



Ecobeach 2007 - 2010

Volume changes since 2007

Areas considered

- Egmond
 - Test
 - Reference
 - Heemskerk
-
- Deltares horizontal boxes
 - Deltares data (graphs of Laura Vonhogen)

Parameters considered

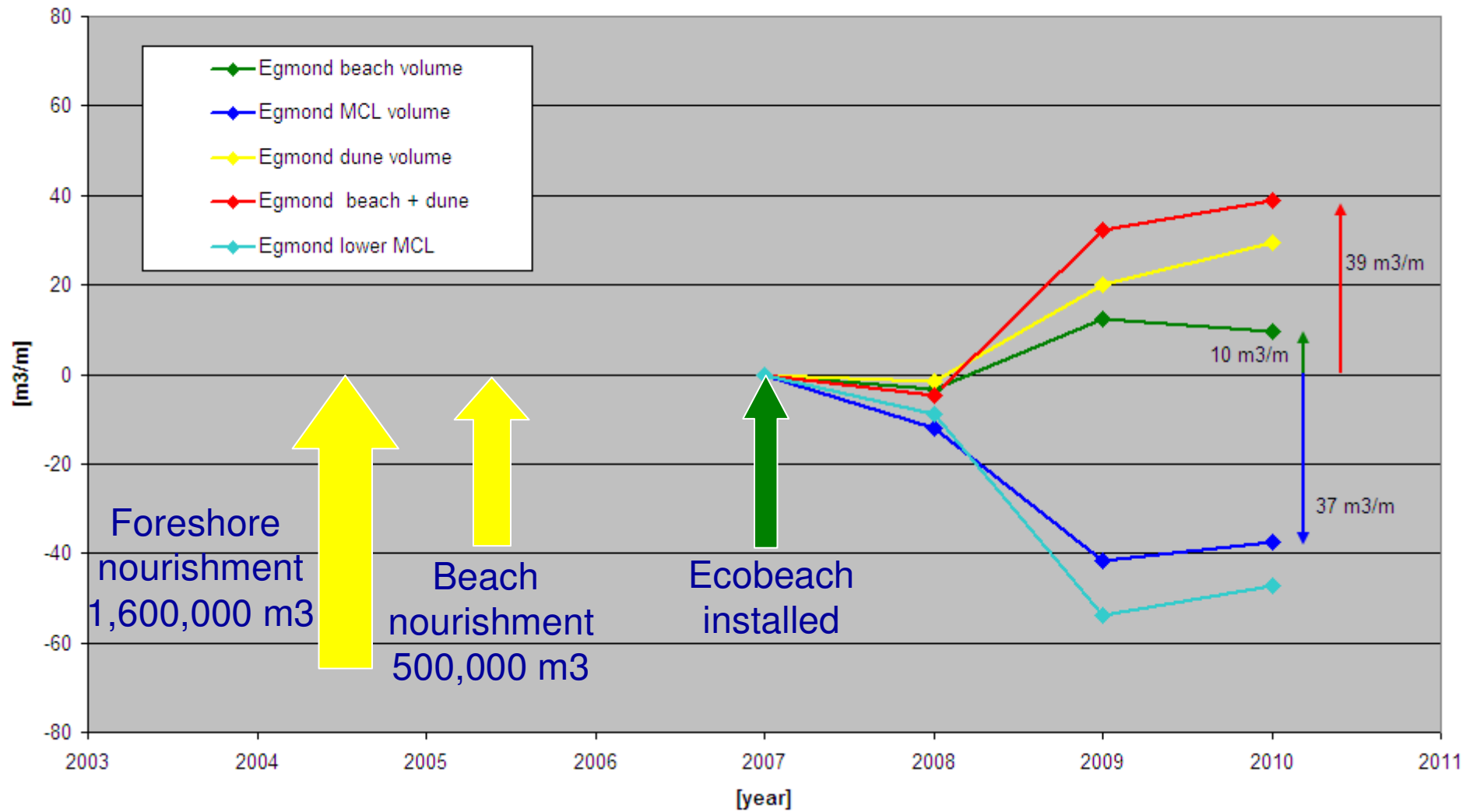
- Beach volume (+3 to -0.78)
 - Dune volume (above +3)
 - Lower MCL volume (-0.78 to -4.56)
 - MCL volume (+3 to -4.56)
-
- Volumes based on JARKUS
 - Data from 2007 to 2010

Sequence of areas

- The following slides show variation in volumes for the areas in sequence from north to south.
- There is a clear difference in behaviour between Test and Reference area
- There is also a clear difference between Reference and Heemskerk area

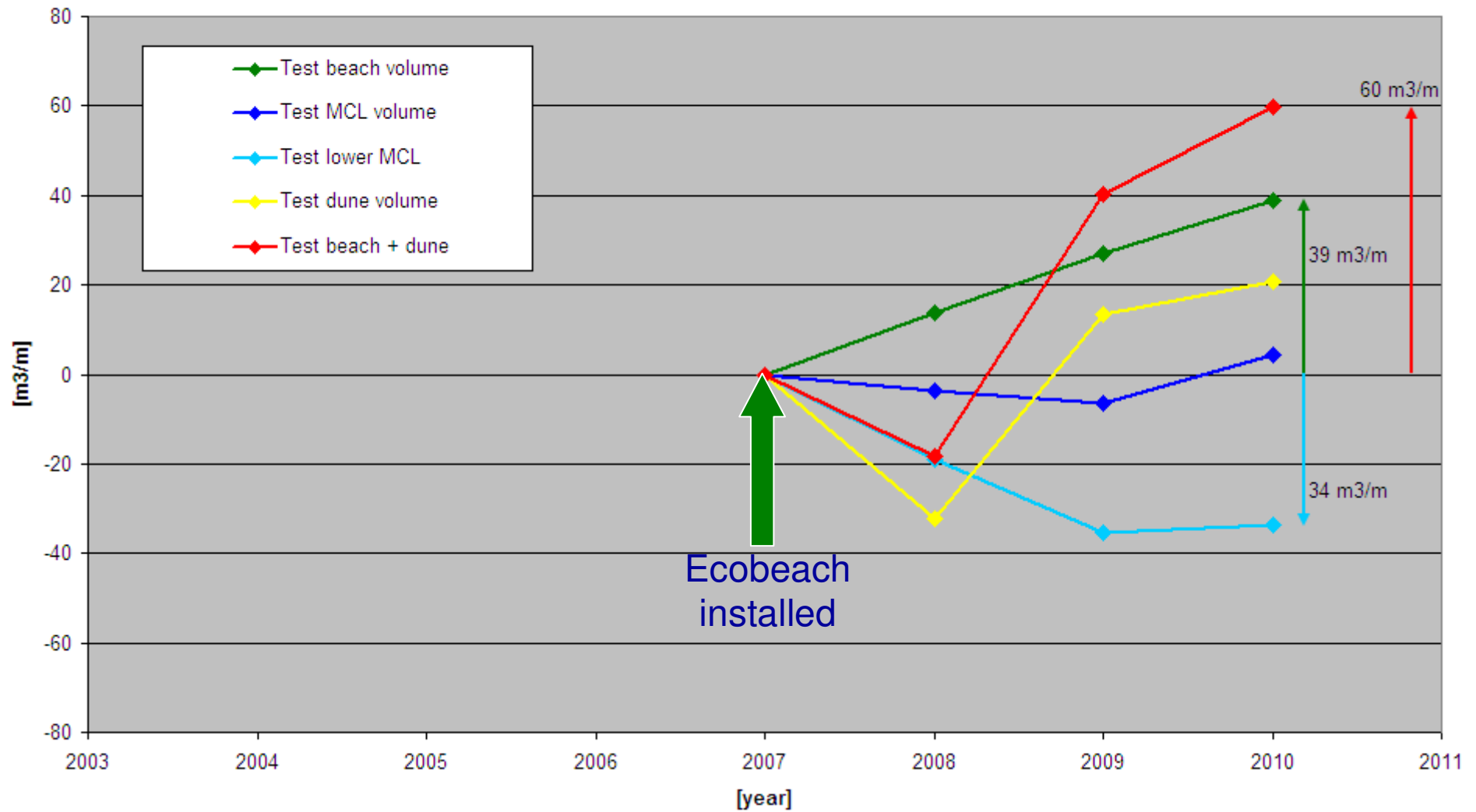
Egmond area (includes northern test area)

