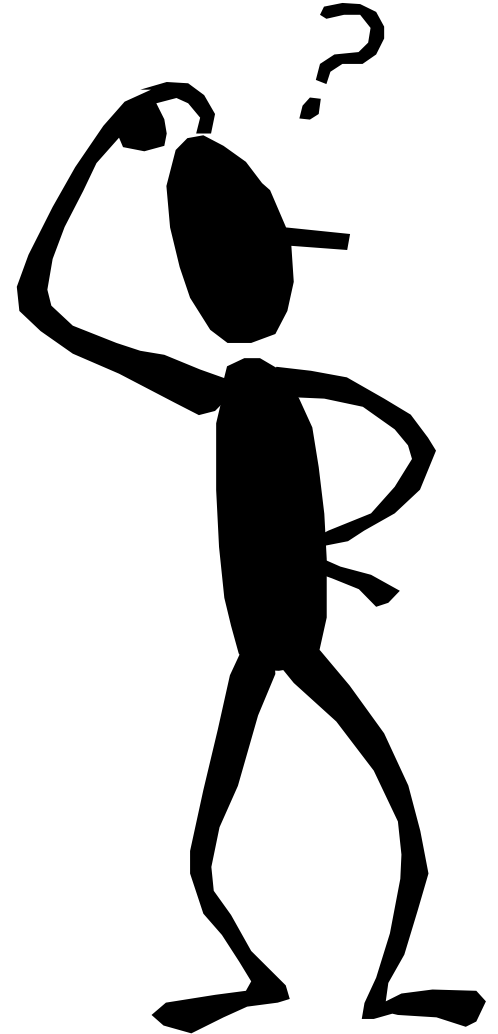


**What We Know
or
What We Think We
Know**

**South River Science Team
Expert Panel Meeting
October 23, 2003**



Biological

- Fish Tissues [bass, sunnies]
 - Baseline or increasing Hg tissue levels through 1996.
 - Slightly decreasing Hg tissue levels from 1996-2002.
 - Peaks seem to co-occur with flood events.
 - On average, tissue levels remain at or above 1 mg/kg.

Biological

- Fish Diet

- Prey items differ with river reach and season.
- Prey items contain Hg.
- Hg in prey items increases downstream of footbridge.
- Hg in prey items may differ with season.
- Higher Hg levels found in aquatic oligochaetes and terrestrial insects.
- Seasonality with Hg in fish.

Biological

- **Birds**

- The South River watershed supports abundant and diverse populations of bird species.
- Piscivorous birds are known to inhabit in South River watershed.
- Hg in fish that might be consumed by piscivorous birds could present a potential exposure issue.
- Addressing the cause of Hg in fish will address the exposure issue for piscivorous birds.
- [need to refine on basis of actual time spent in the area, etc.]

Biological

- Other receptors [small mammals, waterfowl, etc.] ? May need to take a look at these too.
- Take a look at repro studies in fish - Weiner's lab.

Biological

- **Bivalves**
 - Clam tissues contain Hg.
 - Absolute Hg levels less than in fish.
 - Hg levels reflect locational pattern seen in fish of South River.
 - Clams provide an additional tool for near and long term monitoring of mercury in the South River.

Water Quality

- **Nutrients**
 - No obvious trends
 - Nitrate
 - Sulfate
 - o-Phosphate
- **“Standard” Parameters**
 - No obvious trends
 - TSS
 - TOC
 - pH

Water Quality

- **Selenium**
 - Data limited, only recent sampling
- **Mercury**
 - Data limited
 - No obvious trends
 - Consistent levels (3-12 ng/L, total dissolved) from 1996 - 2003.

Water Balance

- **Surface water**
 - Total flow range of 30 - 300 cfs
 - Groundwater represents 30 - 50 % of the base flow.
 - Flow from springs does not appear to be a significant contributor to total flow.[need to revise]
 - The South River contributes about 20% of total flow in South Fork Shenandoah River.

