Optimal Slot-Width Selection for Wedge Wire Screens

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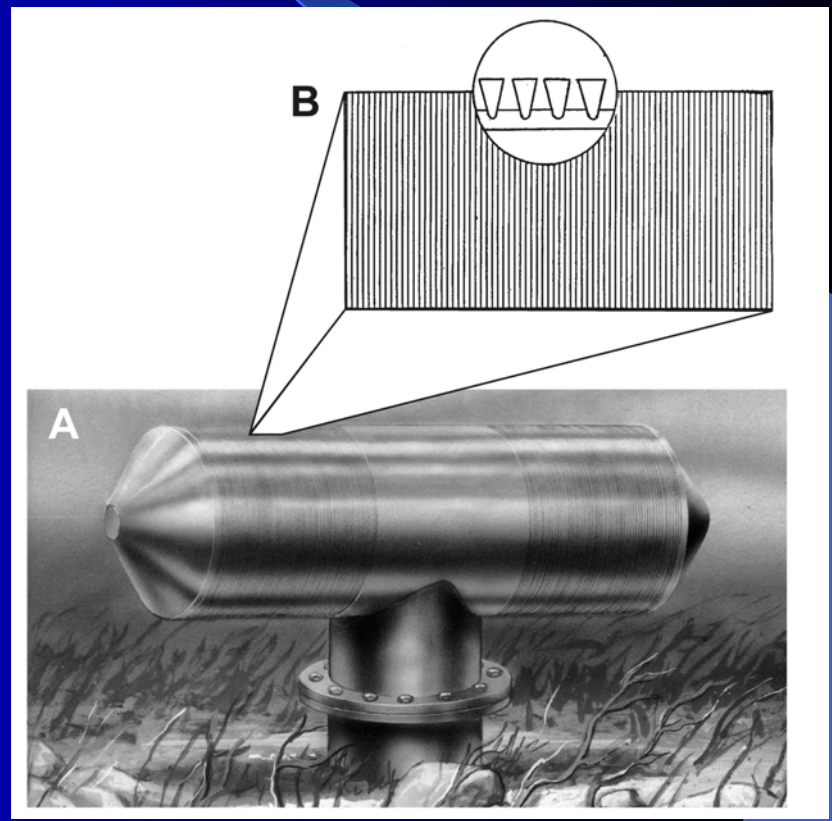
Factors Affecting Screen Performance