Egmond area: relation between referenced beach volume and MCL



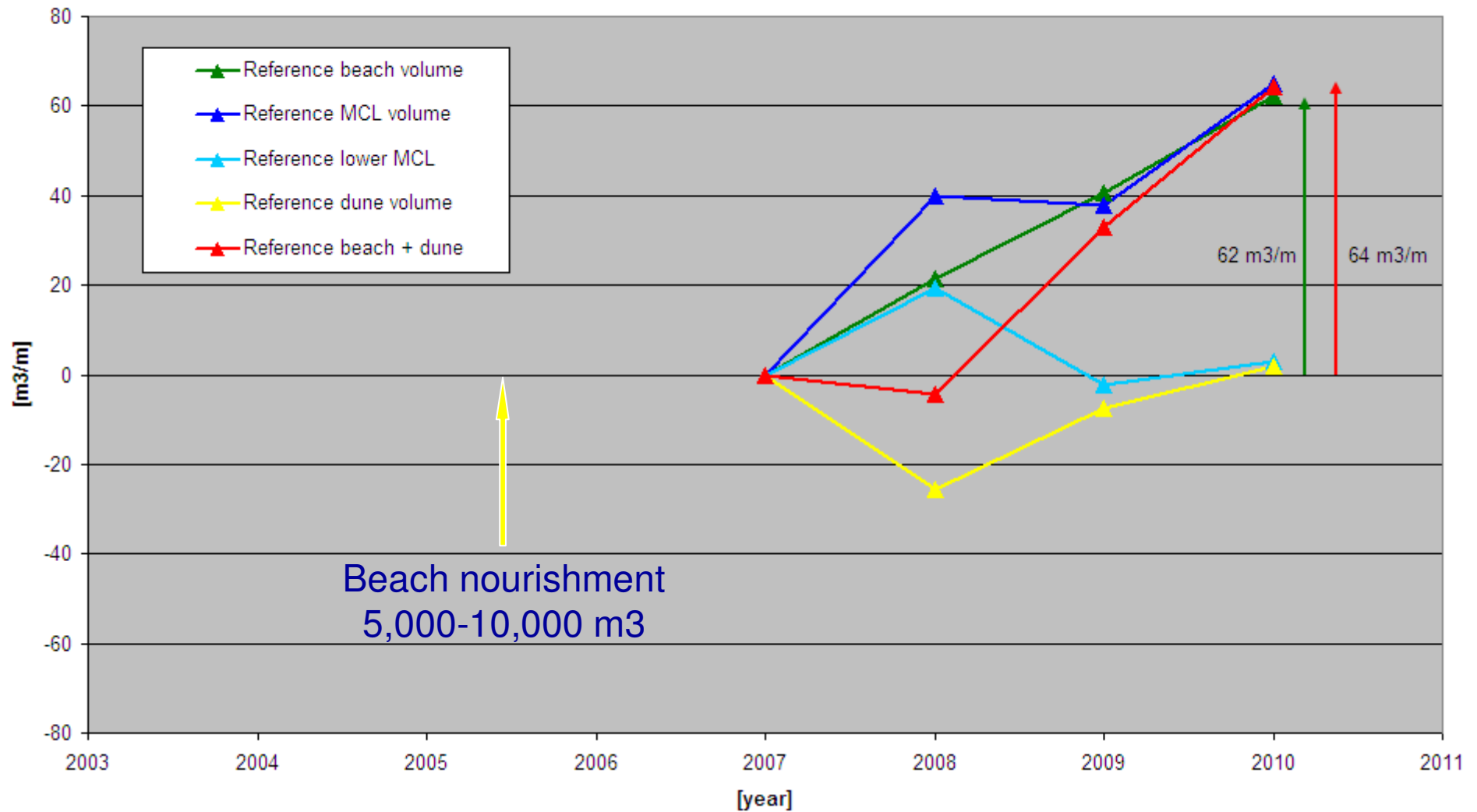
Test area

Test area: relation between referenced beach volume and MCL



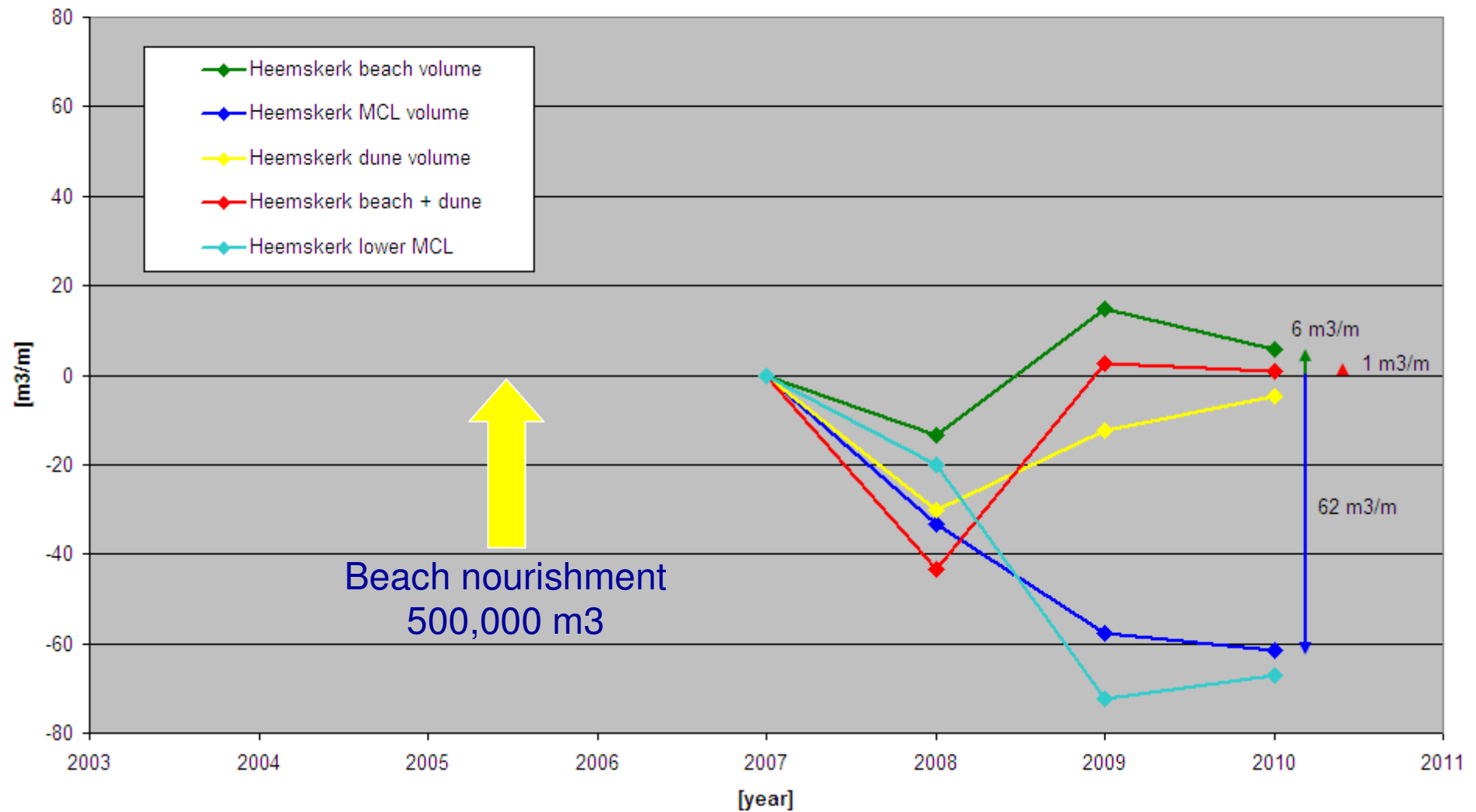
Reference area

Reference area: relation between referenced beach volume and MCL



Heemskerk area

Heemskerk area: relation between referenced beach volume and MCL

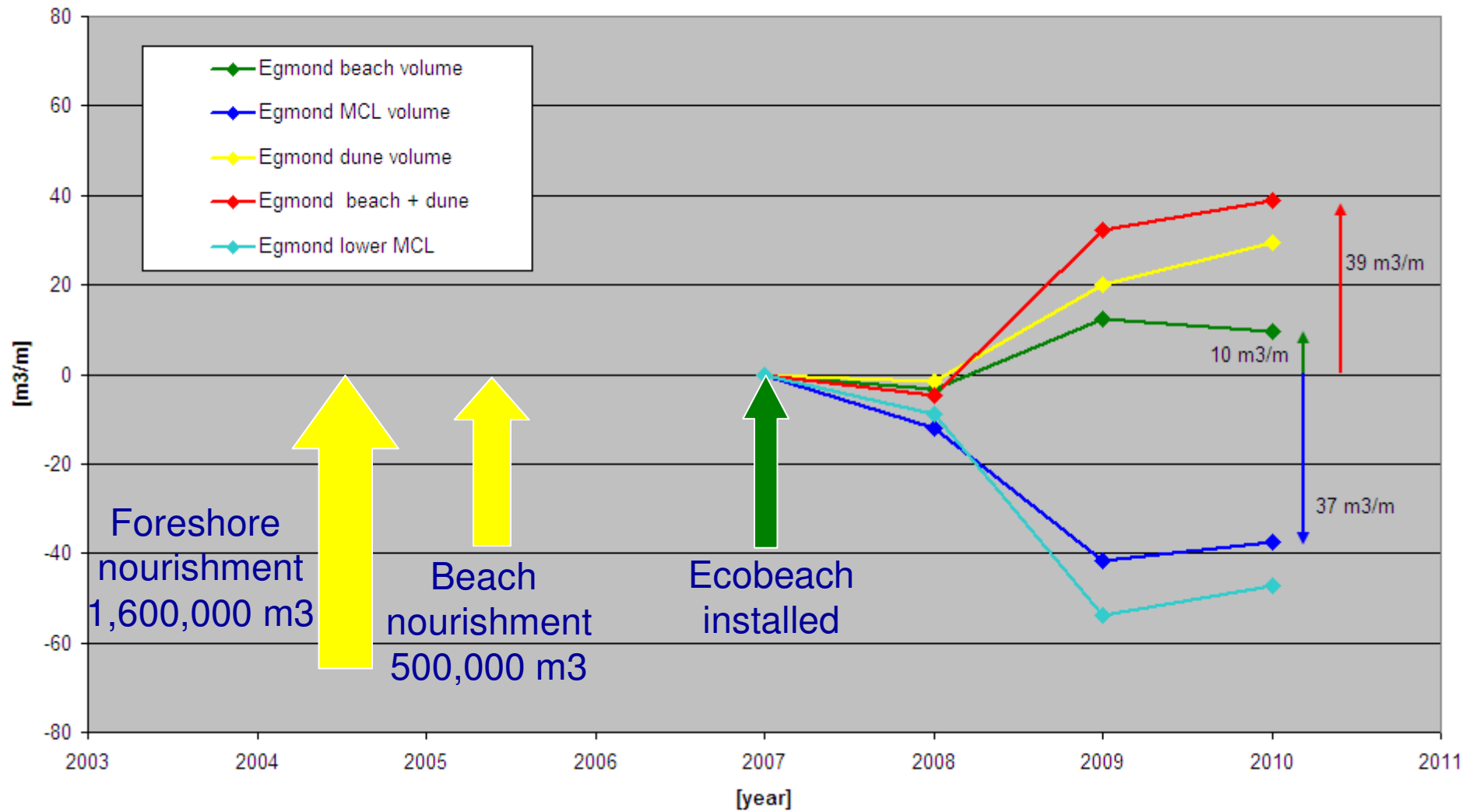