Sediments

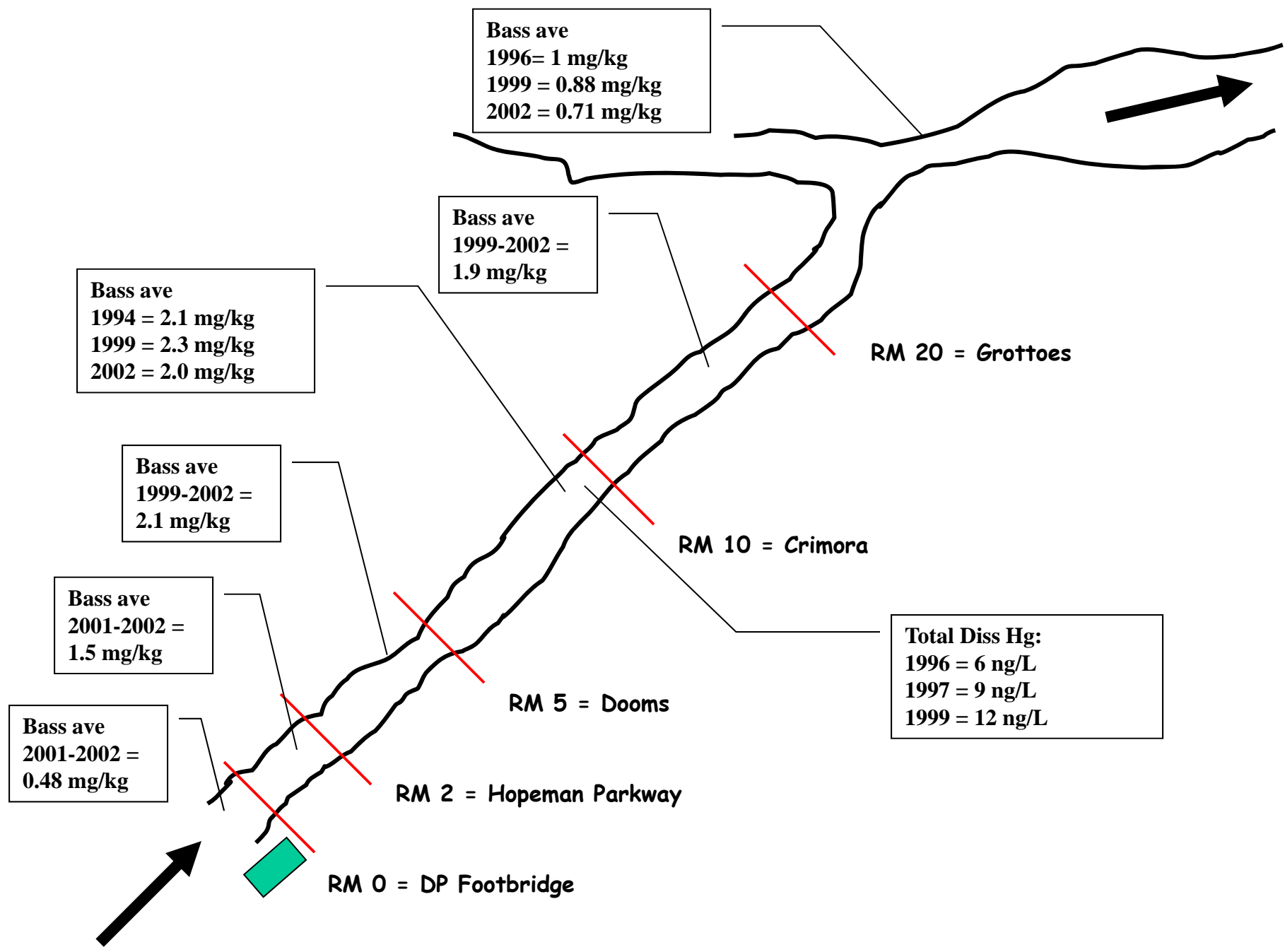
- Sediment is present in SR (but difficult to access), localized zones of deposition are present and have been mapped.
- There are limited, but no recent, sediment data.
- Some mercury bound to sediments can become bioavailable. [total Hg in seds is not a good indicator of bioavailability]
- Even during flood events, mobilized sediments may or may not contribute bioavailable mercury.