- Slot width
- Through-slot velocity
- Sweep velocity



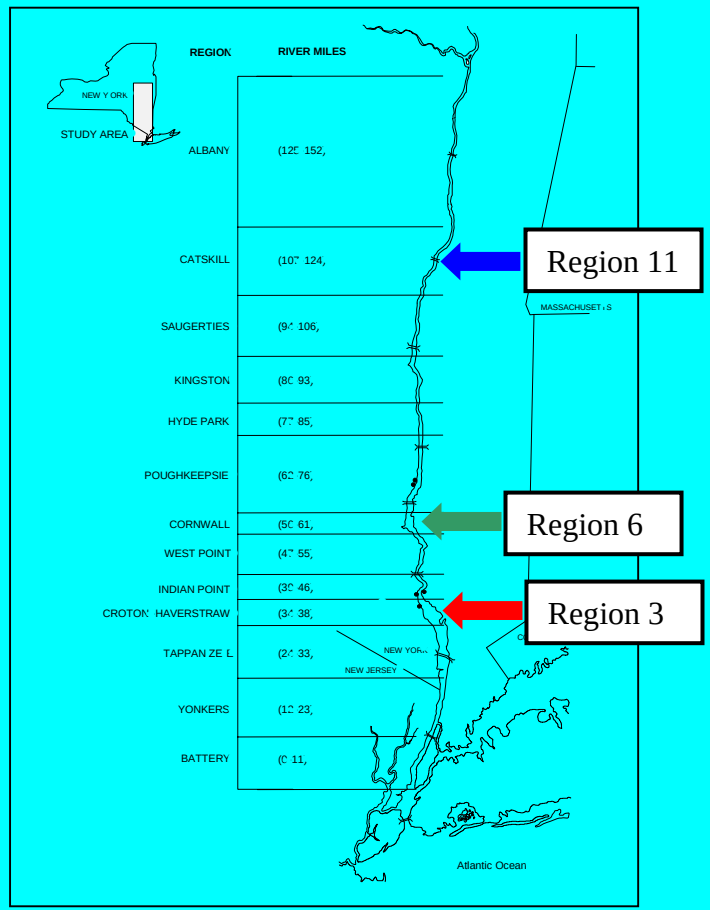
Purpose of Study

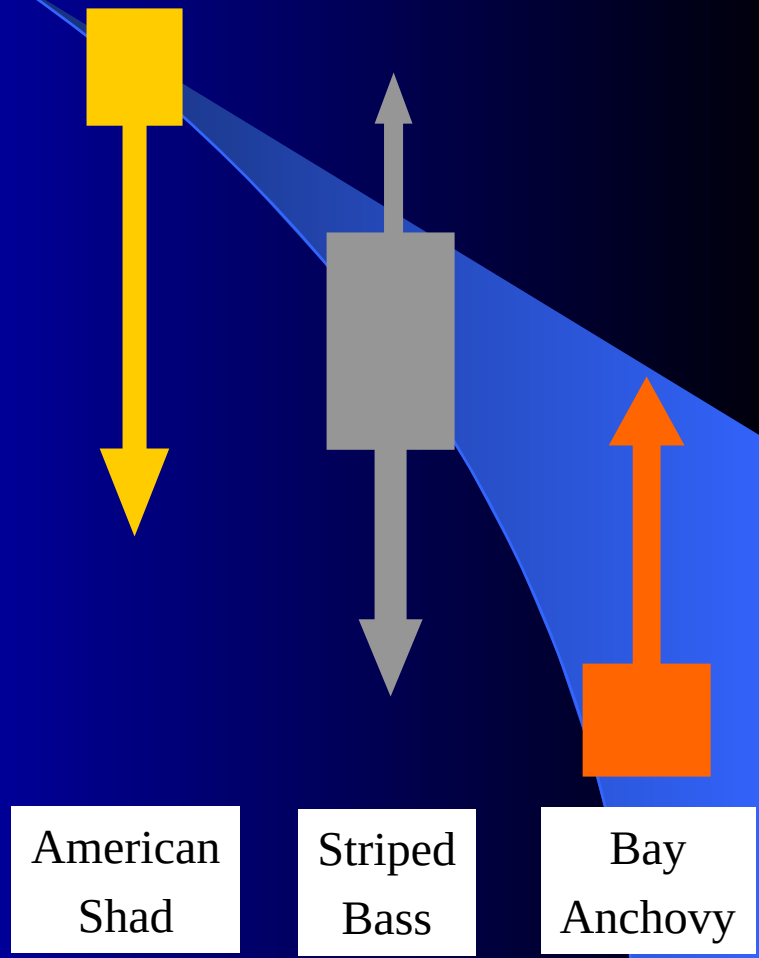
- To evaluate effects of slot width on screen performance at three hypothetical power plan locations on Hudson River estuary
- Address different response across three species:
  - American shad
  - Striped bass
  - Bay anchovy
- Performance measured in terms of equivalent Age 1 individuals

Hypothetical Plant

- 500 MGD cooling water requirement
- Base loaded
- Offshore intake with 0.5 mm, 1.0 mm, 2.0 mm, or 3.0 mm slot width wedge wire screens
- 0.25 fps through-slot velocity
- Three potential locations
  - Mesohaline
  - Lower Tidal Freshwater
  - Upper Tidal Freshwater

