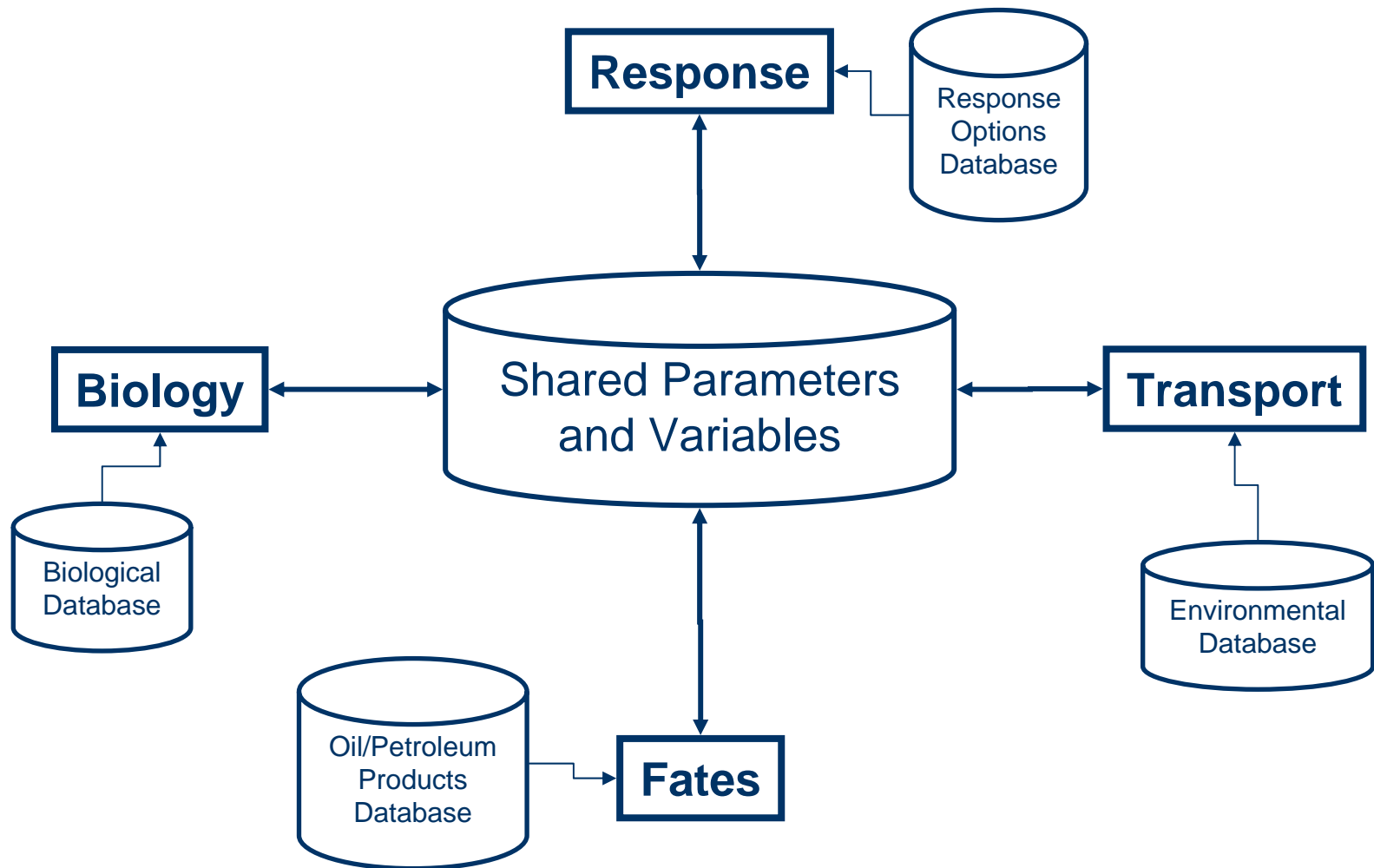


# Overview: parameter and variable exchanges between each of the four “modules” and the shared pool



# Outline

- Four slides to list the state variables (“properties”) that will be made available to the overall model from each of the four “modules” (groups)
- Four slides to summarize the inputs and outputs from each module

# Environmental properties

## Environmental properties at location $x, y, z$ :

- Depth
- Bottom sediment type
- Suspended sediment concentration
- Shoreline type
- ...
- ...
- 

Note: properties that may vary with time (e.g. depth, ssc) are transformed in the Transport modules, or (e.g. seasonally) from the Environmental Database

# Oil properties

## Oil properties at location $x, y, z$ at time $t$ :

- Fractional composition by component or pseudo-component group (may include degradation products)
- Rheology (viscosity, elasticity)
- Water content
- Emulsion stability
- Adhesion characteristics
- Oil-water interfacial tension
- Thickness
- Fractional coverage
- Droplet size represented (or representative?)
- Sediment content
- Density (computed from composition, water content)
- ...
- ...

# Response properties

## Response properties at location $x, y, z$ at time $t$ :

- Actions in progress
- Capabilities (action parameters)
- Status (working, idle due to darkness, etc)
- ...
- ...

# Biological properties

## Biological properties at location $x, y, z$ at time $t$ :

Note: to the extent that the biological feedback to the rest of the system will be ignored, there may be no need to make the biological state available to the model as a whole.

■ ...

■ ...

# Transport parameters and variables

Inputs at  $x, y, z, t$

- oil mass and properties

Outputs at  $x, y, z, t$

- oil mass and properties (if changed)
- currents:  $\langle u, v, w \rangle$
- winds:  $\langle U, V \rangle$
- waves:  $H, T$  (spectral properties?)
- energy dissipation rate
- horizontal and vertical turbulence coefficients

# Fates

**Inputs** at  $x, y, z, t$ .

- oil mass and properties
- transport parameters and variables
- environmental properties

**Outputs** at  $x, y, z, t$ .

- revised oil mass and properties



# Response

## Inputs at $x, y, z, t$ .

- oil mass properties
- response alternatives (parameters specified externally or from database)

## Outputs at $x, y, z, t$ .

- oil mass and properties
- mass balance changes (recovered, dispersed, burned, contained)

# Biology

## Inputs at $x, y, z, t$ :

- oil mass and properties
- hydrocarbon concentrations (THC and WAF, by component group)
- distributions of biological organisms
- behaviors, sensitivities, population parameters

## Outputs at time $t$ :

- exposure  $\rightarrow$  body residue  $\rightarrow$  effects
  - individuals
  - populations