Soils

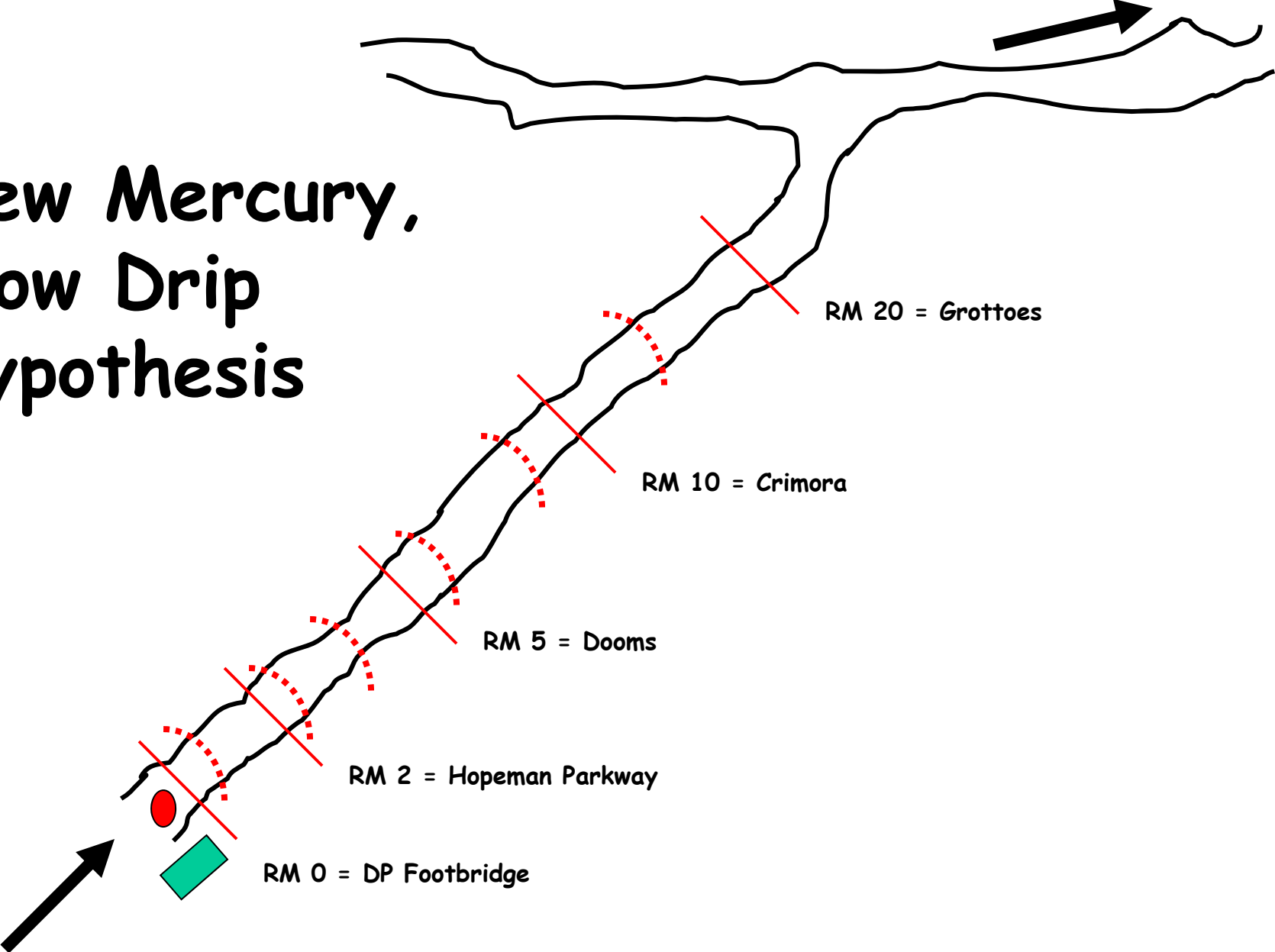
- Mercury still resides in floodplain soils.
- Levels in surficial soils seem to be consistent, averaging approximately 10 mg/kg, and areas up to 50 + mg/kg.[high variability, spatial]
- Mercury levels at depth are higher than in surficial samples, and tend to reflect chronologically the useage of mercury at the DuPont site.
- Soils eroded into the South River may or may not consititute a source of bioavailable mercury.

