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### River Characterization of the Assonet River

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# Assonet River Characterization Study



**Apponequet Regional  
High School**

# Introduction

**A major tributary of  
the Taunton River in  
southeastern  
Massachusetts**

**Located in the  
Taunton River  
Watershed (562  
square miles)**

**The eastern portion  
of the Assonet sub-  
basin: 23.60 square  
miles**



# History

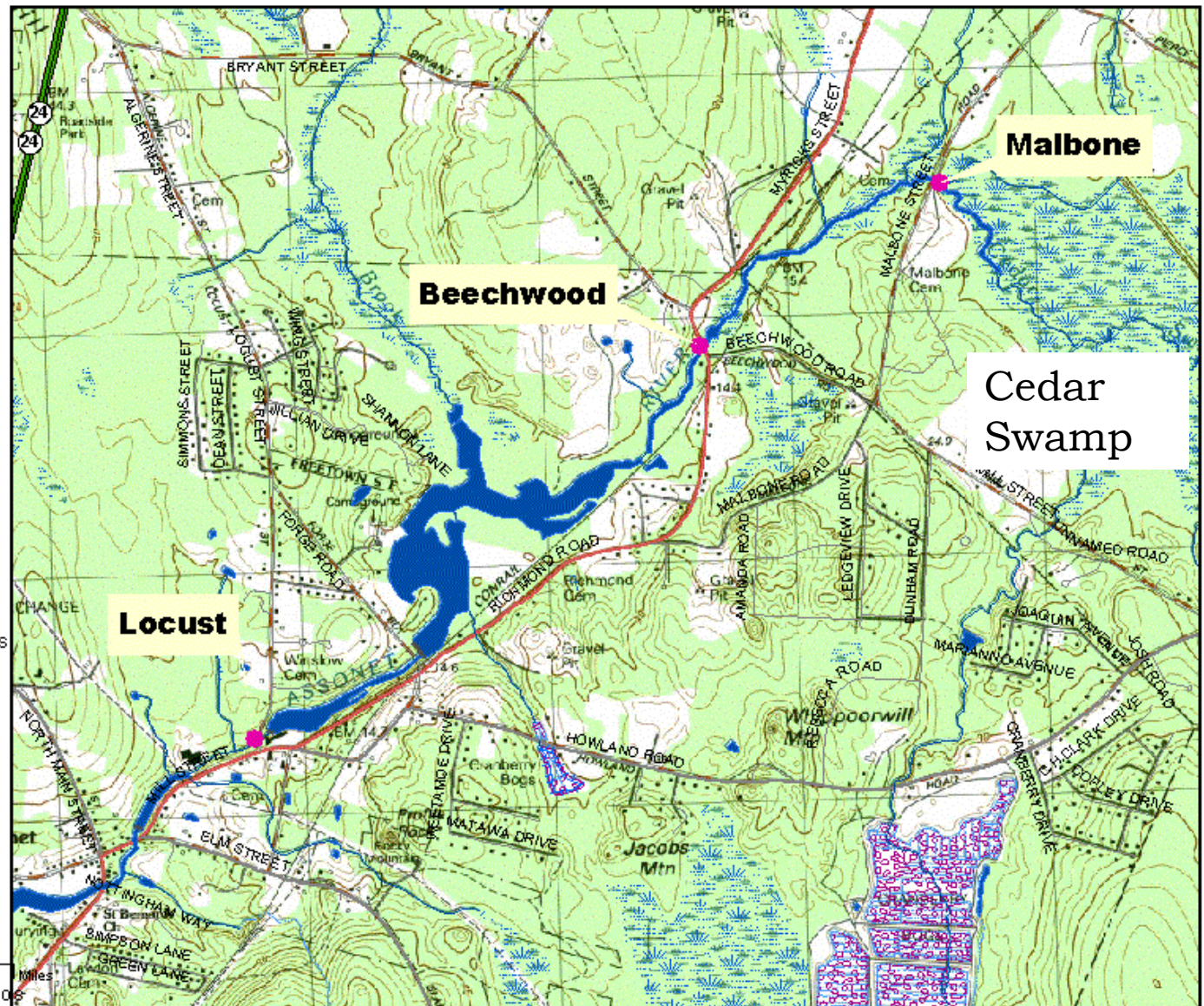
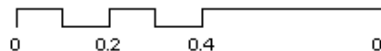
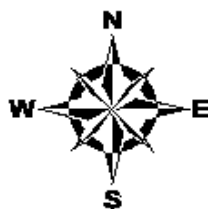
- Played a part in the American Revolutionary War
- Provided the necessary power for gristmills and sawmills
- Sites were downstream from the sites we examined
- Assonet provided for a minor port and the last ship sailed out of the Assonet River in 1902.





# Topography of Assonet River Sites

- Legend**
- Perennial Stream
  - Intermittent Stream
  - Shoreline
  - Intermittent Shoreline
  - Manmade Shoreline
  - Ditch/Canal
  - Aqueduct
  - Dam
  - Channel in Water
  - Pond, Lake, Ocean
  - Reservoir
  - Wetland
  - Salt Wetland
  - Submerged Wetland
  - Cranberry Bog
  - Tidal Flat
  - Inundated Area
- All Roads**
- Road Classification**
- Limited Access Highway
  - Multi-lane Hwy, not limited access
  - Other Numbered Highway
  - Major Road, Collector
  - Minor Road, Arterial