Observations per area

- The following slides give the observations per individual area

Egmond area

Egmond area: relation between referenced beach volume and MCL



Egmond area

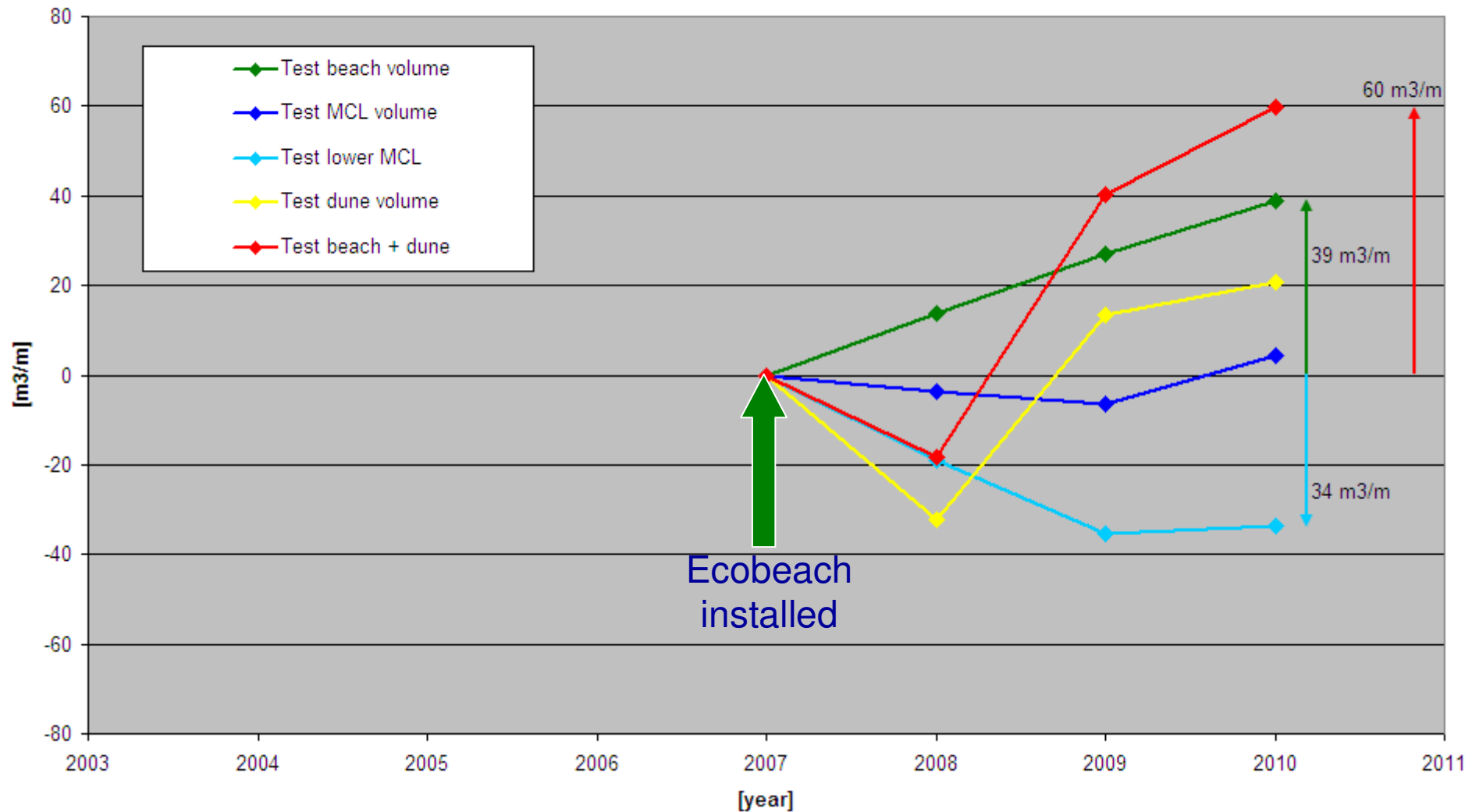
- Since installation of Ecobeach:
- Beach volume increased 10 m³/m
- Dune volume increased 29 m³/m
- MCL decreased 37 m³/m
- 8 m³/m removed from system box
- (system box = MCL + dunes)