Food Crops

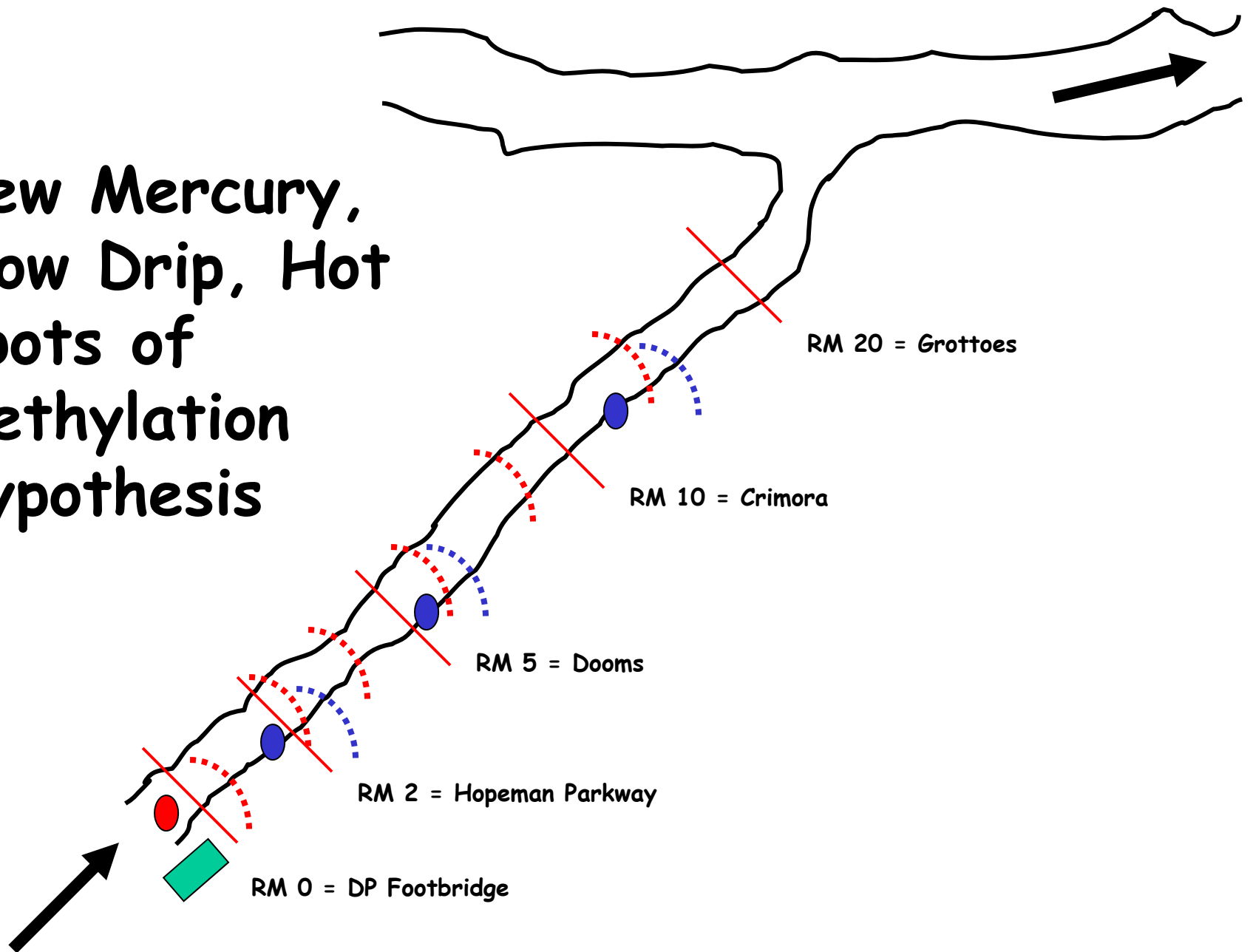
- Mercury still resides in floodplain soils.
- Food crops have been grown in floodplain soils containing up to 50 mg/kg mercury, and if bioaccumulation occurs it is relatively limited.
- Humans consuming food crops grown in floodplain soils do not appear to be at risk of an unacceptable exposure using normal food preparation methods [washing the produce].