# Let Us Introduce Our Sites...



**All three sites are  
located on the third  
order segment**

**From headwaters the  
sites are ordered  
Malbone St. Beechwood  
St., and Locust St.**



# Malbone St.



**Surrounded by forest and medium residential land cover**

**Collects drainage from the Cedar Swamp**

**Site is near and a concrete bridge on a moderately used road**

**Stream has been channelized near bridge during its construction**

# Beechwood St.

**Mixture of forest and medium density residential cover**

**Located near an old stone bridge under a moderately used road – Rt. 79**

**Sand & Gravel Company and railroad tracks upstream from collection site**



**Collecting Macros**



**Determining Flow**



# Locust St.

**Surrounded mix of forest cover, medium density residential and industrial use**

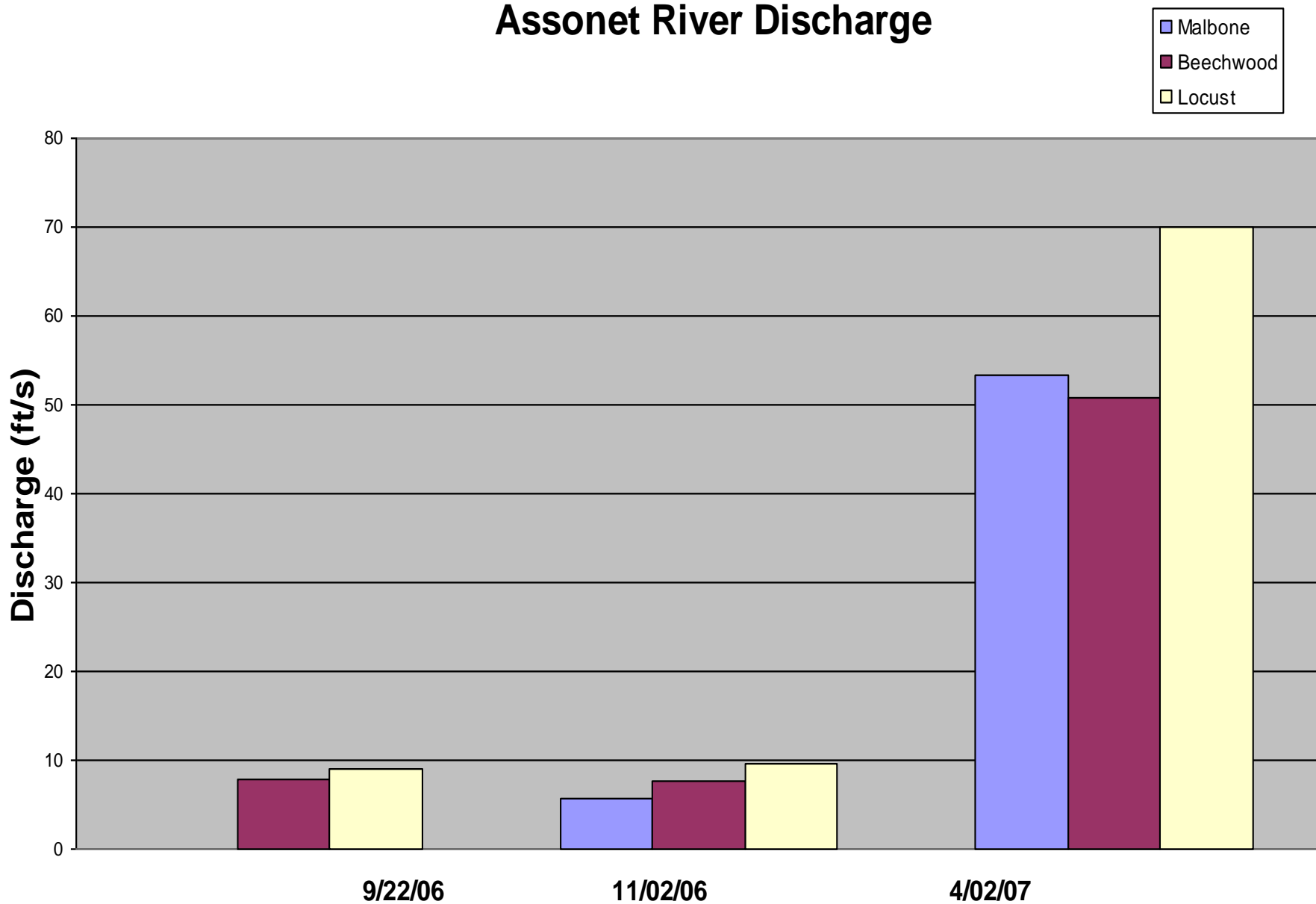
**Runs parallel to Rt. 79 which is a heavy traffic area**

