

USF: BASELINE FOR IMPACT ASSESSMENT OF ZOOPLANKTON AND IMAGING OIL DROPLET DETECTION ON THE WEST FLORIDA SHELF

Dr. Kendra L. Daly

SCIENCE ACTIVITIES

1) General Summary

Narrative (1 pages maximum): Please provide a brief overview of the project and goals supported during the conduct of this project. Be sure to highlight any 'lessons learned' that could be applied to the conduct of RFP-I and RFP-II projects (e.g., management, data support, logistics, etc.). Listing accomplishments against project activities, objectives and milestones in bulleted form is acceptable.

This proposal addresses Category 2. Conduct baseline studies and impact assessments to provide the basis for long-term monitoring. We proposed to:

(1) Establish a baseline of the annual abundance and distribution of zooplankton in the northern Gulf of Mexico and west Florida shelf using the towed SIPPET imaging system and net tows (Daly: USF-Marine Science)

Accomplishments: We have completed all eight of the FIO-BP funded field cruises (Table 1), for a total of 15 cruises (seven cruises funded by other sources) since May 2010. In addition, three other cruises were funded by NRDA/NOAA, but the data are currently embargoed for litigation. Figures 1 and 2 show the location of sampling stations. As part of this final report, we are submitting analyzed CTD, chlorophyll, and SIPPET data for ten cruises (see Section 7). Zooplankton bongo data are submitted for all cruises through November 2011.

(2) Develop new algorithms and image pattern recognition software to adapt the SIPPET for automated oil droplet sensing, as well as software development for improved zooplankton recognition in water with oil present (Goldgof, Kasturi, Hall: USF-Computer Science & Engineering)

Accomplishments: We developed an in situ image-based approach to help assess the consequences of oil spills in the maritime environment. The approach is based on visual detection of suspected oil droplets/fish eggs in the water column adjacent to the oil spill area. We generalized the methodology that was successfully used for plankton classification using the SIPPET (Shadow Imaging Particle Profiler and Evaluation Recorder) underwater sensor.

(3) Conduct preliminary laboratory toxicity studies on lethal and sublethal oil toxic effects of untreated and dispersed MC-252 crude oil water-accommodated fractions on dominant and ecologically relevant northeast Gulf of Mexico zooplankton species (Cohen: University of Delaware)

Accomplishments: Laboratory and shipboard toxicology studies with zooplankton from the Gulf of Mexico were conducted over the 2-year project to assess relative lethal and sublethal effects of Corexit 9500A dispersant, and the water accommodated fractions of MC-252 crude oil (WAF) and chemically-dispersed crude oil (CE-WAF). A series of laboratory experiments with an abundant zooplankton in coastal waters of the Gulf of Mexico (the copepod *Labidocera aestiva*) was used to establish 24 and 48 h median lethal concentrations (24 and 48-h LC₅₀) of these solutions for use in shipboard studies, and to test for acute sublethal effects on swimming behavior. Additional laboratory investigation focused on dispersant effects in the ctenophore *Mnemiopsis leidyi*, establishing lethal levels (24 and 48h LC₅₀s) and exposure effects with

additional endpoints (respiration rate and bioluminescence emission). Shipboard toxicity experiments employing a range of lethal and sublethal endpoints were conducted on eight abundant and ecologically relevant marine zooplankton taxa during four cruises in the northern Gulf of Mexico. Survival and sublethal effects were highly species specific, suggesting that generalizations on toxicity of oil and dispersant exposure for zooplankton may be difficult, and vulnerability of major taxa should be assessed separately.