Conclusions Egmond area

- Both beach and dune volumes increase since 2007
- Major part of this increase comes from reduction in Lower MCL volume

Test area

Test area: relation between referenced beach volume and MCL



Test area

- Since installation of Ecobeach (2007-2010):
- Beach volume increased 39 m³/m
- Dune volume increased 21 m³/m
- MCL increased 4 m³/m
- 25 m³/m added to system box

Test area RSP 42

Increase in dune volume

November 9, 2010, RSP 42, looking south

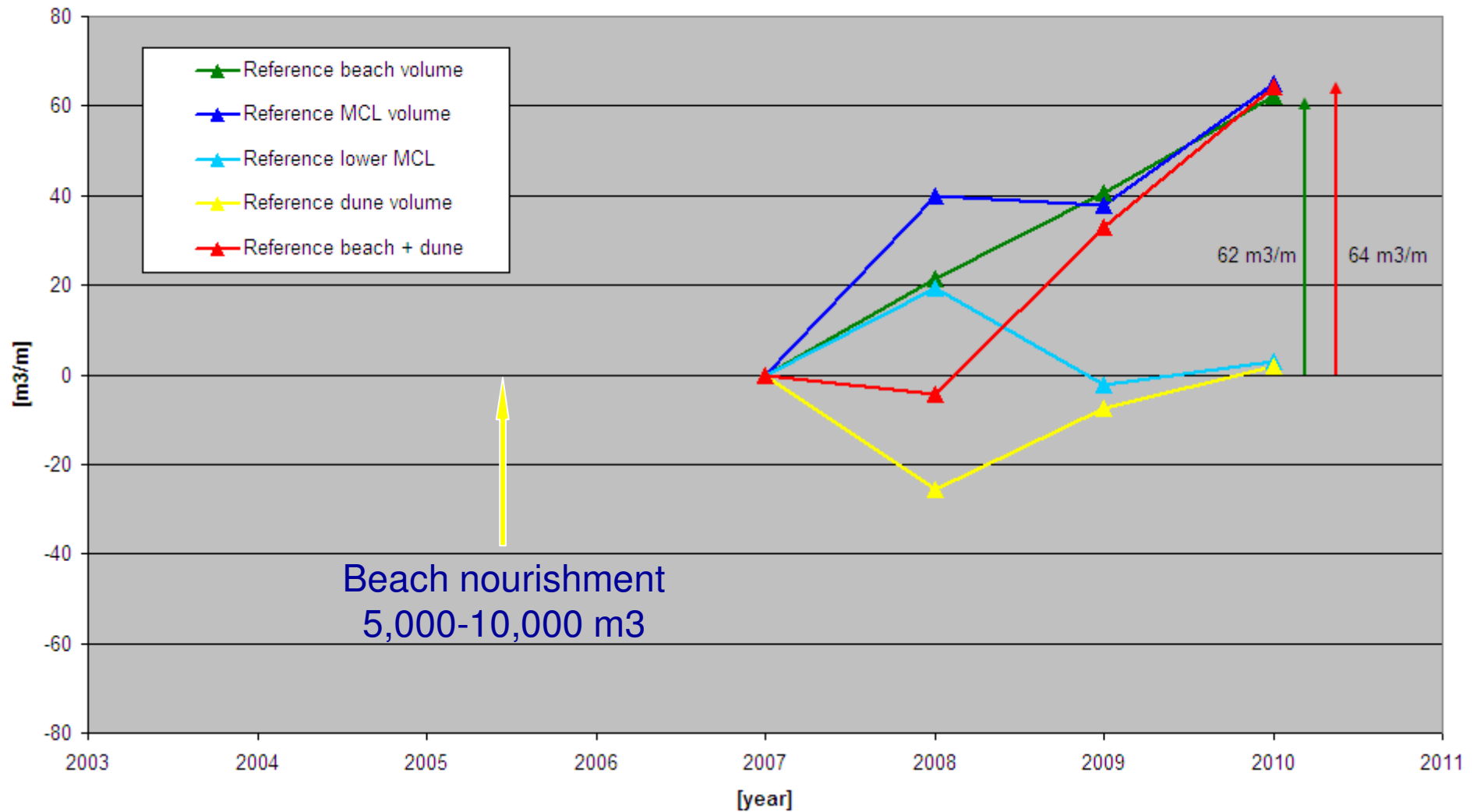


Conclusions Test area

- Beach volume increases since 2007
- Beach volume at an all time high since 1965
- Significant increase in dune volume since 2007
- MCL volume remains relatively constant
- Large part of the increase in beach and dune volume comes from reduction in Lower MCL volume