**Also near residential housing**



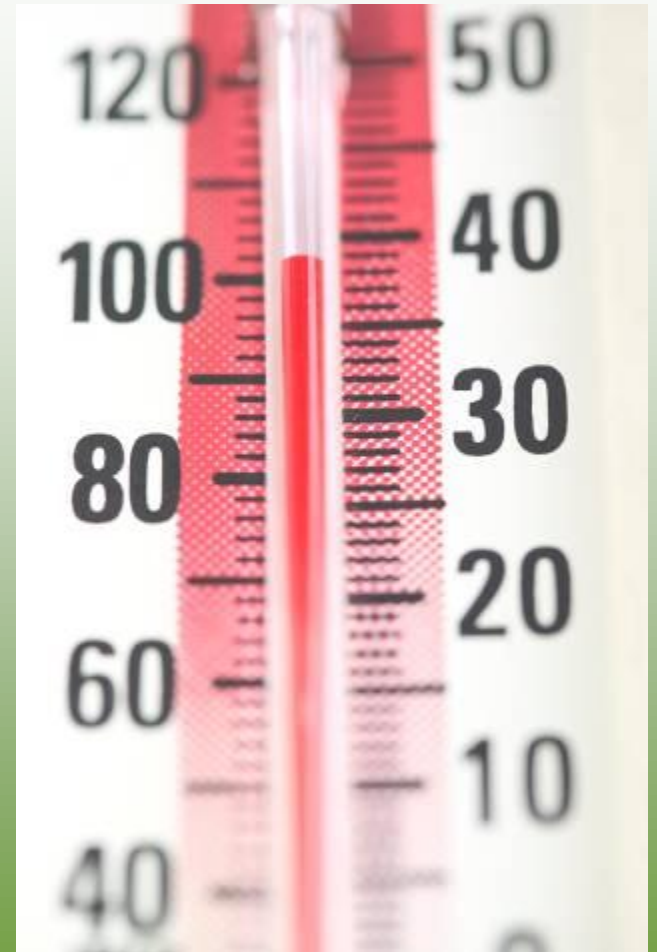
**Collecting Water Sample**

# Assonet River Discharge



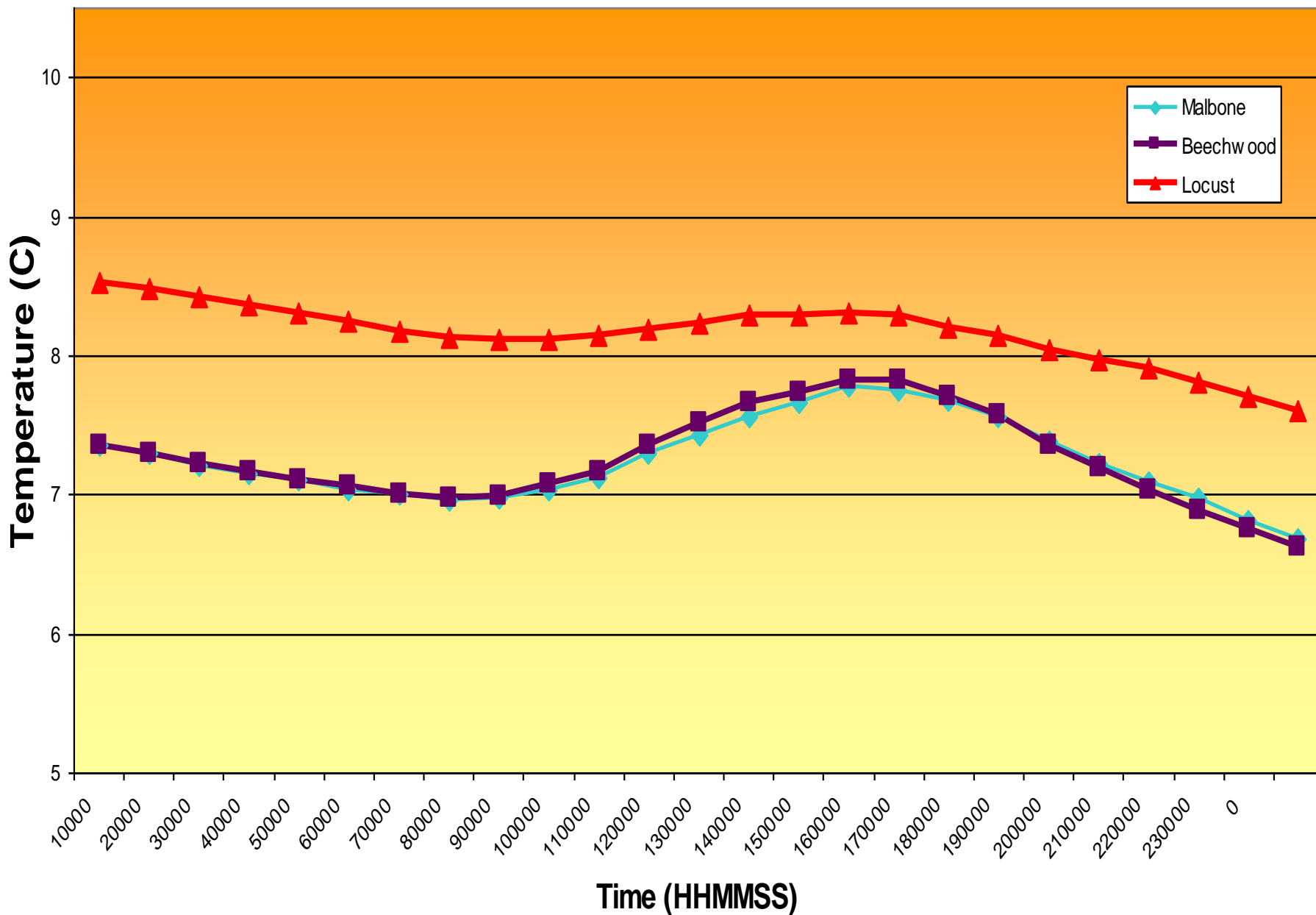
# Temperature

- **Normal Values: Below 26 Degrees C**
- **All 3 Sites fell BELOW Normal Values**
- **Effected by: Erosion, Air Temp., Etc.**
- **Locust has MOST canopy but HIGHEST temp. → Large Surface Area, and Dam**
- **Malbone and Beechwood → About the same!**



