

# Invasive European Green Crab Impacts on Salt Marshes in Maine – Sudden Increase in Erosion Potential

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Research



Days Cove, Damariscotta, ME, 09/15/13, Mid Tide, View SW

*D.F. Belknap*



Previous summer:  
Days Cove, Damariscotta, ME,  
08/31/12, High Tide, View S



20 m  
Imagery Date: 8/31/2012 1997

44° 1.700' N 69° 31.809' W elev 4 m

Google earth

Eye alt 89 m



Damariscotta River *Spartina alterniflora* dieback, 2013



Days Cove, Damariscotta, ME, 09/15/13, Mid Tide, View S

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## The Suspects



ca. 8 cm, 3.5 inches

J.W. Oliver, Lincoln County News, Sept. 04, 2013

Invasive European Green Crab (*Carcinus maenus*)





Days Cove, Damariscotta, ME, 09/15/13, Mid Tide, View E

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Days Cove, Damariscotta, ME, 05/08/83, Mid Tide, View W

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Days Cove, Damariscotta, ME, 09/15/13, Mid Tide, View W

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## Burrowing and Lateral Erosion



Lowes Cove, Darling Marine Center, Walpole, ME, 09/22/13,  
Low Tide, burrowed low marsh scarp and eroding blocks

*D.F. Belknap*



## Extensive Low Marsh Clipping



Harpwell Cove, 08/13/13  
Dan Deveraux

Harpwell Cove, Brunswick, ME, 08/13/13

Dan Deveraux, Warden, Brunswick, ME



## Overhanging Flap Collapse



Harpswell Cove, 08/13/13  
Dan Deveraux

Harpswell Cove, Brunswick, ME, 08/13/13

Dan Deveraux, Warden, Brunswick, ME



## Intensive Crab Burrowing



Dan Deveraux,  
Brunswick Police Department, Marine Warden  
September, 2013

Scarborough marsh, ME, 09/05/13

*Dan Deveraux, Warden, Brunswick, ME*



Fall conditions



Belknaps Point E, Damariscotta, ME, 10/15/13, Mid-low Tide, View E

*D.F. Belknap*



## Crab trap, low marsh



Belknaps Point E, Damariscotta, ME, 10/15/13, Mid-low Tide

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Two green crabs captured on a single nocturnal high tide [installed 5 PM to 12:30 PM]