Reference area

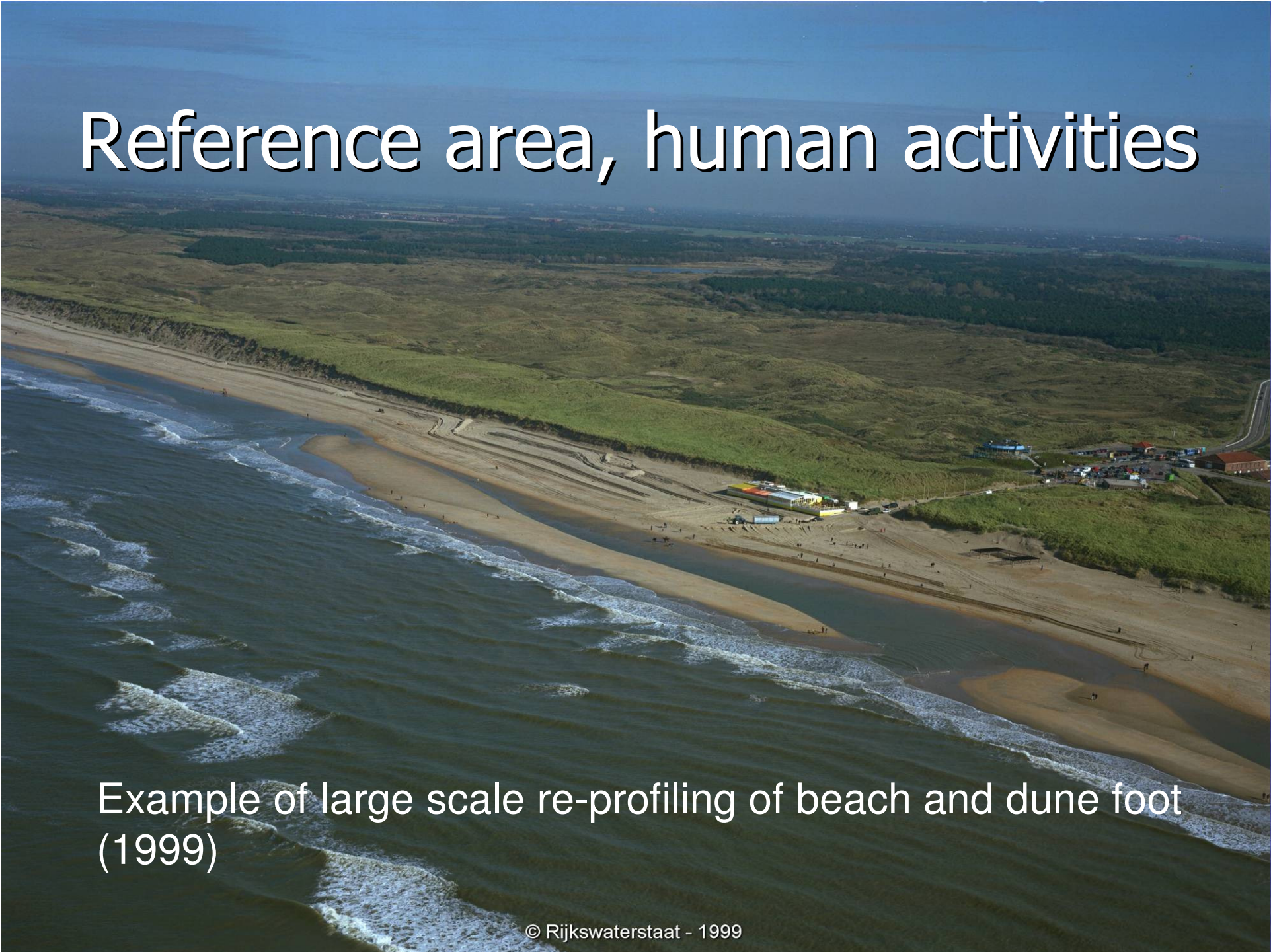
Reference area: relation between referenced beach volume and MCL



Reference area

- Since 2007:
- Beach volume increased 62 m³/m
- Dune volume increased 2 m³/m
- MCL increased 65 m³/m
- 67 m³/m added to system box

Reference area, human activities

An aerial photograph showing a wide, sandy beach and dunes. The ocean is on the left, with waves breaking onto the shore. The beach is wide and flat, with some structures and vehicles visible. The dunes are green and grassy, extending inland. In the background, there are rolling hills and a road.

Example of large scale re-profiling of beach and dune foot
(1999)

Reference area RSP 44.75



November 9, 2010 looking south

Reference area RSP 44.75



February 5, 2011 looking south

Reference area RSP 44.75



November 9, 2010 looking north

Reference area RSP 44.75

February 5, 2011 looking north

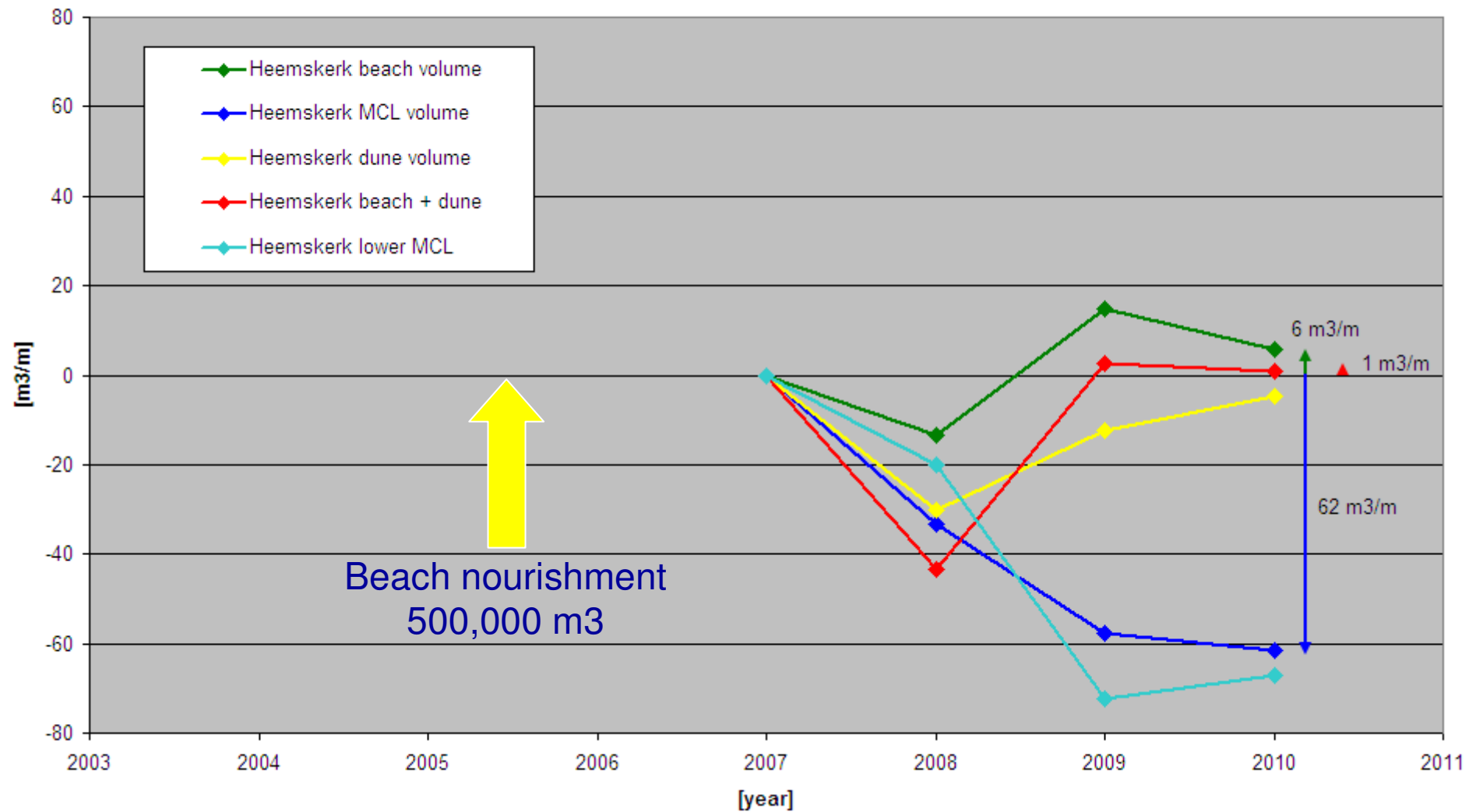


Conclusions Reference area

- Large increase in beach volume since 2007
- Little increase in dune volume since 2007
- Increase in MCL volume same as beach volume
- Beach volume increase due to supply of sand from outside MCL box
- Reference area largely disturbed by human activities
- In 2011 clear signs of beach erosion, beach restaurants getting in danger zone

Heemskerk area

Heemskerk area: relation between referenced beach volume and MCL



Heemskerk area

- Since 2007:
- Beach volume increased 6 m³/m
- Dune volume decreased 5 m³/m
- MCL decreased 65 m³/m
- 70 m³/m removed from system box

Heemskerk area RSP 46.5

October 2005 (1 year before start Ecobeach experiment)