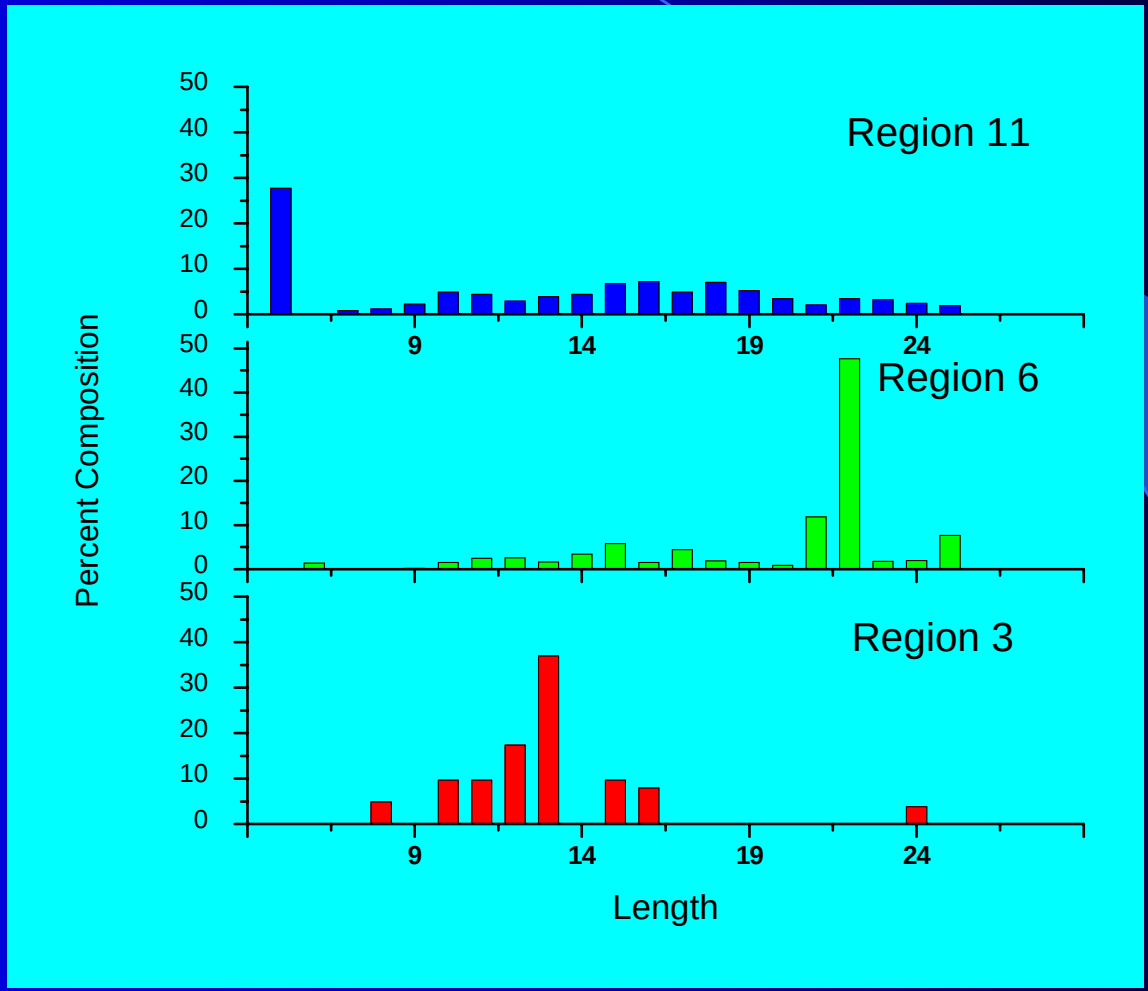
Hudson River Estuary



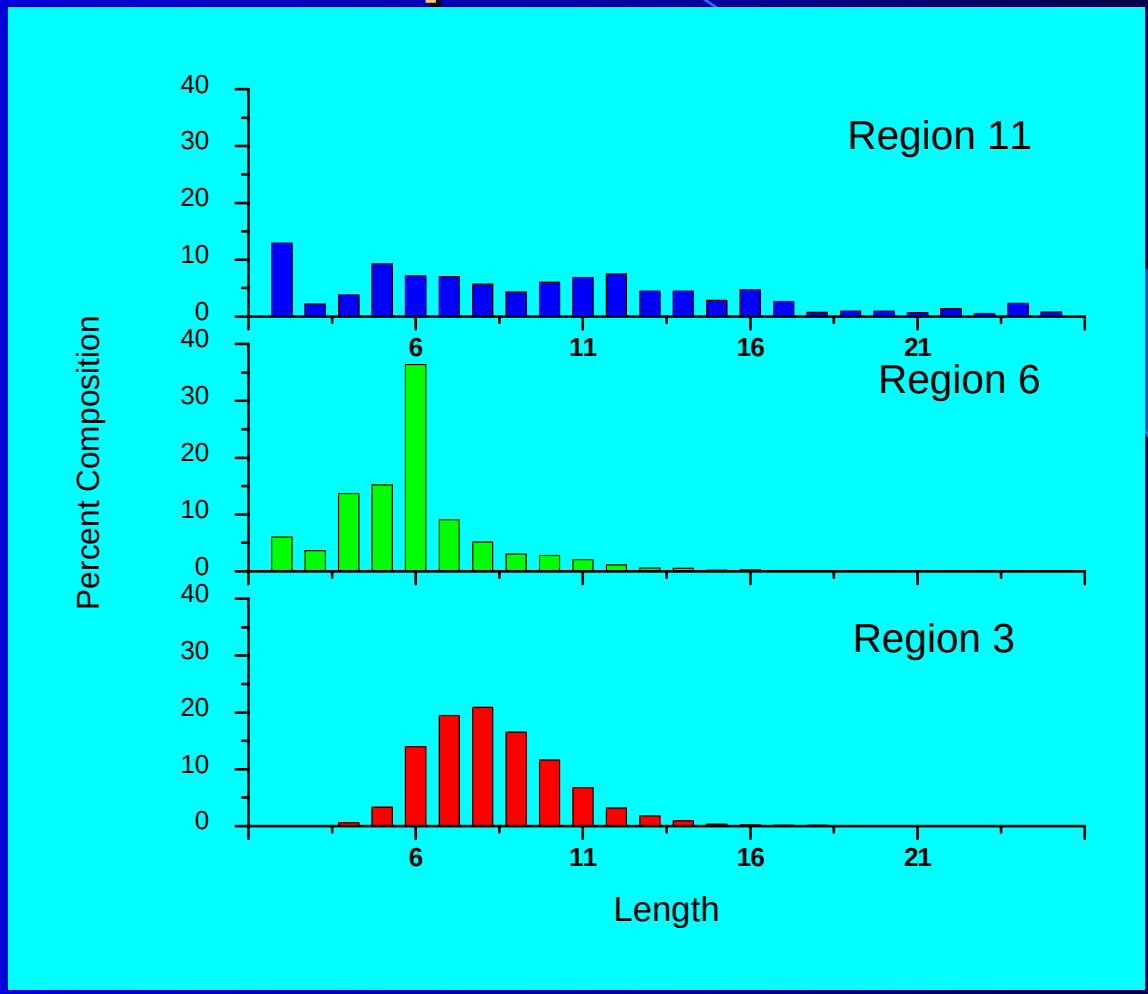


ASA analysis & communication

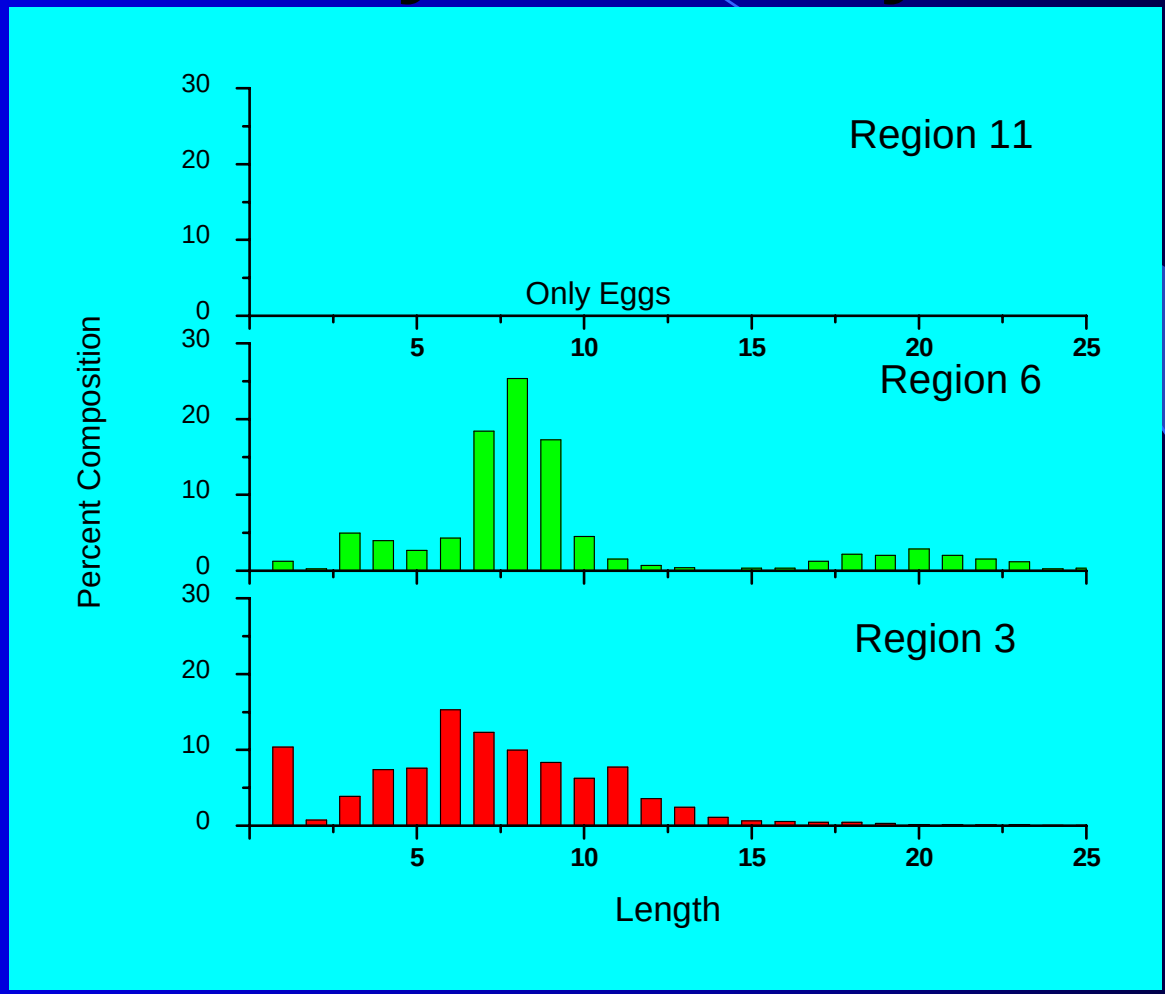
