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Technical Report

Submitted in partial fulfillment of contract requirements with NOAA
for the proposal entitled:

Population dynamics of the zebra mussel (*Dreissena polymorpha*) in the Hudson River:
settlement and post-settlement processes

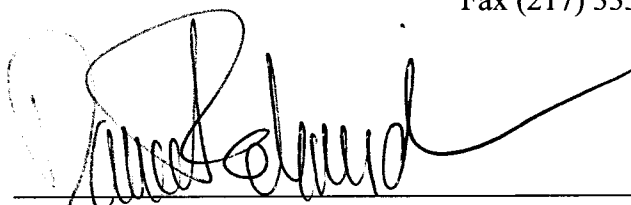
Semi-Annual Report – October 2004

For Submission To:

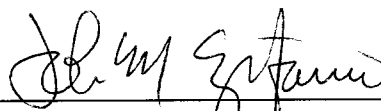
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NOAA GRF Semi-Annual Report – Helen Bustamante - 12/14/04

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Date: 14 December 2004
NOAA Award Number: NA04NOS4200127
Research Project Title: Population dynamics of the zebra mussel (*Dreissena polymorpha*) in the Hudson River: settlement and post-settlement processes
NERR site: Hudson River National Estuarine Research Reserve
Reporting period: June 1, 2004 – November 30, 2004

Research activities: Apart from initial delays with field site set up, I met most targets set out in the proposed milestone schedule detailed below.

Table 1: Copy of part of milestone schedule detailed in proposal “Population dynamics of the zebra mussel (*Dreissena polymorpha*) in the Hudson River: settlement and post-settlement processes” dated 30 October 2003

Month	Task
1	Hire assistant, set up sites and begin field sampling
2	Continue field sampling, begin Lab sample processing and data entry
3	Continue field sampling, lab sample processing and data entry
4	As above
5	As above
6	Complete field work and clean, inventory and repair all equipment
7	Continue Lab sample processing and data entry

Site set up: Settlement frames were deployed at all four sites during the first week of the reporting period. Recruitment plates were installed at most sites by the middle of month 2. However, there was a problem at one site (Tivoli channel site), the location of 2 replicates had to be moved, delaying the completion of recruitment plate installation until the middle of month 3. Environmental monitoring probes (YSIs) were installed at two sites (Norrie marina and Norrie channel) by 29 June and at a third site (Tivoli channel) by 14 July. HRNERR already had a YSI installed at my fourth site (Tivoli north bay) and kindly agreed to provide me with data on temperature,

conductivity, depth, and dissolved oxygen concentrations at that site. As I did not have chlorophyll probes at 2 sites (Norrie Channel and Tivoli North Bay), I collected 3 replicate water samples every week, at each of the four sites, and performed chlorophyll analysis using spectrophotometry.

Field Sampling:

Plankton sampling commenced 25 – 26 May, prior to the reporting period, and continued weekly until the end of the field season.

Settlement sampling commenced 8 – 9 June and continued weekly until the end of the field season. Intensive daily sampling (to investigate early settler mortality) was carried out during the period 20 – 28 July at two sites, Tivoli channel and Norrie marina (budget constraints prevented me from intensively sampling all four sites). Sampling was abandoned after 8 days (instead of 14 days) due to zero survivorship of settlers by the eighth day. In addition, plankton and water samples were taken daily during this period to monitor daily larval supply and suspended solids / chlorophyll concentrations.

Recruitment plates were monitored weekly from month 3, however, by the end of the field season there were still no visible recruits on the plates (Appendix figs 1a & b). It is probable that poor settlement led to poor recruitment this year (Appendix fig 2).

Field sampling ended 12 – 13 October and field sites were cleared and equipment cleaned, repaired and stored away by the middle of month 6 (November).

Sample processing / Data entry:

Settlement sample processing began during month 2 and is almost complete (Appendix fig 3). Plankton sample processing and data entry will continue for the next 6 months as per milestone schedule.

Presentations / Seminar:

Program in Ecology & Evolutionary Biology “Ecolunch” seminar series, University of Illinois at Urbana-Champaign – Presentation title: *Population dynamics of the zebra mussel (Dreissena polymorpha) in the Hudson River: an introduction to my research* – Presentation date: 29 November 2004.

Research Accomplishments:

In the first six months of the project, I established that my methods were successful for tracking settlement, securing and photographing recruitment plates, measuring water quality, and sampling larvae. Settlement was much lower at Norrie Marina during 2004 than 2003 (Appendix fig. 2); reduced settlement is probably responsible for the lack of recruitment in 2004, which suggests that early life stages are critical in zebra mussel population dynamics in the Hudson River. Interannual variability in settlement at Norrie highlights the need for additional years of sampling at Tivoli to document variability in population processes. I have not yet had time to process larval samples (that will be accomplished during the next few months, as per Milestone Schedule), but correlation of larval samples to settlement, and comparison of larval abundance between years will allow the evaluation of supply, settlement, and recruitment in population dynamics.

Appendix Figures

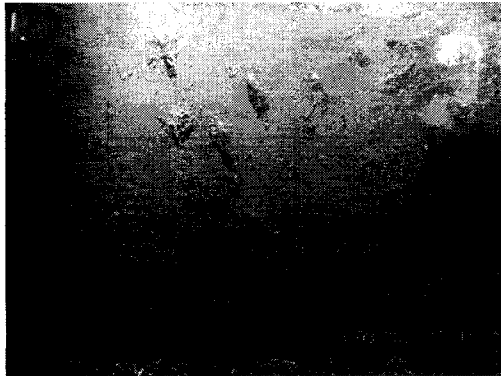


Fig 1a: Underwater digital image of PVC collection plate, Tivoli channel site (north side, Magdalen island), replicate 3, plate b, dated 10/08/2004.