Ref area

RSP 46

Beach nourishment May/June 2005

October 18, 2005, RSP 46.5, looking north

Heemskerk area RSP 46.5 February 2011

February 5, 2011, RSP 46.5, looking north



Heemskerk area RSP 46.5 February 2011

February 5, 2011, RSP 46.5 looking south



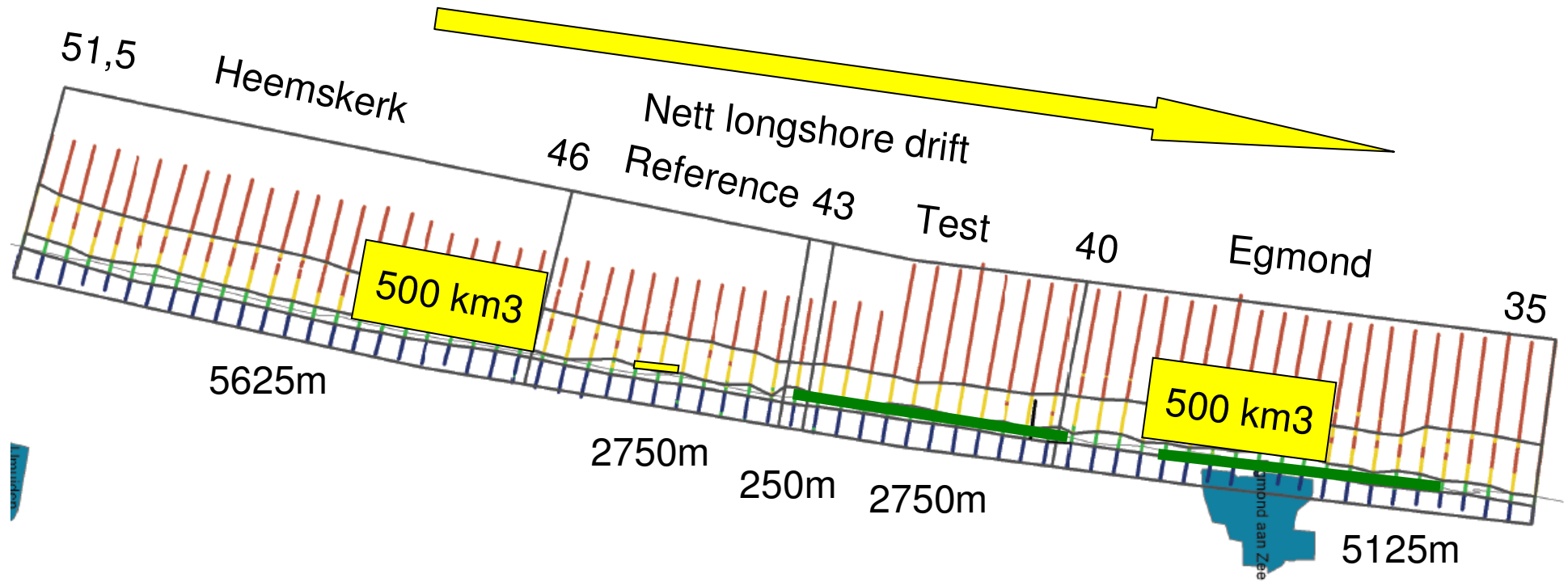
Conclusions Heemskerk area

- Small increase in beach volume since 2007
- Decrease in dune volume since 2007
- Very large decrease in MCL volume
- Presently (2011) significant dune and beach erosion
- Beach nourishment of 2005 has disappeared

Plan views of volume changes

- The following slides show a plan view of the volume changes, left is south, right is north
- The areas are as defined by Deltares in 2010