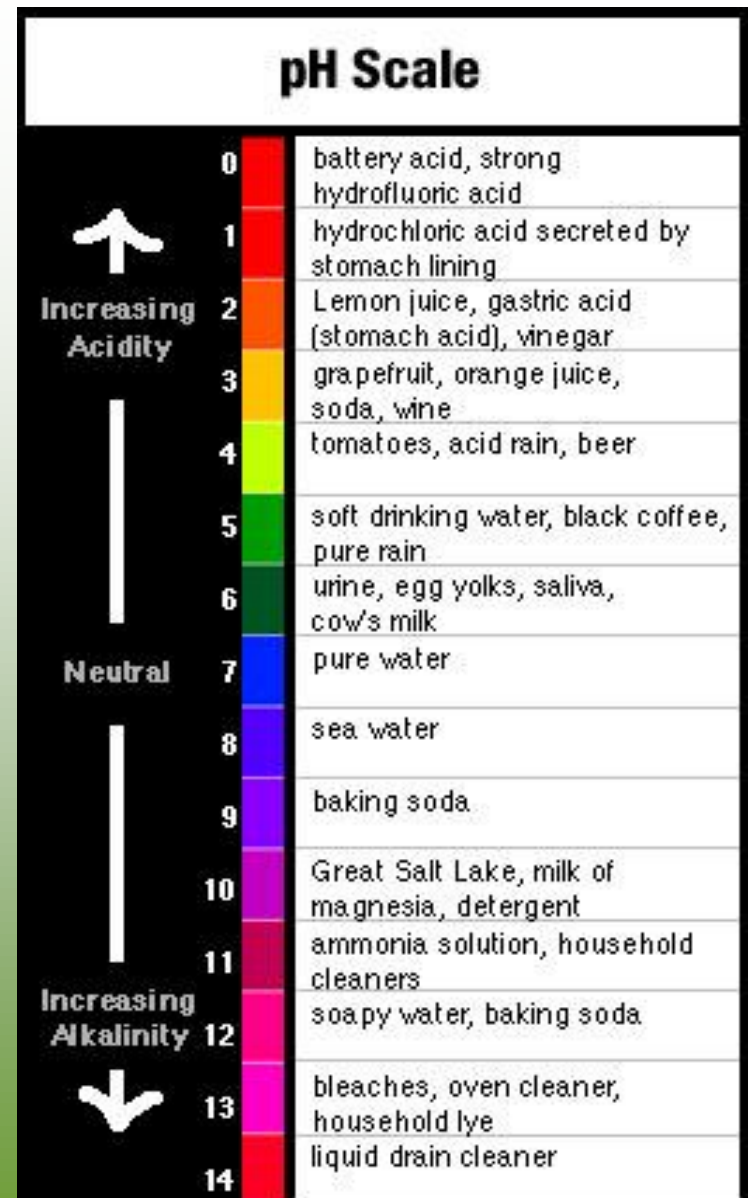


# Temperature Vs. Time, Assonet River, All Sites, April 3-4, 2007

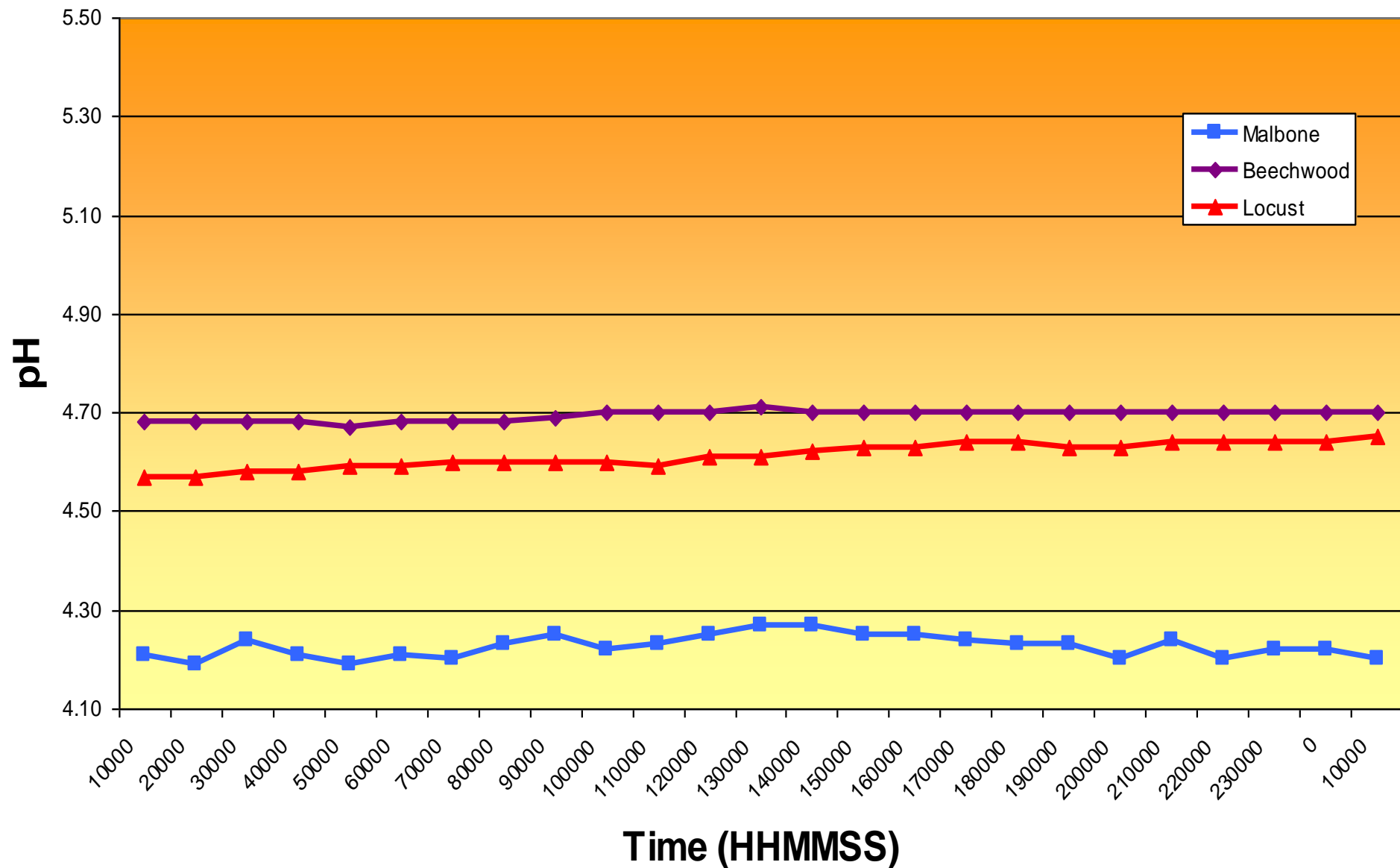


# pH

- **Normal Range: 6.5 to 8.0 mg/L**
- **All 3 sites: BELOW normal range on all sampling dates**
- **In Spring:**
  - **Locust had highest pH with 5.3 mg/L**
  - **Beechwood: 4.7 mg/L**
  - **Malbone: 4.5 mg/L**

