LIVING SHORELINES

WHAT WORKS, WHERE
&
WHY

GEORGE BANGS
STOKES ENVIRONMENTAL ASSOCIATES, LTD.
LIVING SHORELINES

• FACTORS THAT AFFECT DESIGNS
  • WHAT IS THE EXISTING SHORELINE CONDITION?
  • WHAT IS THE SOURCE OF EROSION?
  • WHAT IS THE REASON FOR WORK?
  • WHAT MATERIALS ARE APPROPRIATE FOR THE SITE?
  • IS THERE HISTORY THAT MAY BE USEFUL?
EXISTING SHORELINE CONDITIONS

• HOW STEEP IS THE BANK?

• IS or WAS THERE A BULKHEAD or RIP RAP?

• HOW MUCH ROOM IS THERE TO WORK WITH?

• CAN IT ALL BE DONE LANDWARD or IS GOING SEAWARD NECESSARY?
SOURCES OF EROSION

• WIND DRIVEN WAVES

• BOAT WAKES

• COASTAL SUBSIDENCE and SEA LEVEL RISE

• DISCRETE STORM EVENT THAT REQUIRES ACTION

• A COMBINATION OF ANY or ALL OF THE ABOVE
REASON FOR WORK

- ERODING BANK
- FAILED or FAILING BULKHEAD
- DESIRE TO ARREST LOSS OF YARD
- DESIRE TO RESTORE LOST SALT MARSH
- VIOLATION
MATERIALS TO STABILIZE THE TOE

• COIR LOGS

• RIP RAP TOE STABILIZATION

• SAND FILL BEHIND TOE STABILIZATION

• GRADING THE BANK (6:1 IS IDEAL, BUT 3:1 MAY WORK)

• DEFINING THE LANDWARD LIMIT
HISTORY THAT MAY BE USEFUL

• AERIAL PHOTOGRAPHS SHOWING FORMER SALT MARSH

• GROUND LEVEL PHOTOGRAPHS SHOWING SALT MARSH

• SURVEY SHOWING HISTORIC EDGE OF WATER
NORFOLK HARBOR EXPOSED SHORE
FLEET PARKING LOT UPGRADE 2008
INITIAL SHORELINE GRADING
INDUSTRIAL SHORE
2010 BUILDING THE LIVING SHORELINE
INITIAL PLANTING
SUMMER 2012
NORTHEASTER FALL 2012, THE ACID TEST
NOR THEASTER FALL 2012, THE ACID TEST
MOST PERFORMED WELL
THE REPAIR SPRING 2013
A FUNCTIONING LIVING SHORELINE
RELATIVELY HIGH ENERGY SHORE
INITIAL CONDITIONS
THE PLAN

A - A
Fill behind to mean high water to account for settling, and plant with smooth cordgrass (*Spartina alterniflora*) on 12 inch centers.

B - B
Fill behind to mean high water to account for settling, and plant with smooth cordgrass (*Spartina alterniflora*) on 12 inch centers.
HIGH MARSH RESTORATION
LOW BULKHEAD BEING OVER TOPPED
SHORELINE WAS A MESS
DEFINE THE OUTER EDGE
PLANT NURSERY SPECIES
SHORELINE WAS A MESS
DEFINE THE OUTER EDGE
FALL 2015
PLANT NURSERY SPECIES
LAFAYETTE RIVER
LOST SHORELINE
BY 2006 LOST 1.5 ACRES SALT MARSH
BUILT MARSH TOE RIP RAP & FILLED
CITY OF NORFOLK PROJECT
BRANCH OF KING CREEK, EASTERN BRANCH
ELIZABETH RIVER
COIR LOGS, SAND FILL & PLANT