VIMS-CCRM Decision Tree For Currently Defended Shorelines

**Existing Bulkheads**

**Structural Integrity**
- **Failing or flanked**
  - **Low**
    - **Energy/Risk Level**
      - **Moderate**
        - **Grade Bank?**
          - **Yes**
            - **Nearshore water depth**
              - **Shallow**
                - **Remove bulkhead + grade bank + marsh sill + riparian buffer**
              - **Deep**
                - **Nearshore water depth**
                  - **Shallow**
                    - **Remove bulkhead + grade bank + revetment landward**
                  - **Deep**
                    - **Bulkhead toe revetment**
          - **No**
            - **Navigation Limited?**
              - **Yes**
                - **Seek expert advice**
            - **No**
              - **Grade Bank?**
                - **Yes**
                  - **Nearshore water depth**
                    - **Shallow**
                      - **Marsh sill channelward + riparian buffer**
                    - **Deep**
                      - **Bulkhead toe revetment**
                - **No**
                  - **Remove bulkhead + go to Existing Groins decision tree**

- **High**
  - **Modify upland land use?**
    - **Yes**
      - **Seek expert advice**
    - **No**
      - **Wide beach present or potential?**
        - **Yes**
          - **Are groins also present?**
            - **Yes**
              - **Shoreline Length**
                - **Greater than 200 ft (single or multiple parcels)**
                  - **Remove bulkhead + offshore breakwaters + beach nourishment**
                - **Less than 200 ft**
                  - **Grade Bank?**
                    - **Yes**
                      - **Remove bulkhead + grade bank + revetment landward from original bulkhead**
                    - **No**
                      - **Bulkhead toe revetment**
            - **No**
              - **Shoreline Length**
                - **Less than 200 ft**
                  - **Grade Bank?**
                    - **Yes**
                      - **Remove bulkhead + grade bank + revetment landward from original bulkhead**
                    - **No**
                      - **Bulkhead toe revetment**

- **Serviceable/No Erosion**
  - **Consider if bulkhead is actually needed at this location; if not, consider removing it**
    - **If so, inspect and maintain while considering alternatives for eventual replacement**

*Expert advice incl. local govt. for land use options and limitations, health dept for parcels with sanitary drainfields, private sector for house moving or raising, geotechnical expertise, etc.*