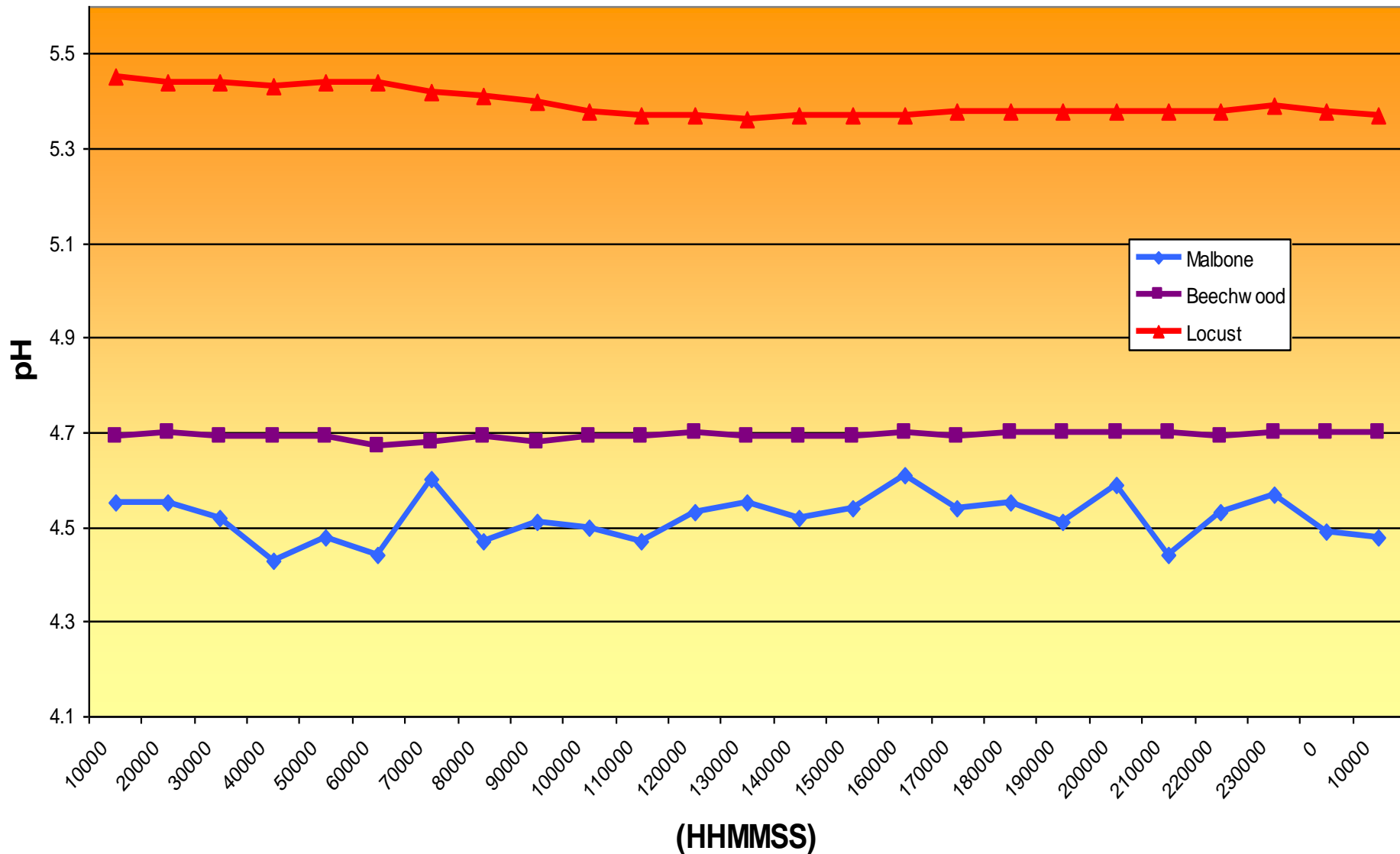


# pH vs Time, Assonet River, All sites, Nov3-4





pH vs. Time, Assonet River, All Sites, April 03, 2007

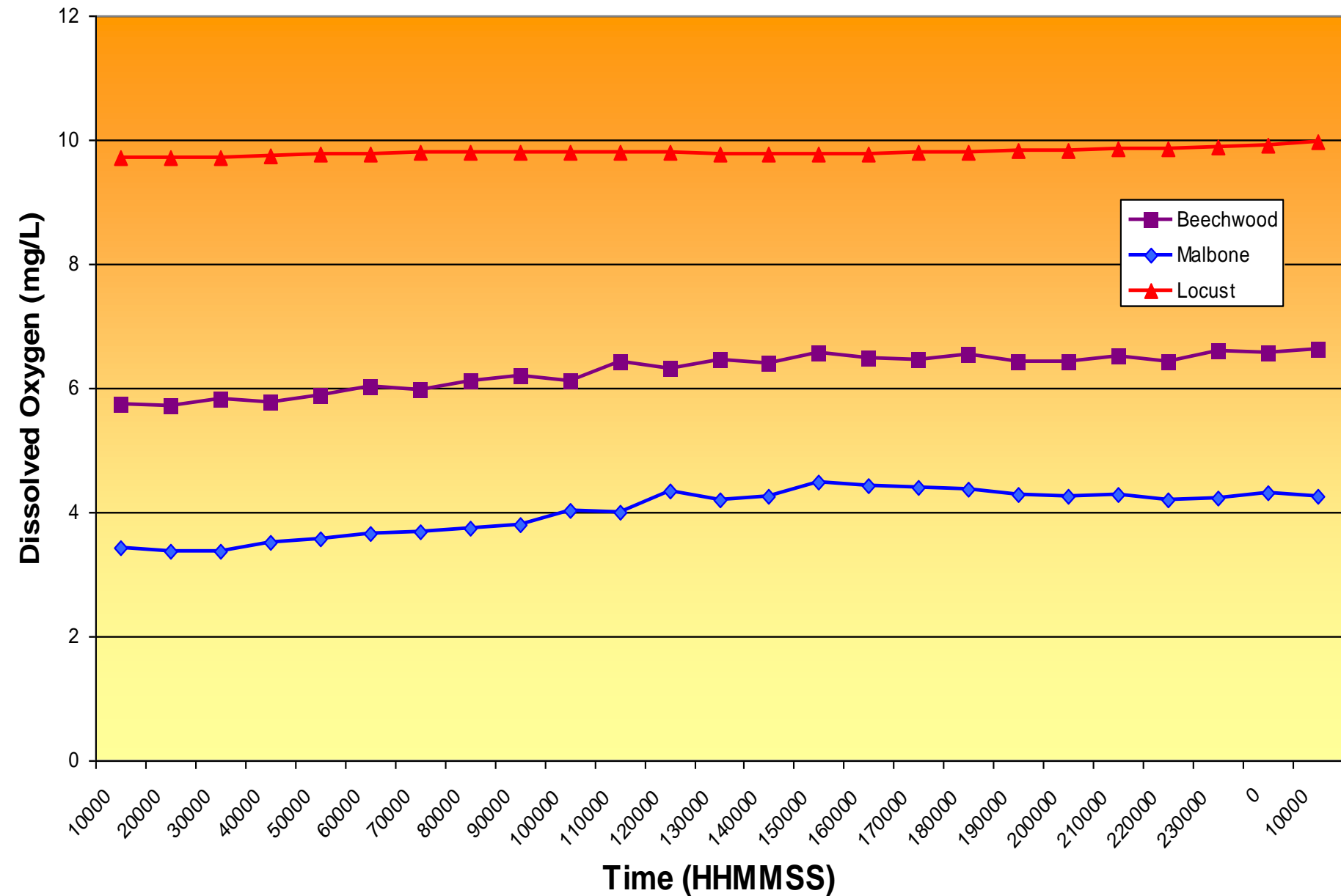


# Dissolved Oxygen

- **Levels Vary due to Diff. Amounts of Aeration**
- **Aeration: Adds Oxygen to water**
- **More TURBULENCE → More DISSOLVED OXYGEN**
- **November 2, 2006 Sampling:**
  - **Malbone: 4mg/L → Drains Wetlands**
  - **Beechwood: Medium with 6 mg/L**
  - **Locust: Highest with 12 mg/L → DAM**