Length Distribution American Shad



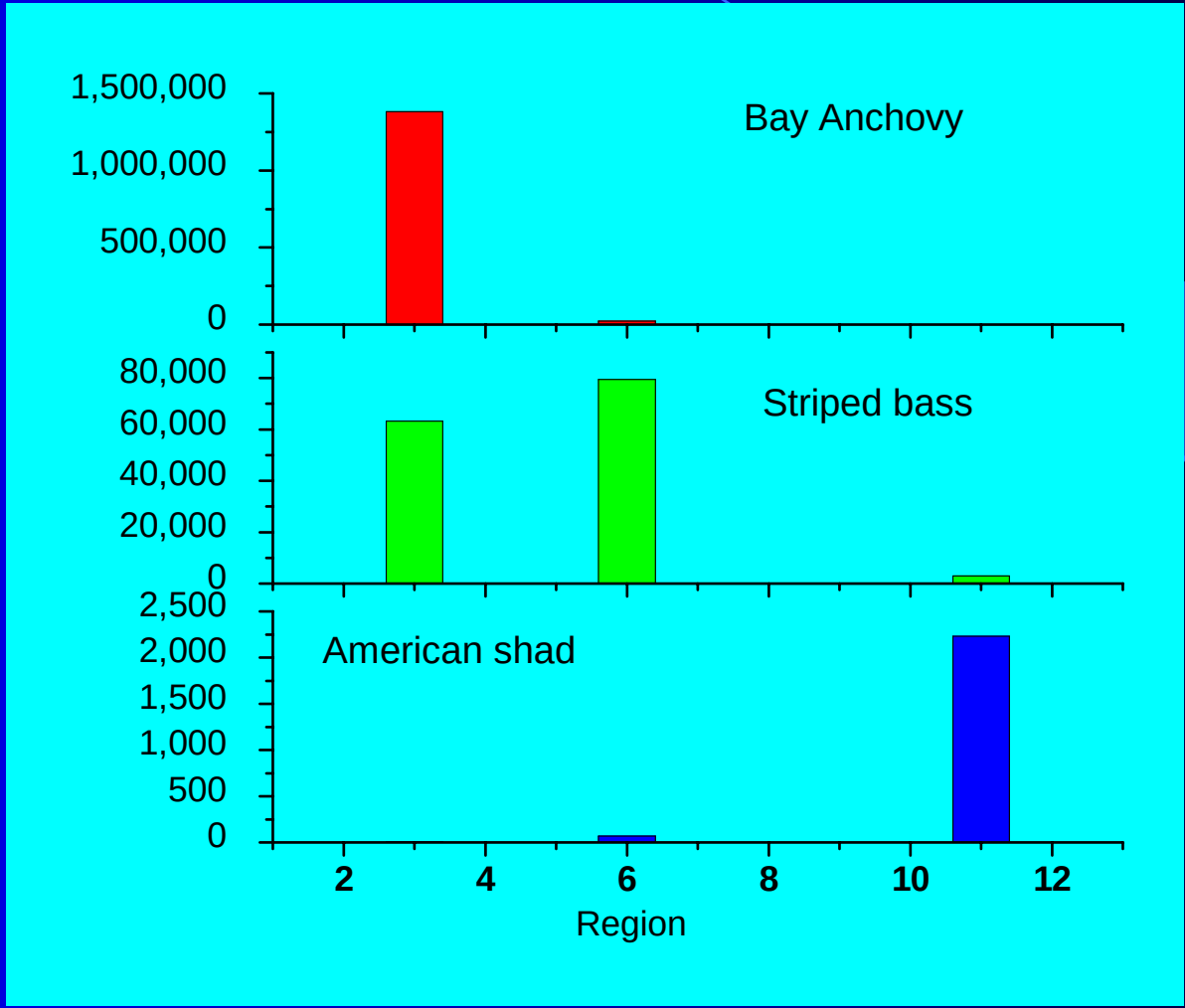
Length Distribution Striped Bass



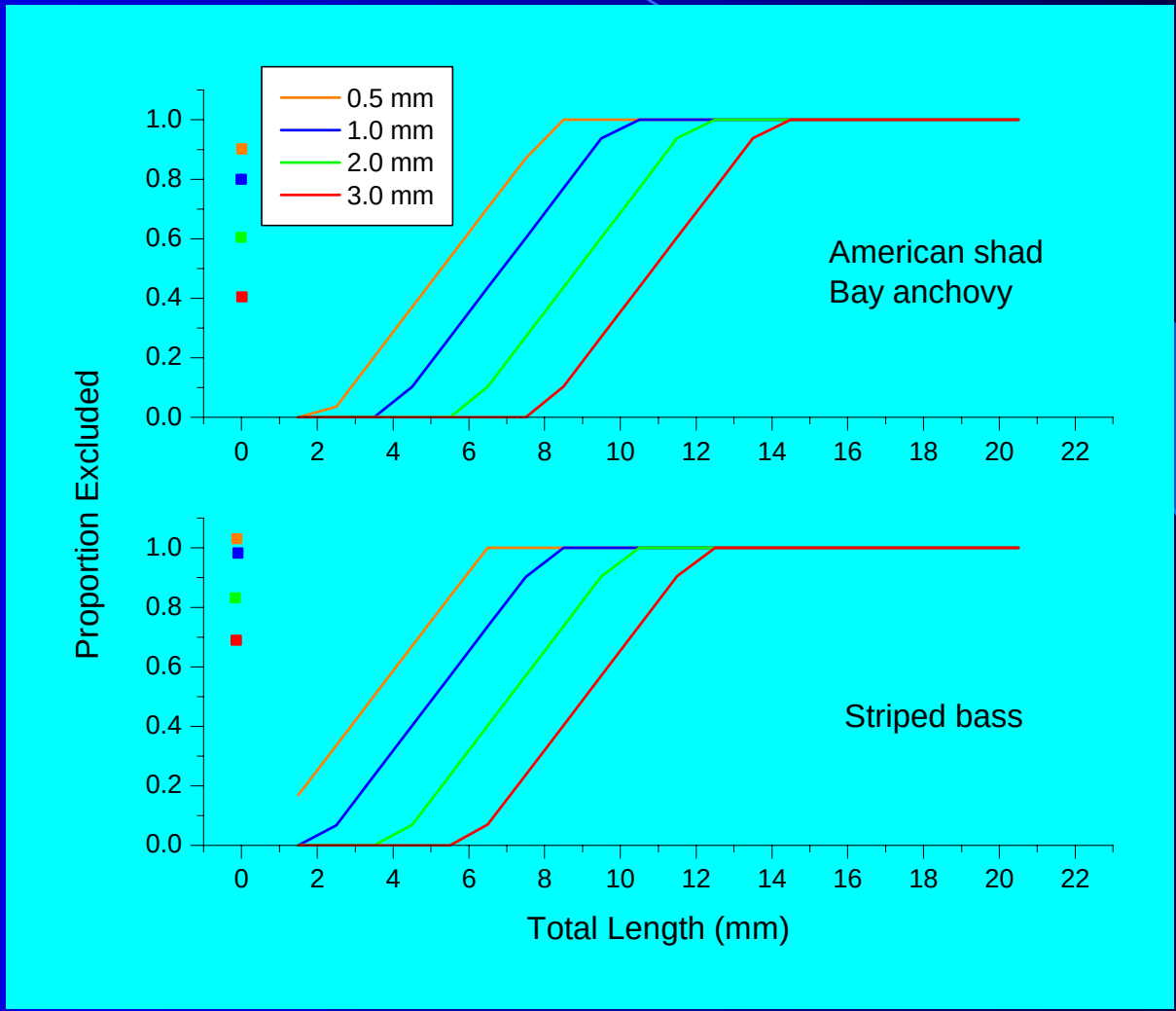
Length Distribution Bay Anchovy



