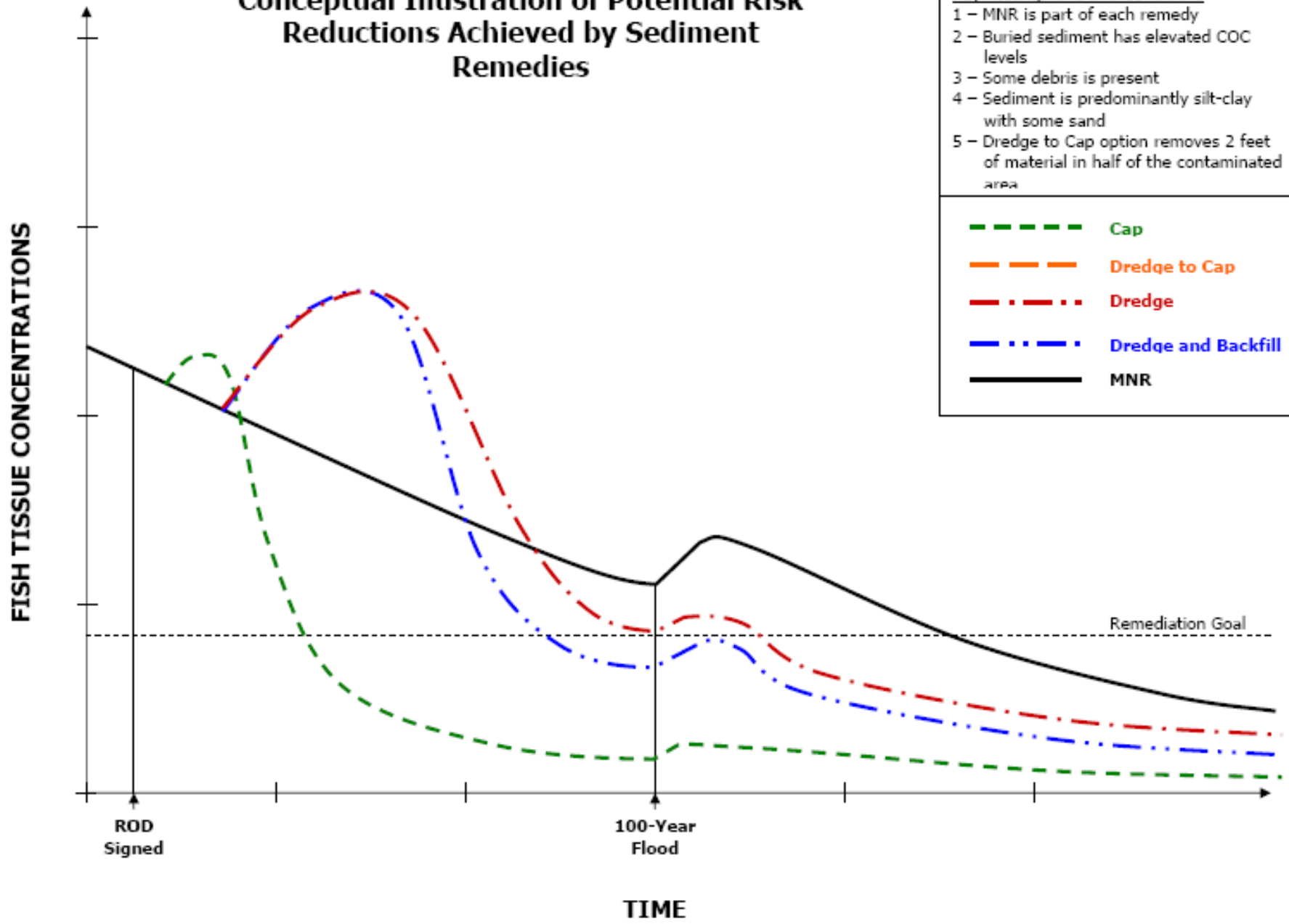


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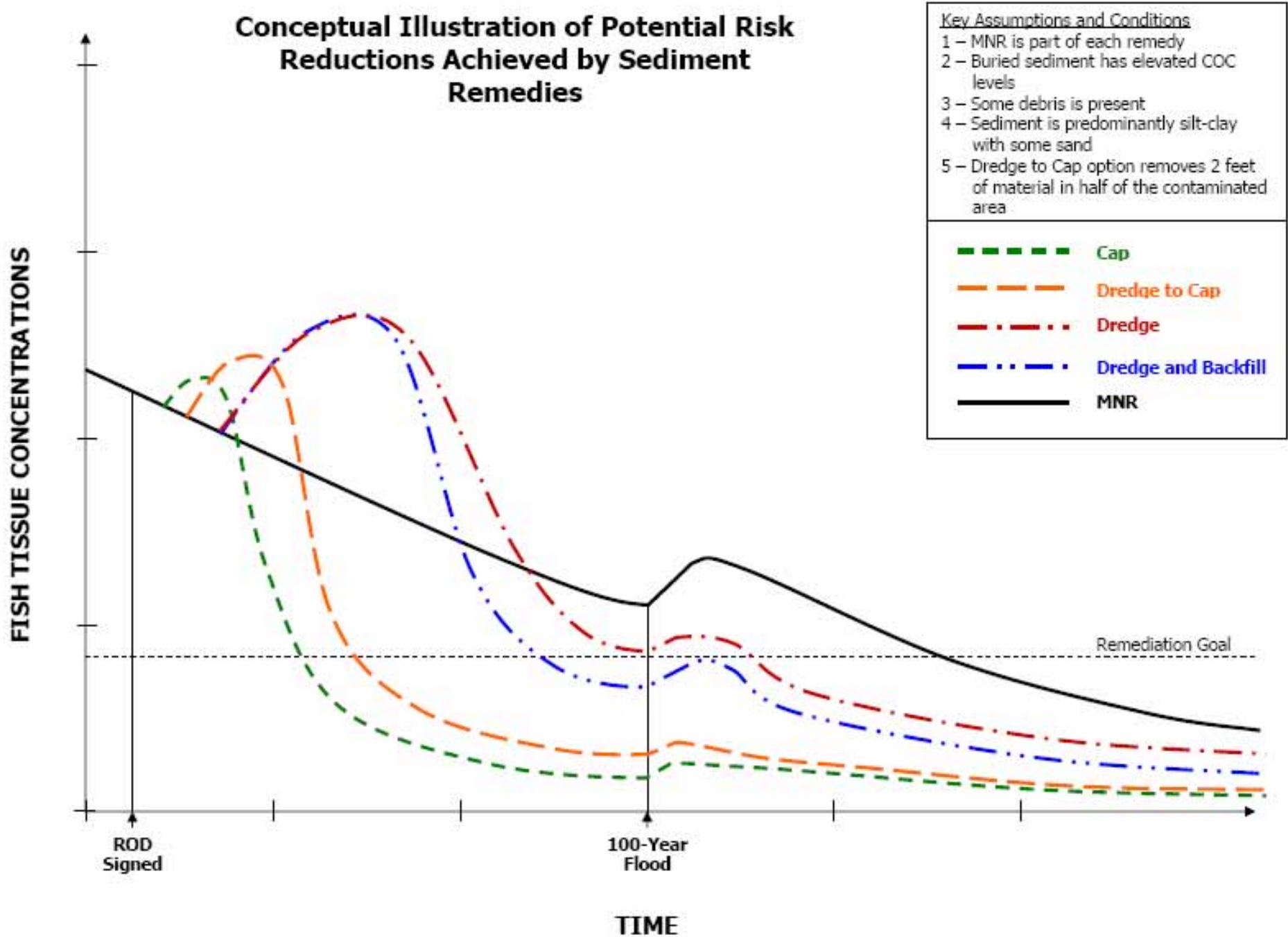
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	Cap
	Dredge to Cap
	Dredge
	Dredge and Backfill
	MNR



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# Rules of Thumb

- ??

# Possible Rules of Thumb

- Control all sources
- Dredge and backfill hot spots: e.g., 20 x CUL
- Dredge and cap navigational channels
- Cap areas with contam. e.g., > 2 – 5x CUL
- Dredge shallow areas before capping if are flood control issues
- MNR for lesser contaminated areas if there is deposition, thin sand layer if no deposition
- ICs for caps and fish consumption as needed