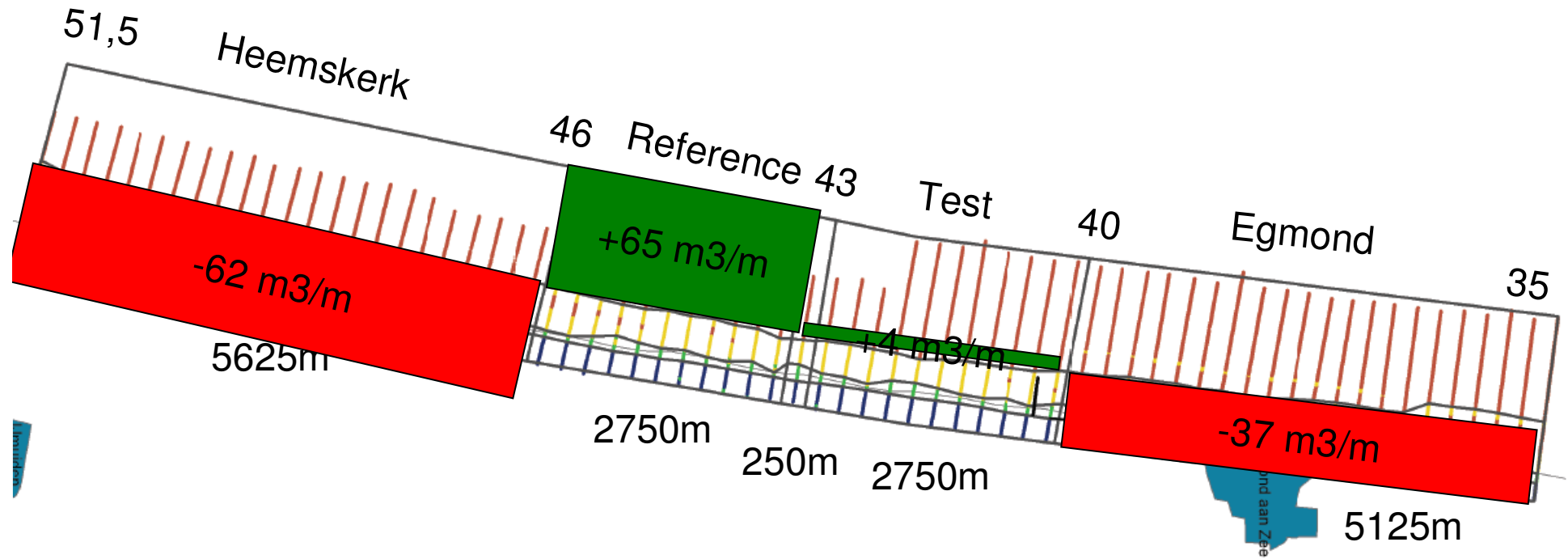
Sizes of various areas



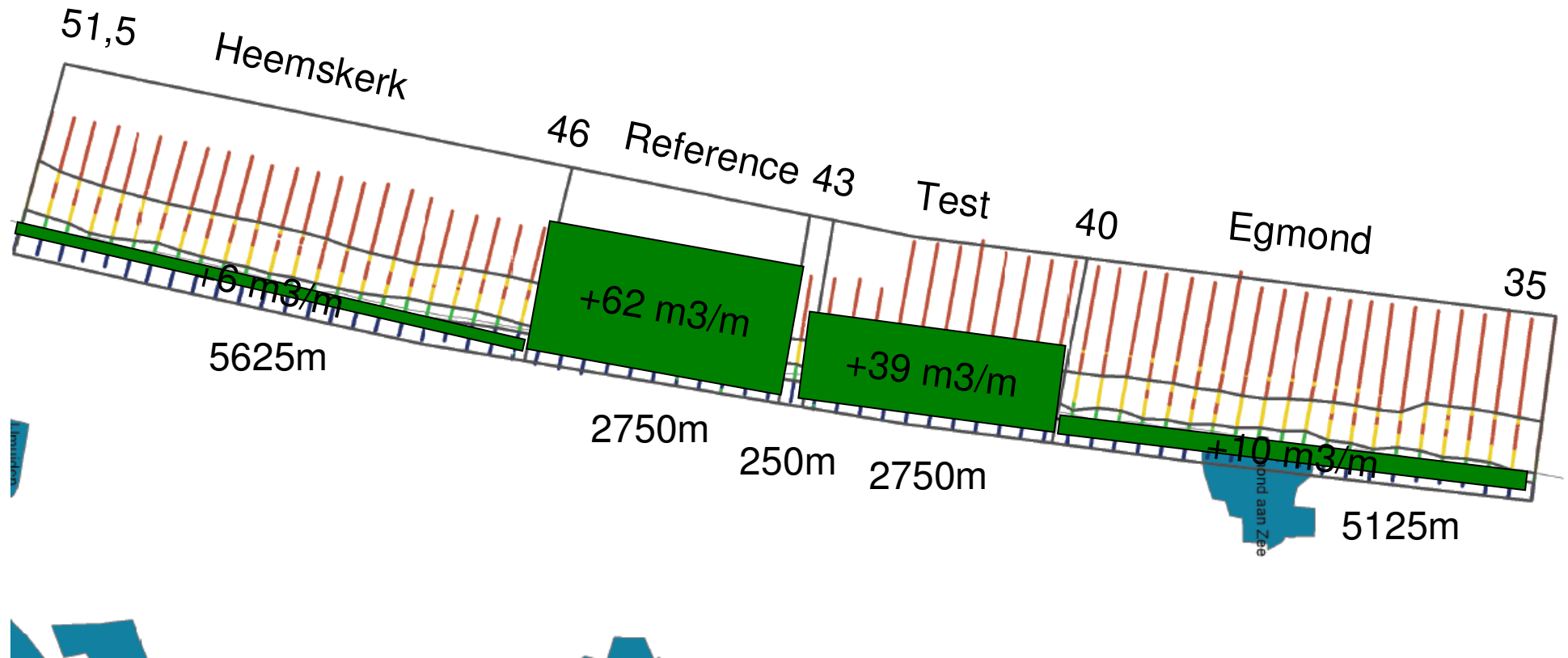
Ecobeach indicated in green

Beach nourishments 2005 indicated in yellow boxes

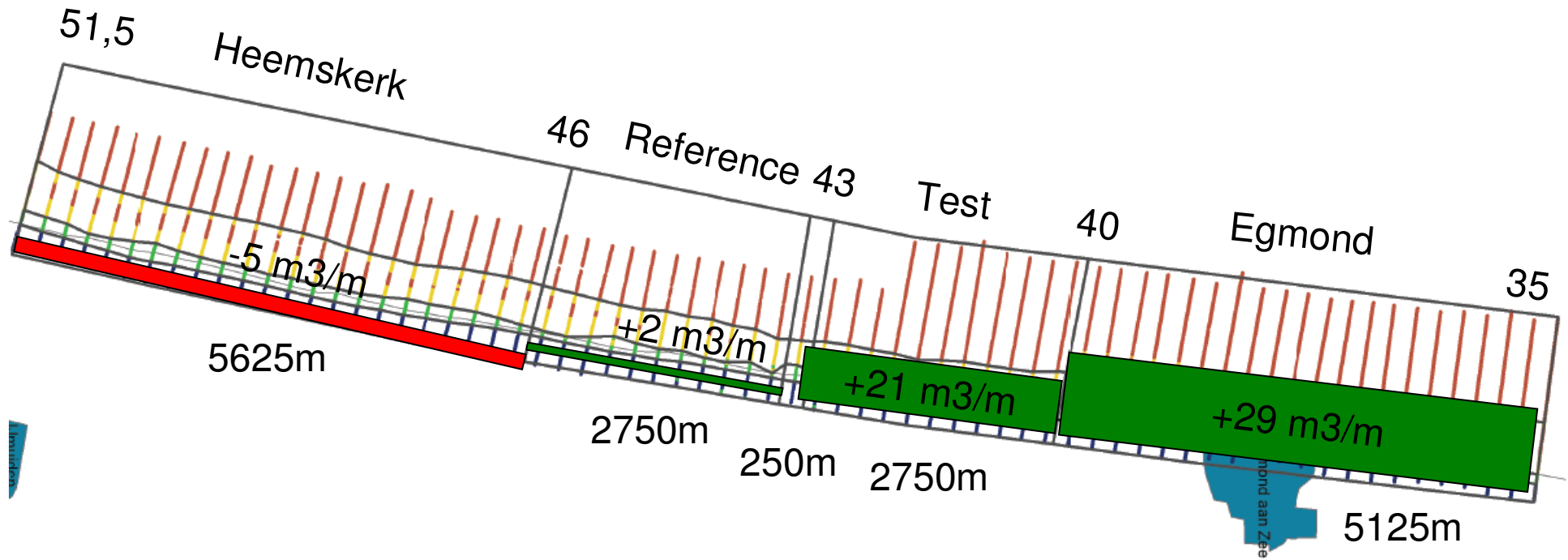
MCL volume increase 2007-2010



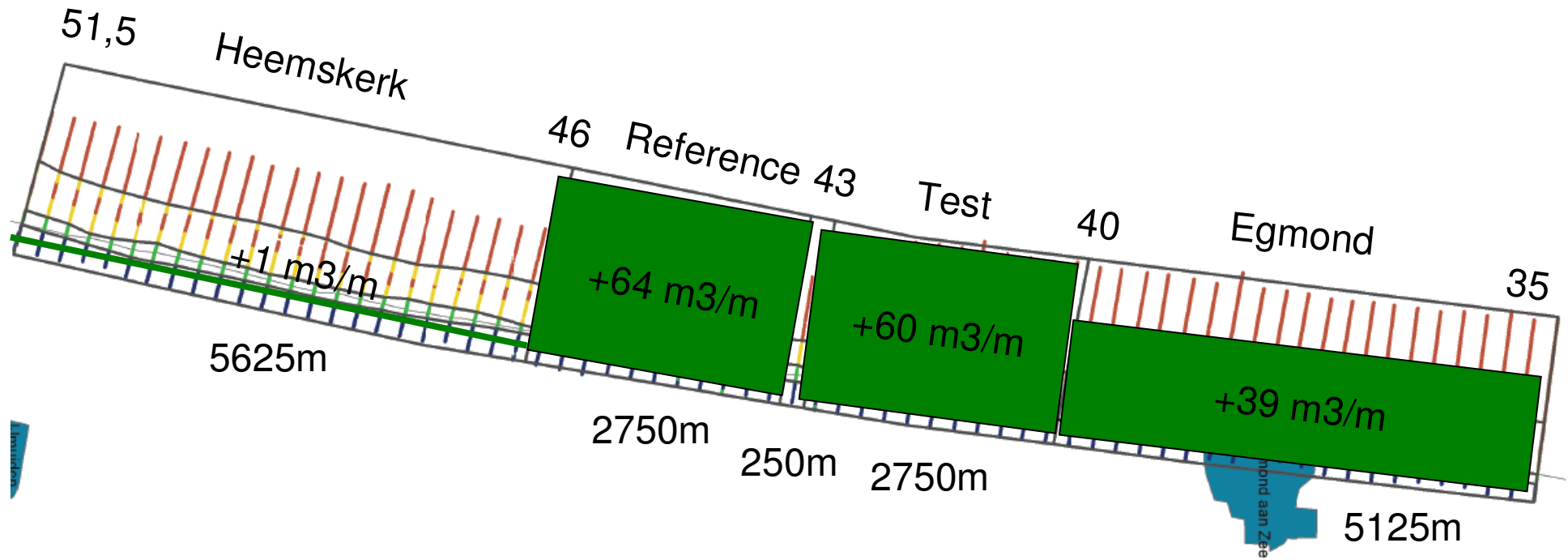
Beach volume increase 2007-2010



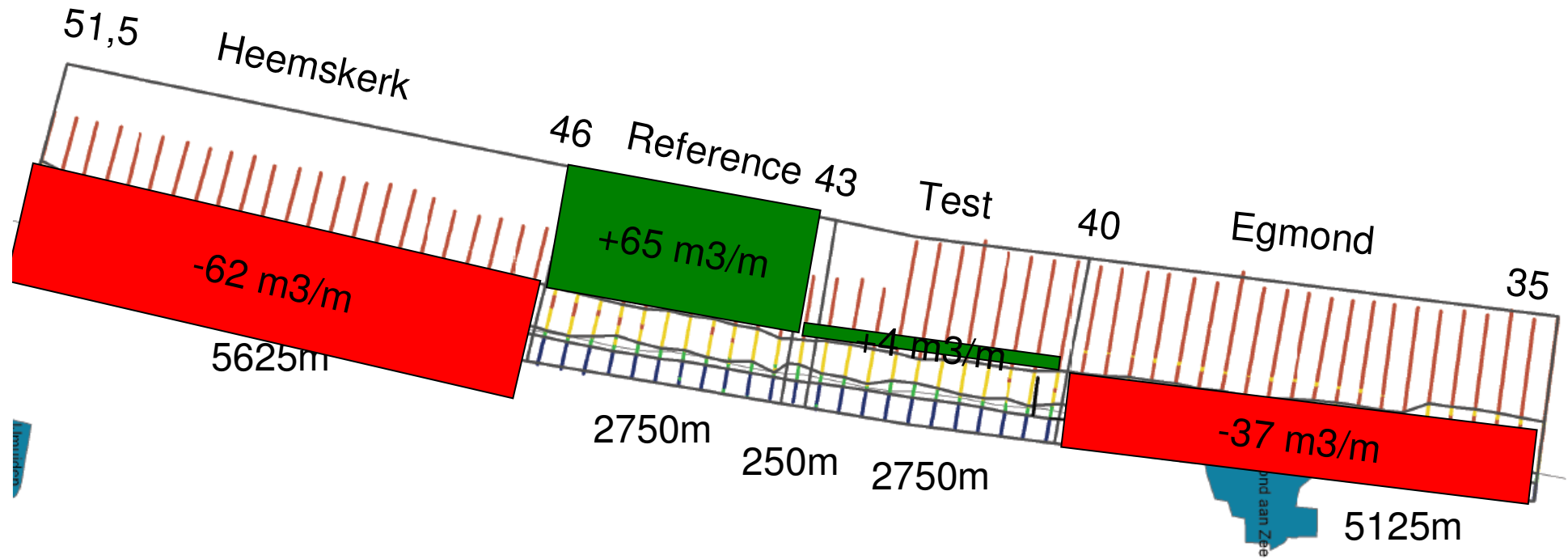
Dune volume increase 2007-2010



Beach + Dune volume increase 2007-2010

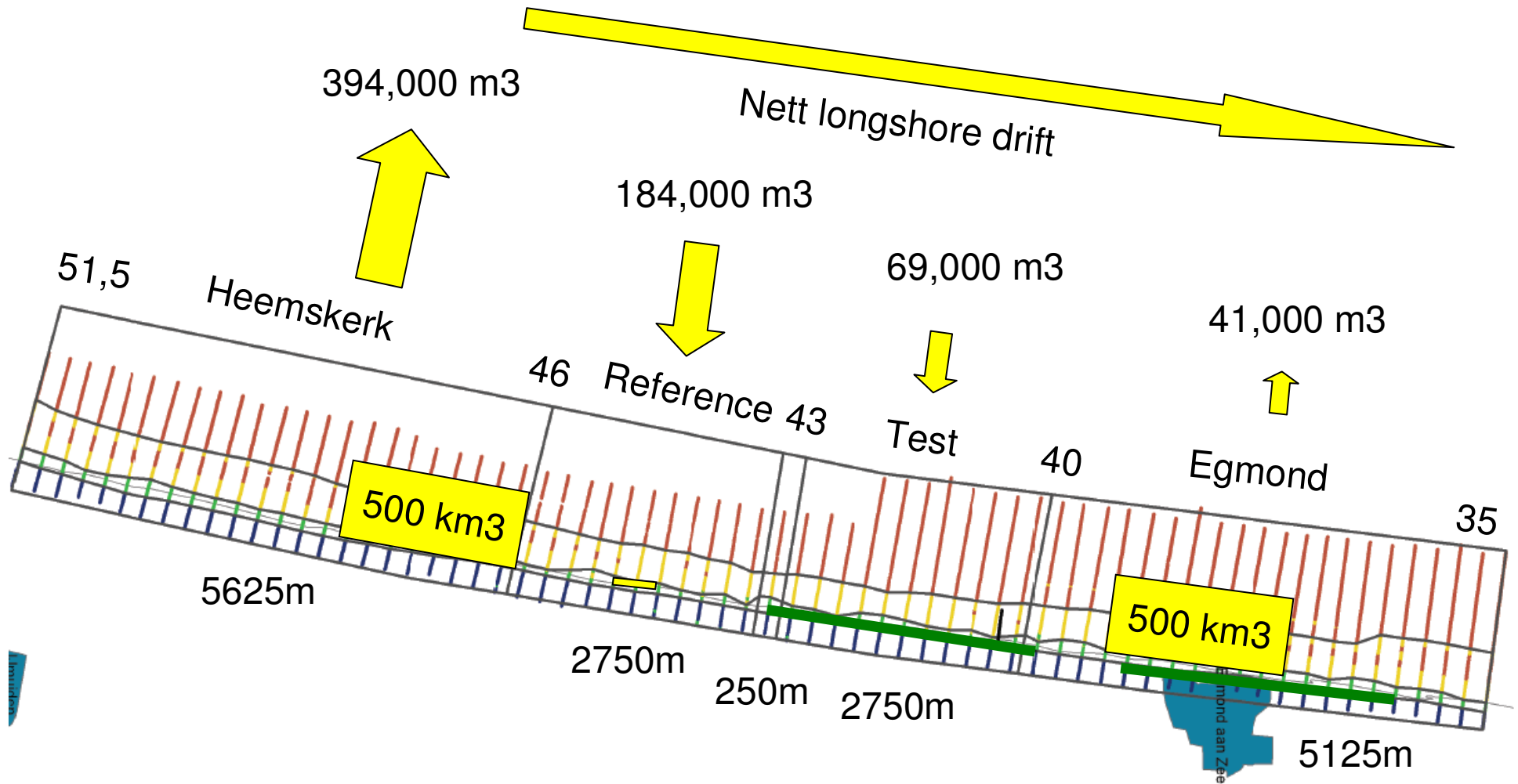


MCL volume increase 2007-2010



Volume change 2007 to 2010

(MCL + dunes)



Ecobeach indicated in green

Beach nourishments 2005 indicated in yellow boxes

Overall Conclusions

- Ecobeach areas show significant increase in beach en dune volumes but decrease in Lower MCL volume since 2007
- Ecobeach areas do not show significant increase in MCL volume since 2007
- Reference area shows large increase in MCL volume, while Heemskerk area shows large decrease in MCL volume since 2007

Overall Conclusions

- The 2005 nourishment in the Heemskerk area has disappeared from this area
- The increase in beach volume in the Reference area can be explained by northward transport of sand of the 2005 nourishment into the Reference area as this nourishment has been placed directly adjacent to, and in, the Reference area
- The Reference area is largely disturbed by human activities

Overall Conclusions

- Heemskerk and Reference area do not show a significant increase in dune volume
- The beach volume in the Test area is at an all time high since 1965, without a significant increase in MCL volume
- This all time high can be explained by the effects of Ecobeach