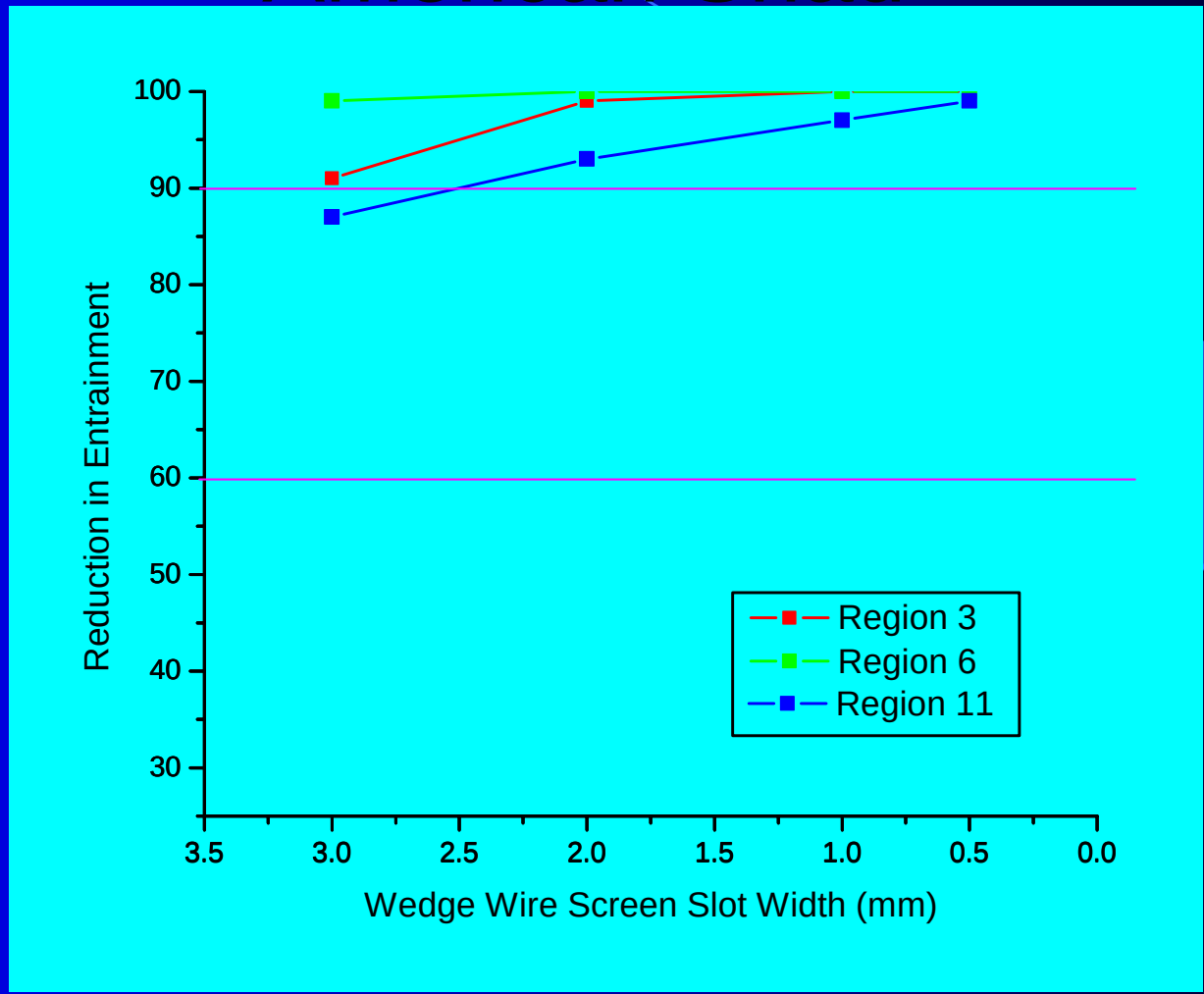
Equivalent Age 1 Base Case



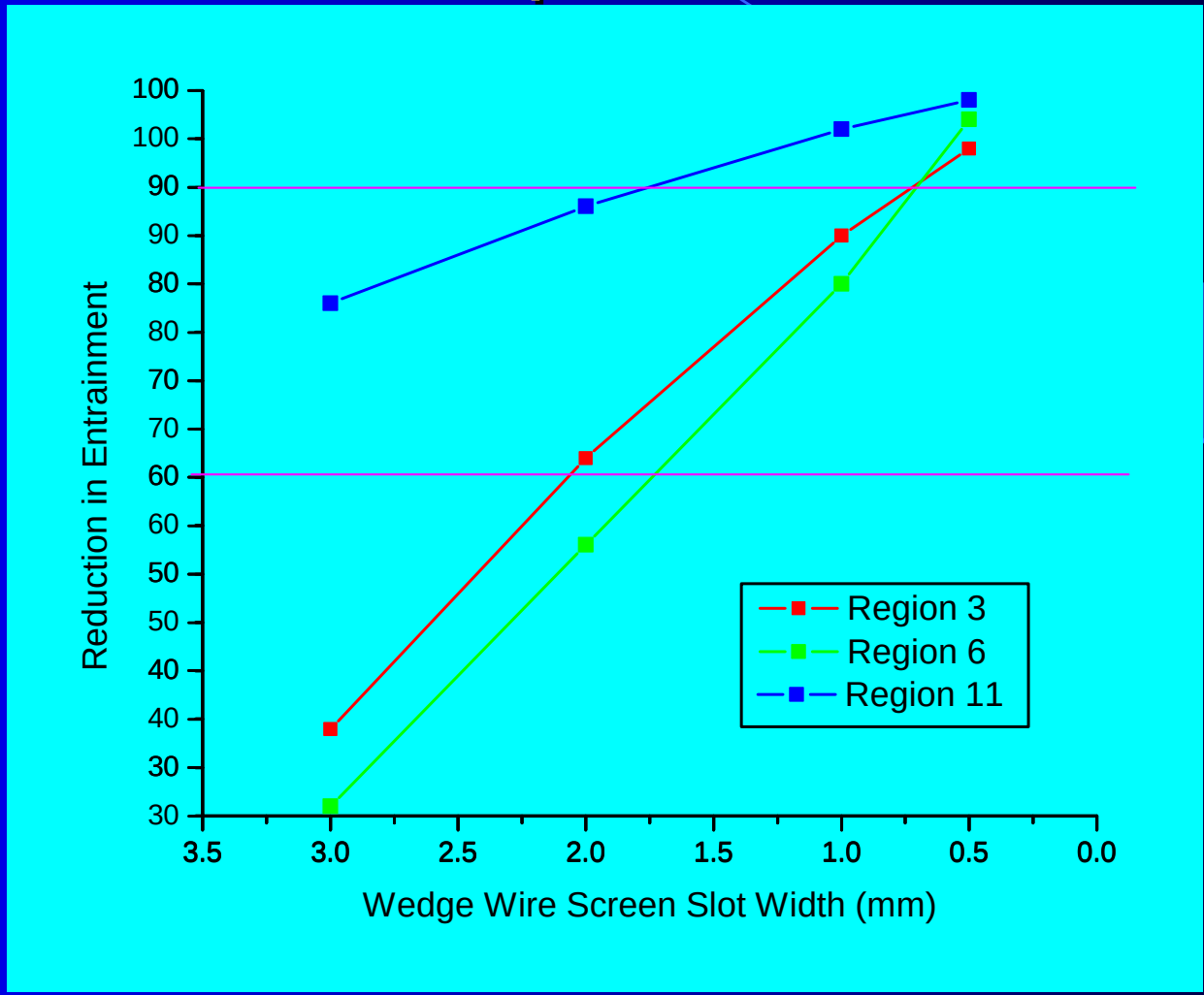
Assumed Screen Exclusion Rates



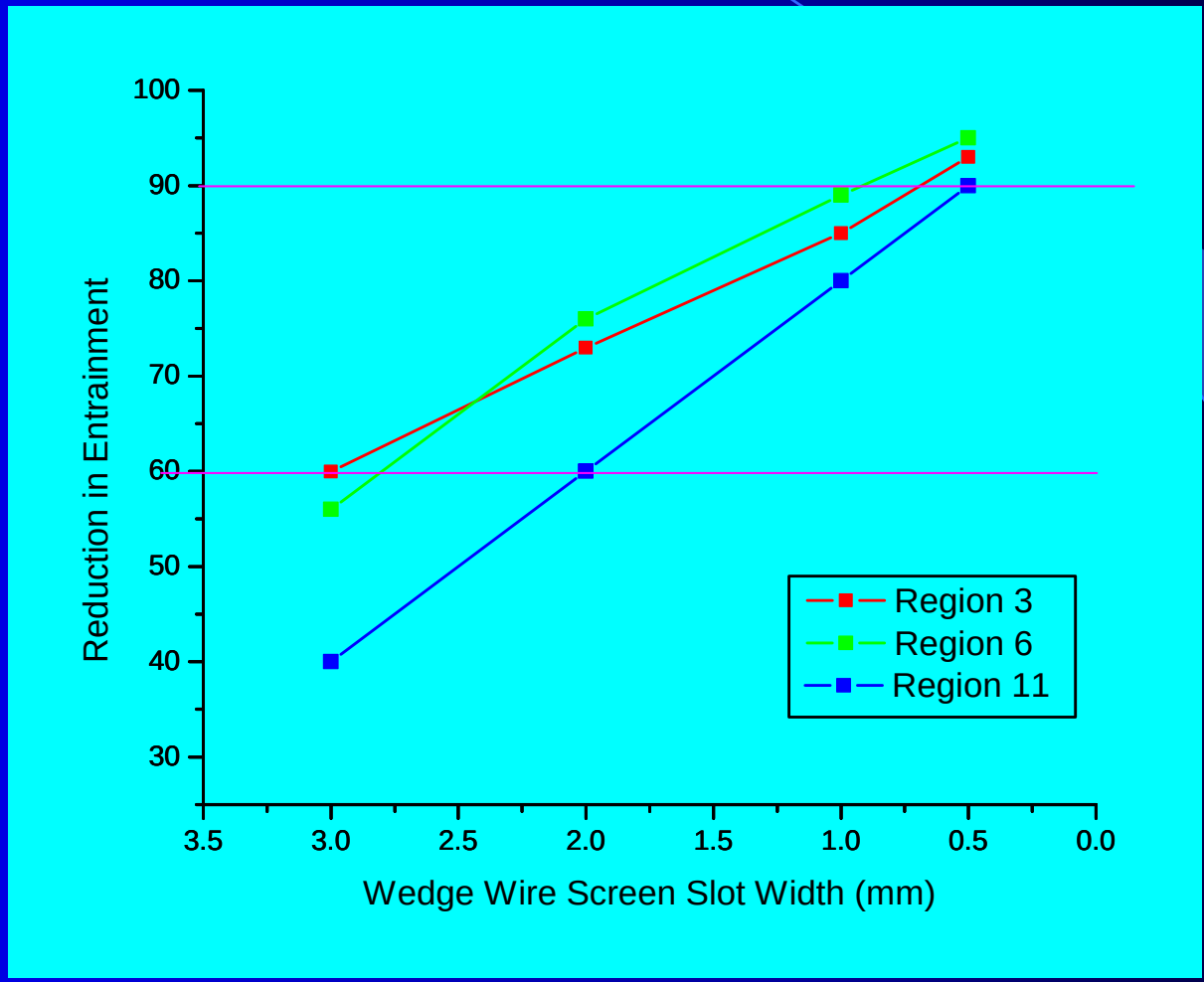