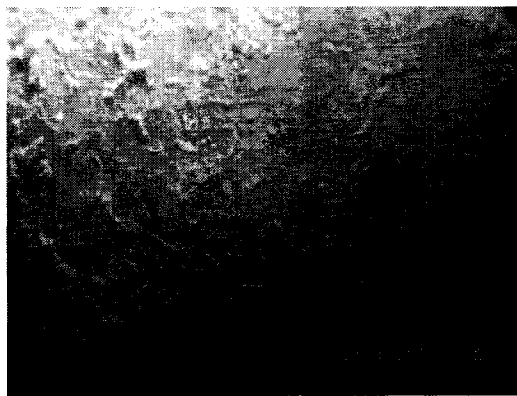


Fig 1b: Underwater digital image of PVC collection plate, Norrie marina site, Replicate 2, plate c, dated 10/10/2004.

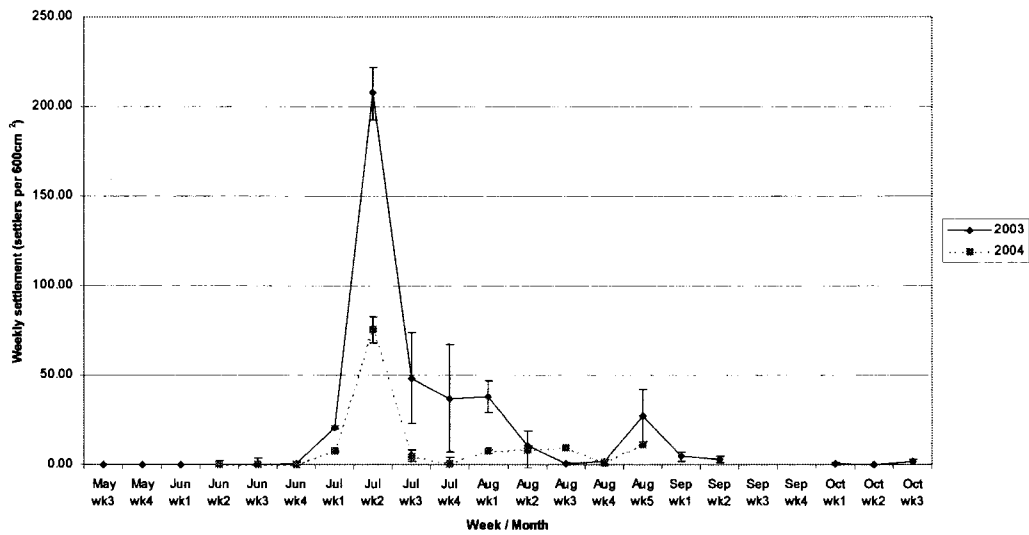


Fig. 2: Weekly *D. Polymorpha* settlement (settlers / 600 cm²) at Norrie marina site, Hudson River, NY, during 2003 & 2004. Error bars are +/- standard errors.

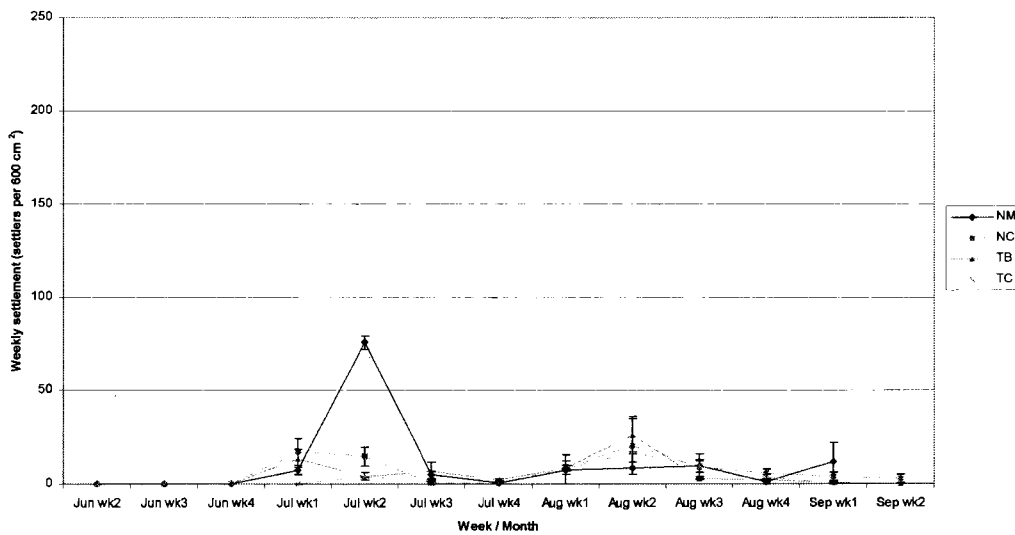


Fig 3: Weekly *D. polymorpha* settlement (settlers / 600 cm²) at four sites along the Hudson River, NY in 2004. NM = Norrie marina site, NC = Norrie channel site (pilot dock, Norrie point), TB = Tivoli North Bay, TC = Tivoli channel site (north side, Magdalen island)