# Dissolved Oxygen vs. time, Assonet river, All Sites, Nov.3-4, 2006

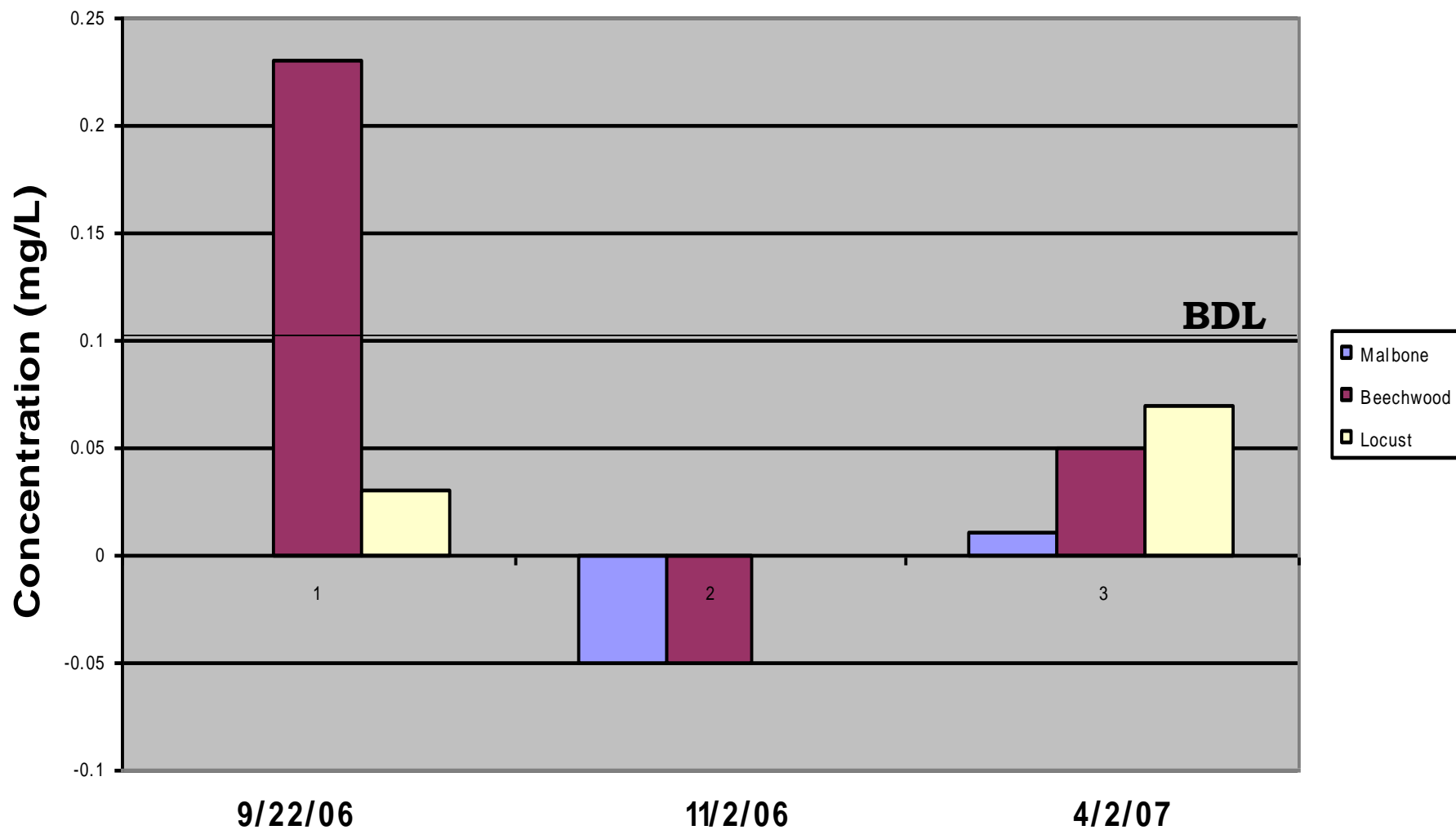




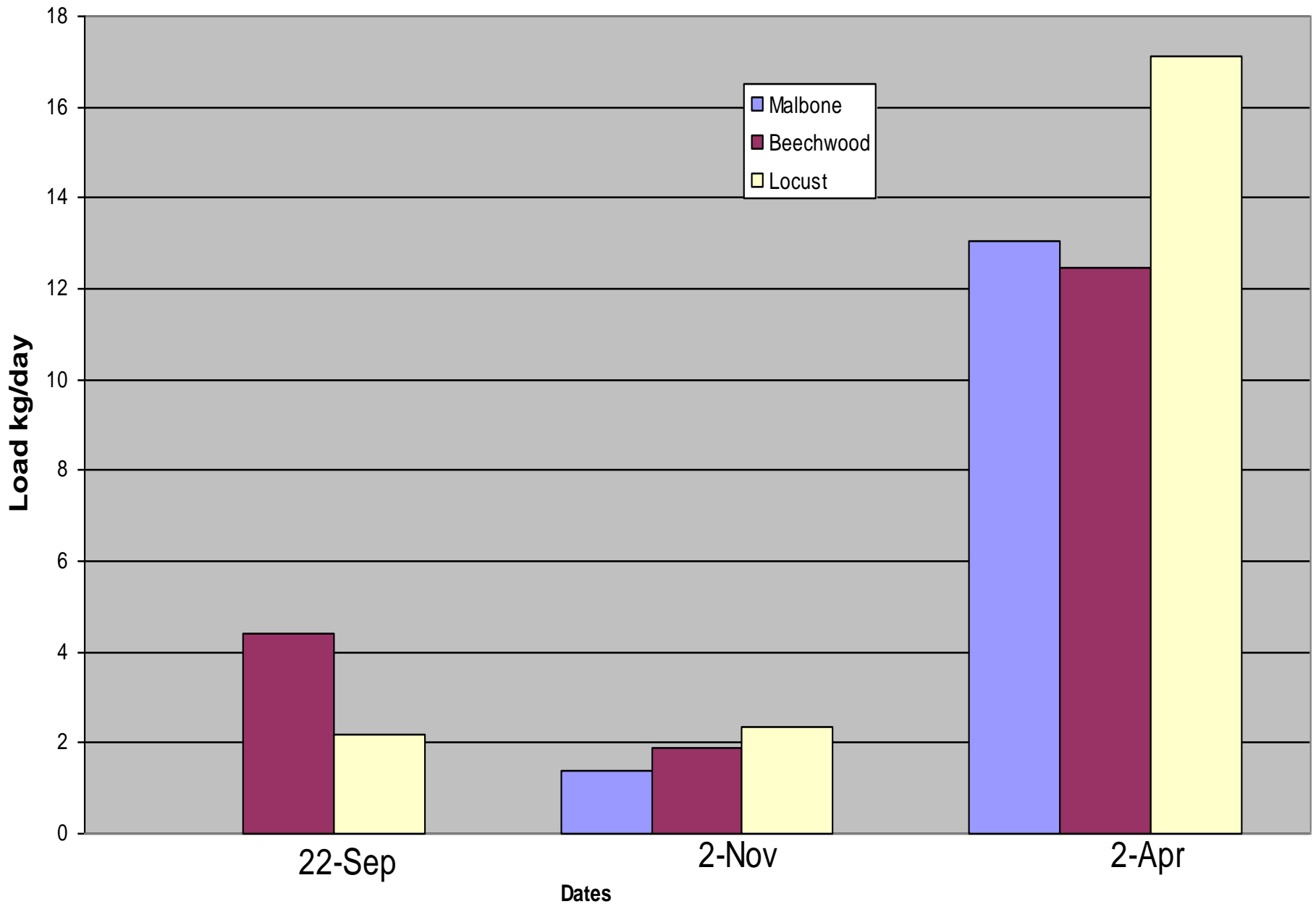
# Nitrates

- **Normal Values: 0.1-2.0 mg/L**
- **All Values are below BDL of 0.1 mg/L, except:**
  - **Beechwood on Sept. 2, 2006**
- **As rainfall INC. → Concentration DEC.**
- **Nutrients are DILUTED**
- **Nitrogen loads at our sites fluctuate according to discharge data.**
- **Since there is high discharge, the load is higher.**
- **Large drop b/w Beechwood and Locust → DUCKWEED**