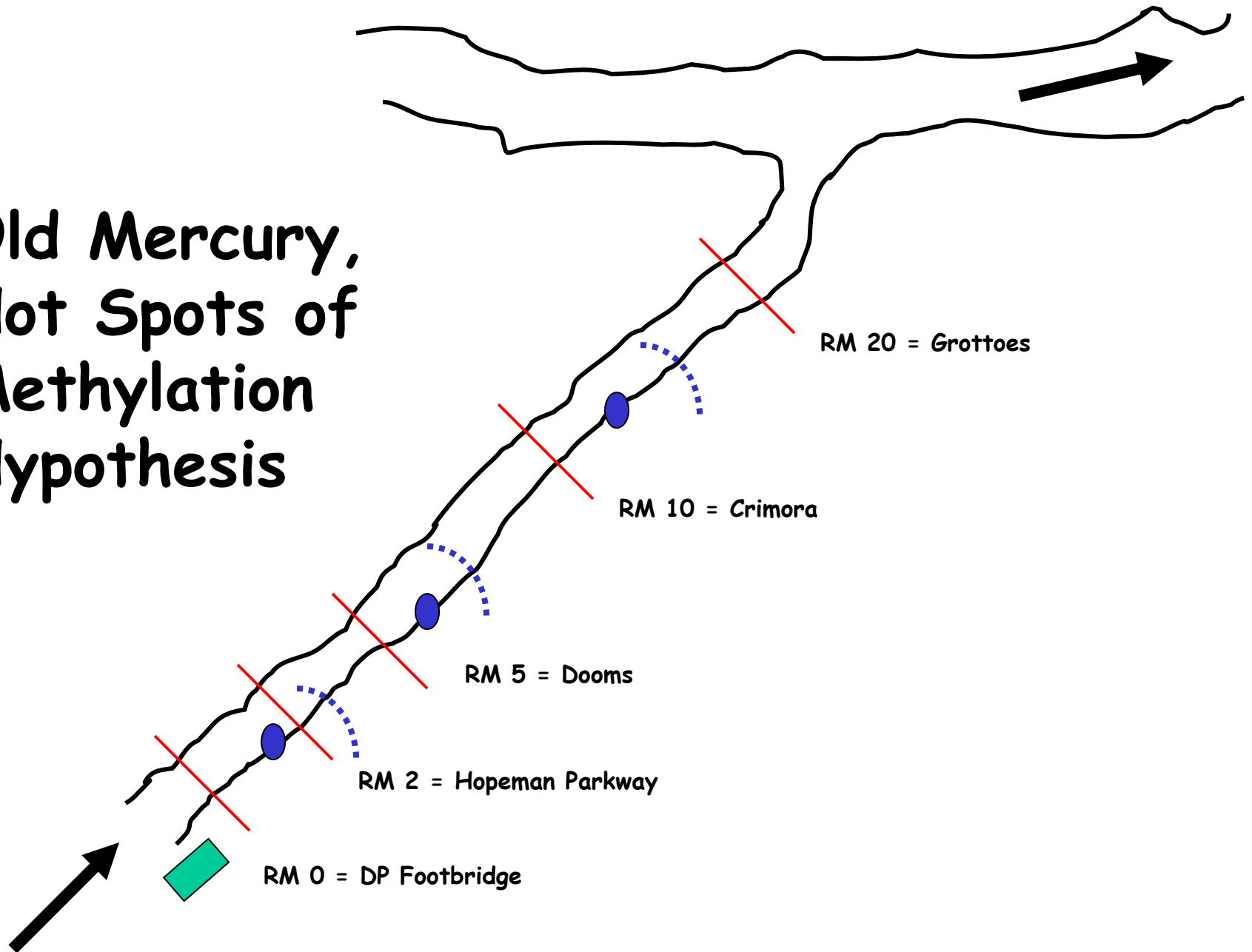
New Mercury, Slow Drip Hypothesis



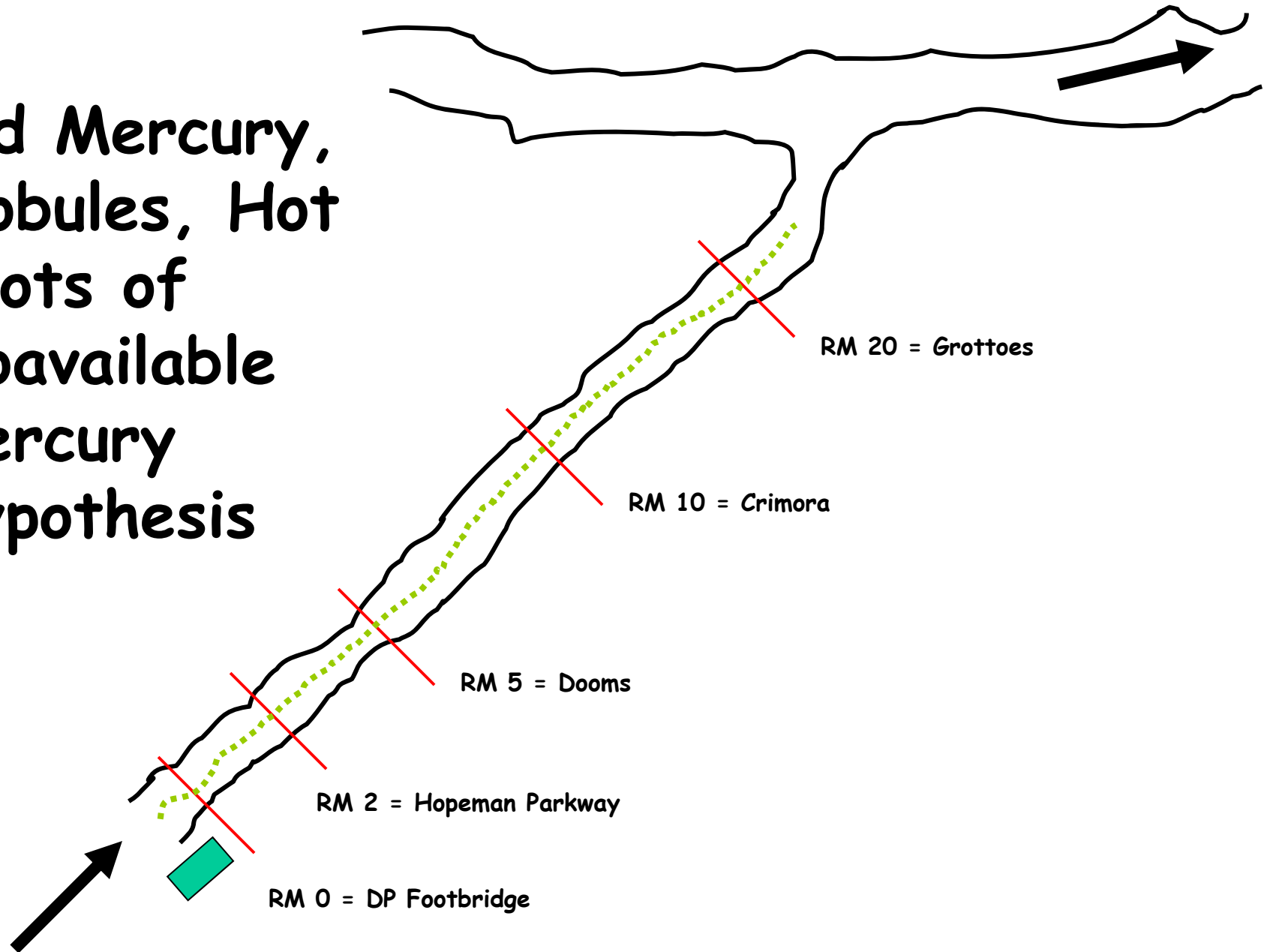
New Mercury, Slow Drip, Hot Spots of Methylation Hypothesis



Old Mercury, Hot Spots of Methylation Hypothesis



Old Mercury, Globules, Hot Spots of Bioavailable Mercury Hypothesis



The "Combo" Hypothesis