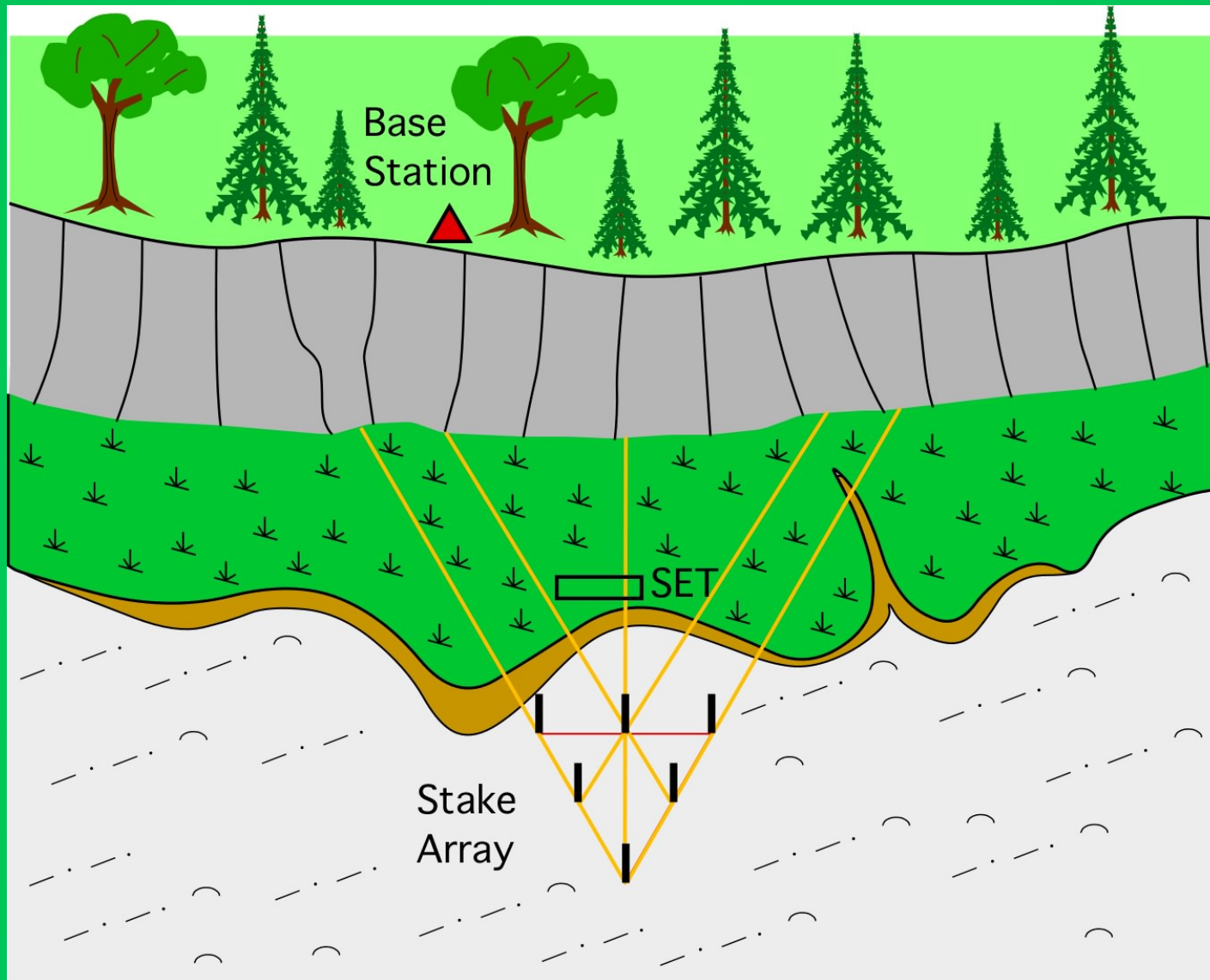


Belknaps Point E, Damariscotta, ME, 10/15/13, Mid-low Tide, View E

*D.F. Belknap*



## Stake arrays for survey of marsh and bluff erosion



Schematic layout of stake array, SET, and Base Station at bluff site with marsh toe (after Belknap and Kelley, 1988). Note that stakes enable a five-fold replication of measurements to bluff toe, marsh scarp, and marsh toe.





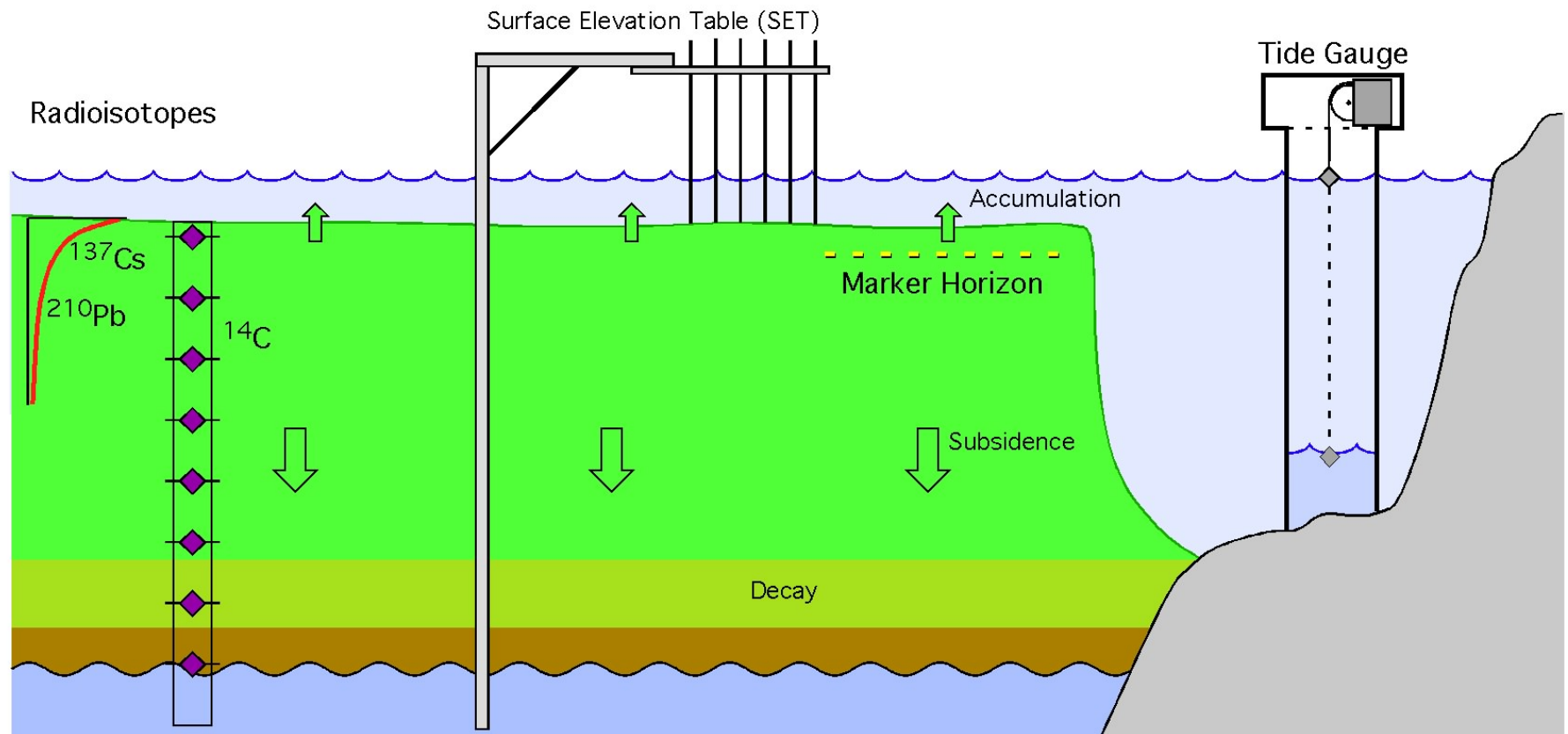
Days Cove – Belknaps Point W, Damariscotta, ME, 05/15/89, Low Tide, View NW

*D.F. Belknap*



# SET - Surface Elevation Table measurement of marsh accretion changes

## Marsh Elevation and Accumulation Rate Measurements





## Other Suspects



[www.dpr.ncparks.gov](http://www.dpr.ncparks.gov)

### Purple Marsh Crab (*Sesarma reticulatum*)

Known to eat saltmarsh cordgrass and burrow extensively in Cape Cod, native from Florida to Woods Hole, MA, [http://en.wikipedia.org/wiki/Sesarma\\_reticulatum](http://en.wikipedia.org/wiki/Sesarma_reticulatum) not known to have invaded Gulf of Maine yet.