# Concentration of Nitrogen/Nitrate, Assonet River, All Sites 2006-07



# Nitrogen/Nitrates Load, Assonet River, 2006-07

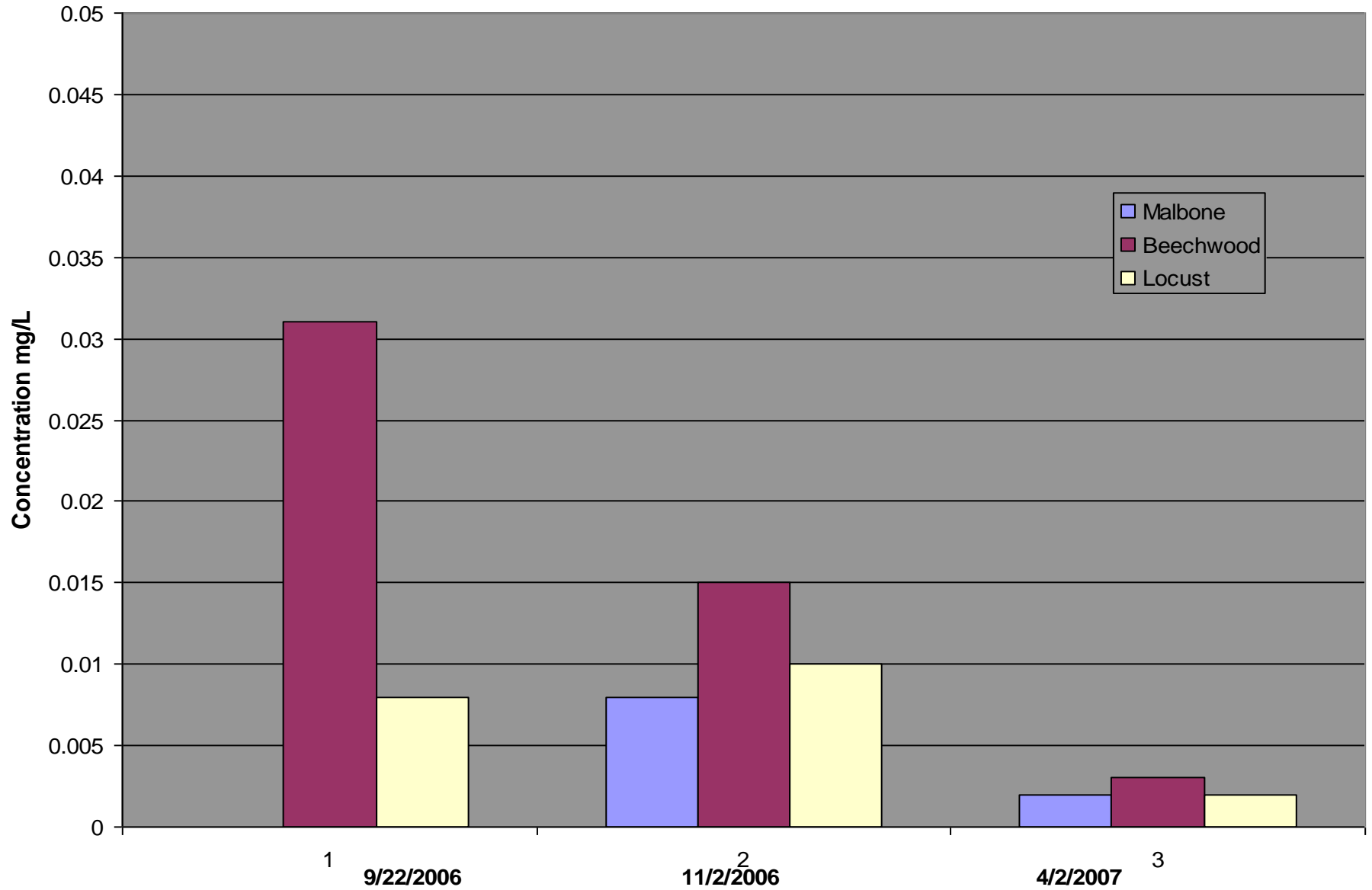




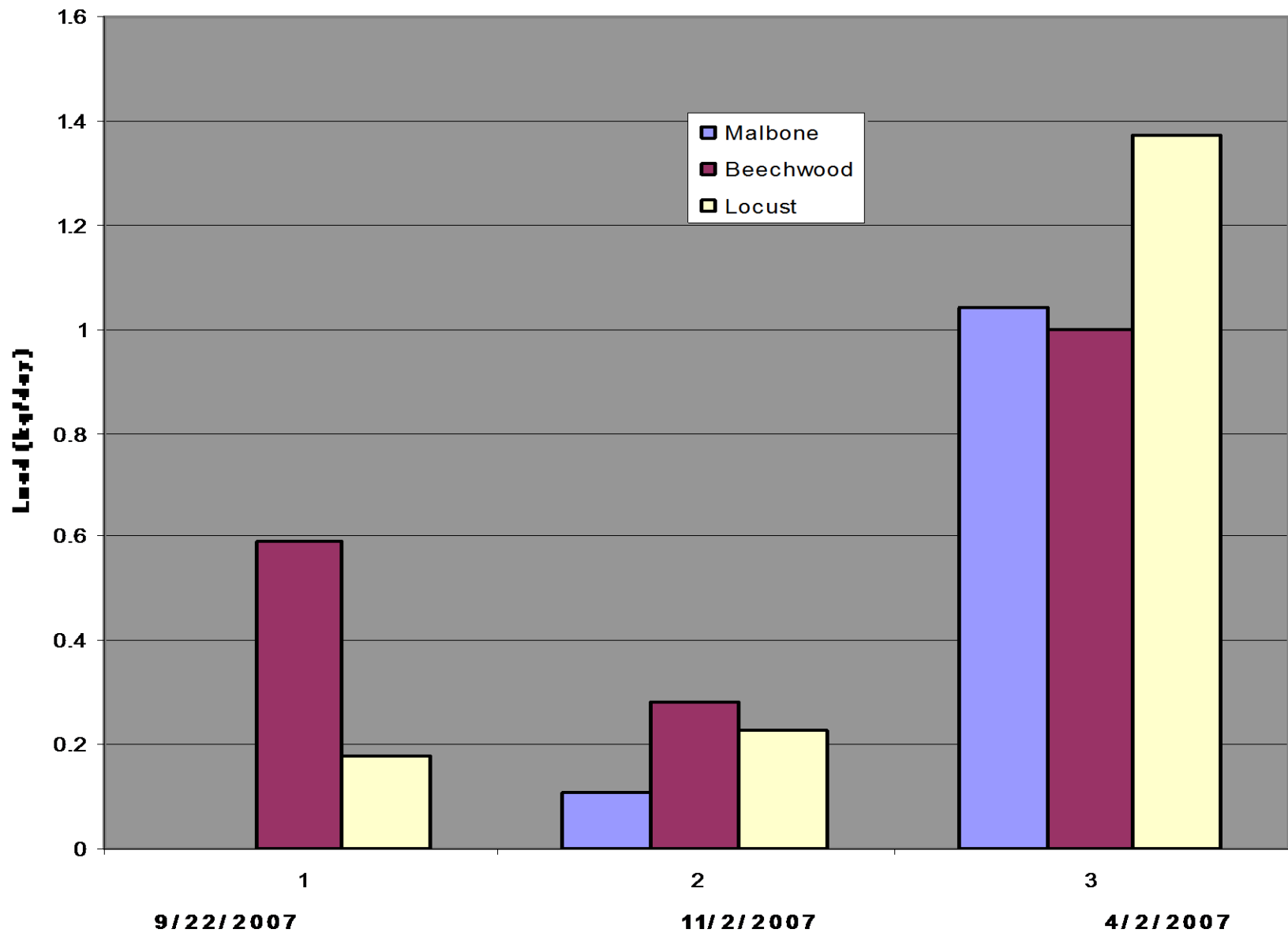
# Reactive Phosphorous

- **Limiting Factor** → Least Available for Plant Growth
- **Essential Nutrient**
- **Normal Values**- 0.01 mg/L to less than 0.05mg/L
- **DUCKWEED** → Large Difference b/w Beechwood and Locust
- On Graph all Values are **BDL of 0.008** except:
  - **Beechwood in Sept. + Nov.**
  - **Locust in Nov.**
- **Phosphorus load followed discharge graph**
- **Duckweed was again using up nutrients b/w sites**

# Concentration for Reactive Phosphorous, Assonet River, 2006



## Load for Reactive Phosphorous, Assonet River, 2006-07



# MACRO INVERTEBRATES

- **Beechwood: 275 organisms**
- **Locust: 696 organisms**
- **Used Hilsenhoff method to determine Family Biotic Index**
- **Hilsenhoff Max10**
- **LARGE # of Hydropsychidae**  
→ **Intolerant organisms**
- **FBI: Beechwood 4.73 GOOD**
- **FBI: Locust: 4.44 Good**



# CONCLUSION

- **Water Quality → GOOD**
- **Load Varied b/w sites → Based on discharge**
- **Nitrogen and Phosphorus was very good in relation to amount of water!**
- **Amount of Macros → Allowed for Maximum Survival**



# Pictures