Entrainment Reductions American Shad



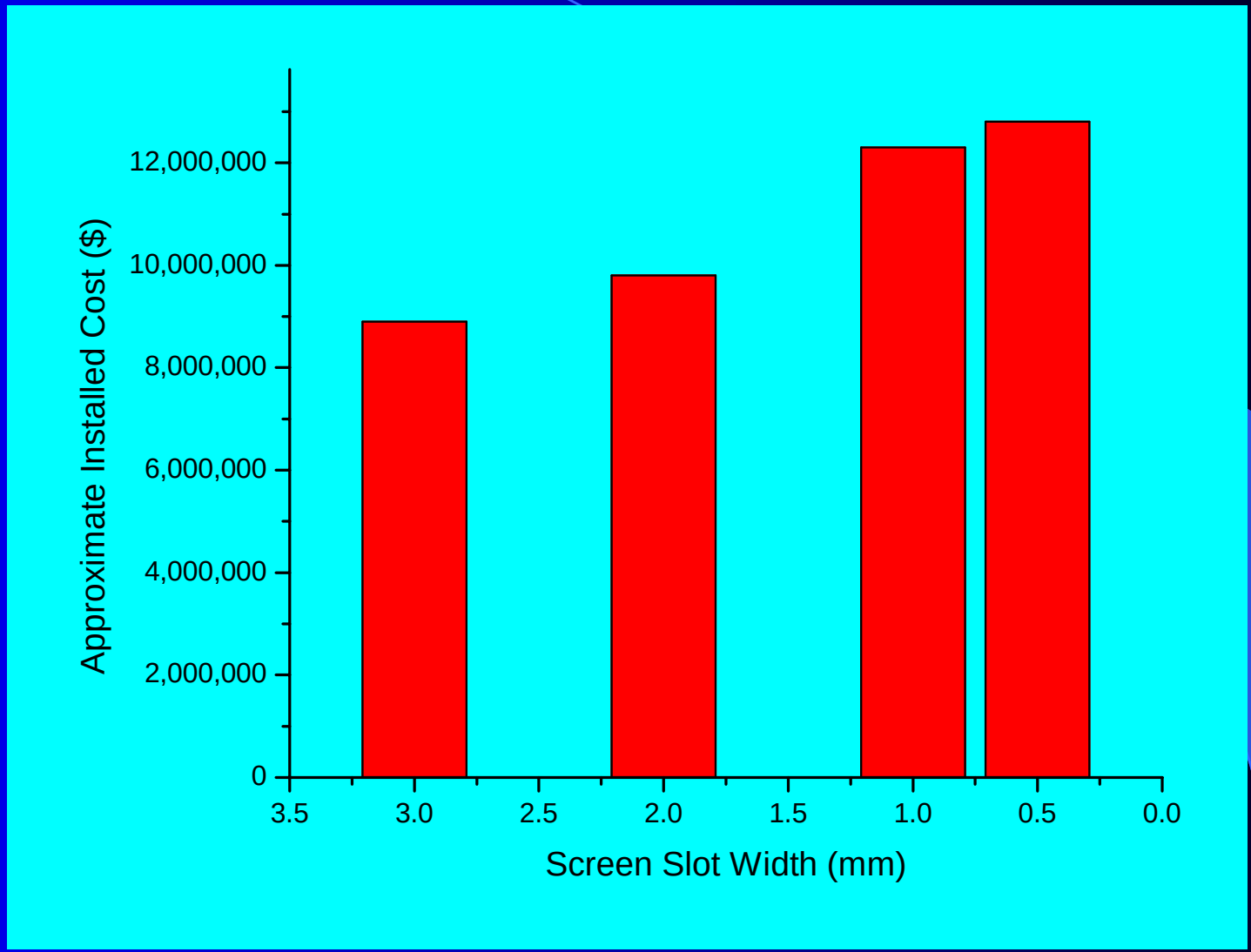
Entrainment Reductions Striped Bass



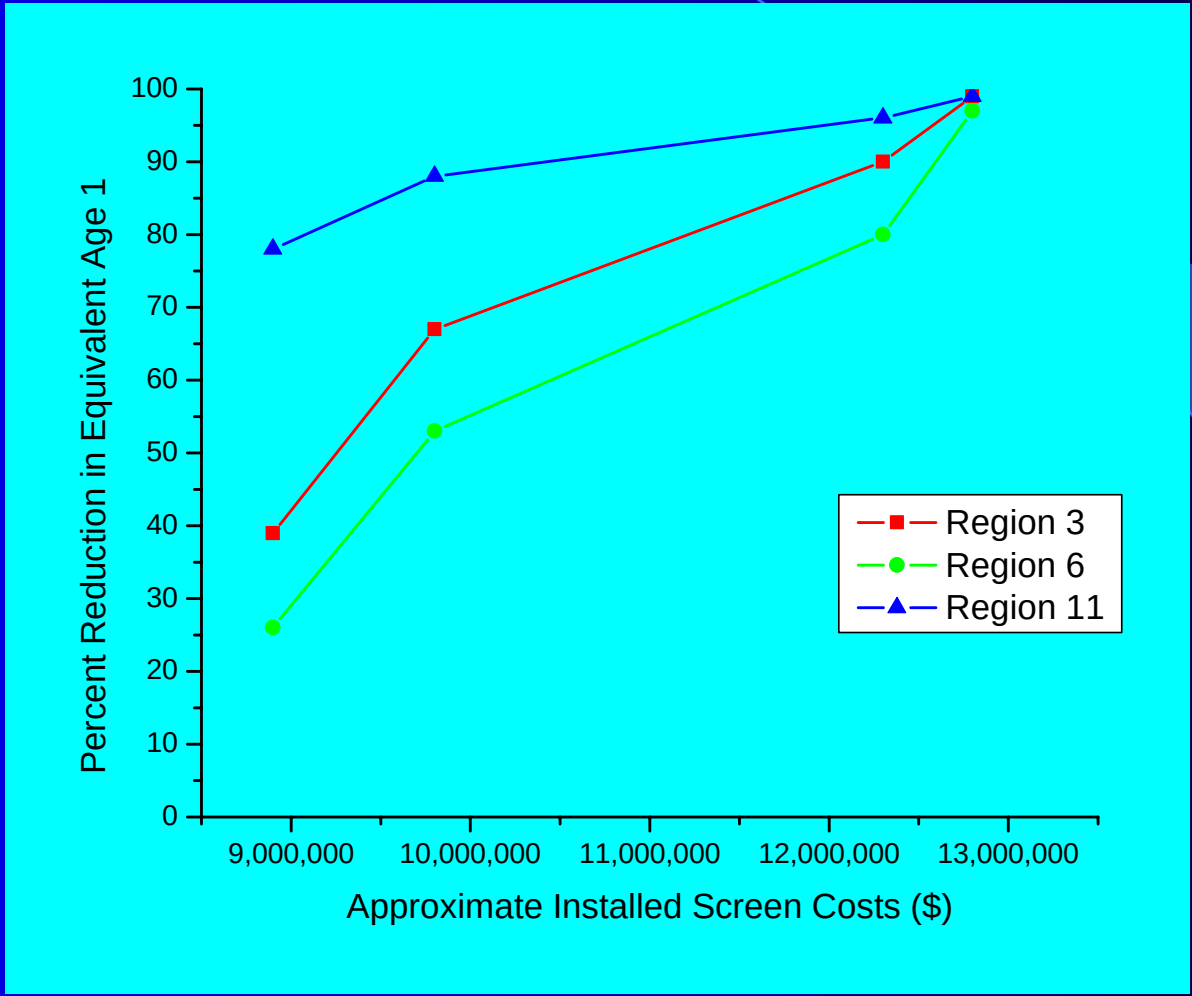
Entrainment Reductions Bay Anchovy



Screen Installation Costs



Example Cost-Benefit Curve



Conclusions

- Wedge wire screens appear to be highly effective in reducing entrainment losses
- Site-specific length information is required for optimal slot-width selection
- For American shad, 3 mm screens provide a high degree of protection
- For striped bass and bay anchovy, 2 mm screens provide significant protection.