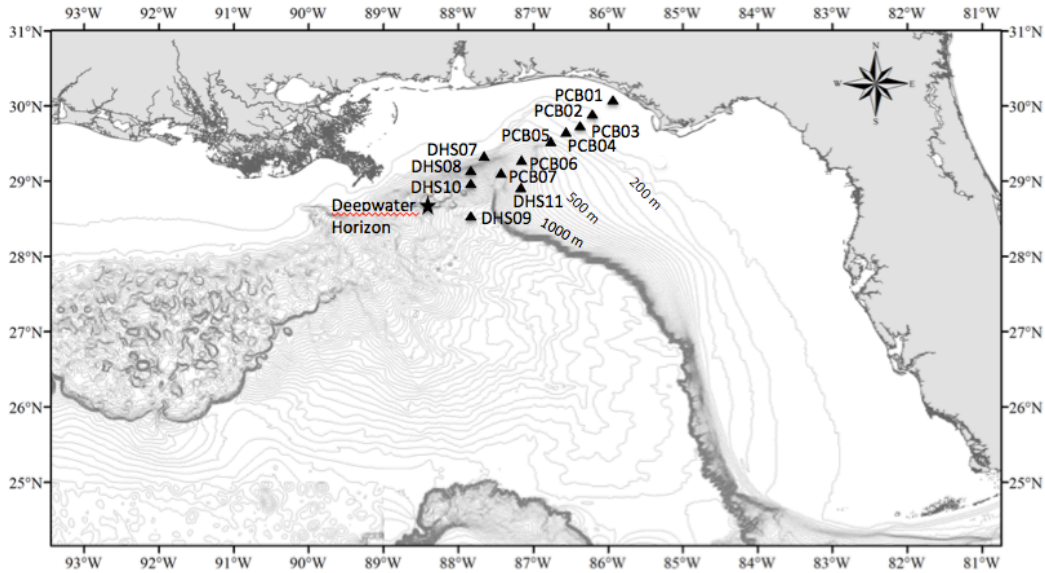


Figure 1. Location of stations in the northern Gulf of Mexico.

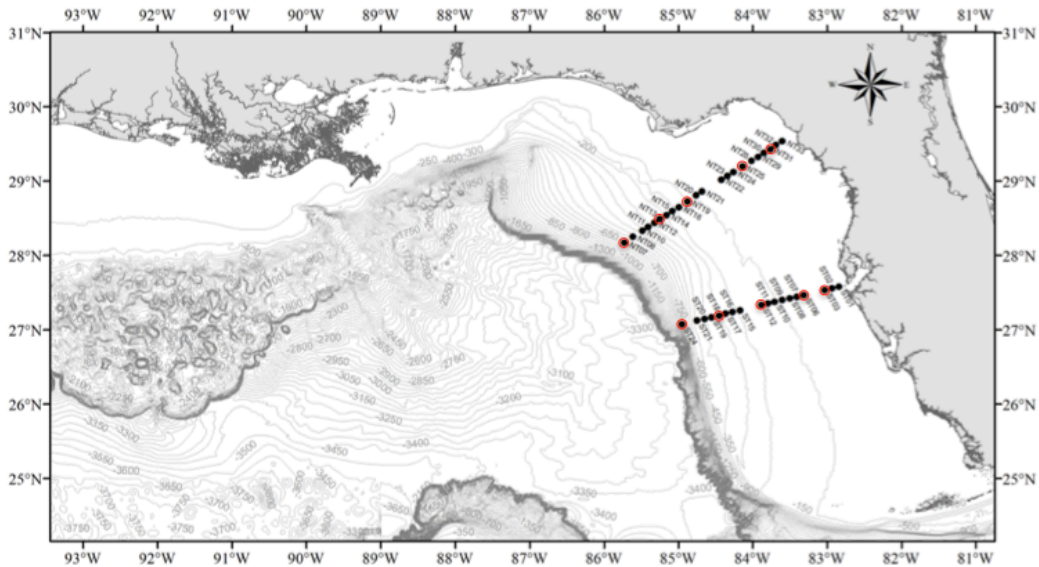


Figure 2. Location of stations on the west Florida shelf. The stations in red are the locations of routine time-series stations.

2) Results and scientific highlights

Narrative (2 pages maximum): This should be a summary of significant results (positive and negative) and conclusions during the conduct of this project. Listing science results and highlights in bulleted form is acceptable. In each case, please explain the impact of the result.

(1) Establish a baseline of the annual abundance and distribution of zooplankton in the northern Gulf of Mexico and west Florida shelf using the towed SIPPER imaging system and net tows (Daly: USF-Marine Science)

Results:

- Environmental conditions varied widely between May 2010 and November 2012. For example, results from a time-series station at DHS09 in the northern Gulf of Mexico (GOM) indicate that surface waters during August 2010 were strongly influenced by Mississippi River waters, resulting in a highly stratified density gradient and maximum concentrations of chlorophyll ($2 \mu\text{g L}^{-1}$) and marine snow (62,470 particles per m^3). No other cruises showed the same influence of near-surface fresh water. In addition, field observations indicated that phytoplankton photosynthetic capacity decreased during August 2010 at the stations nearest the wellhead and near DeSoto Canyon and phytoplankton species diversity also decreased. In general, transparent exopolymer particles (TEP) production increases when microplankton are stressed and contributes to particle aggregation and flux. Thus, the high marine snow concentrations during August 2010 support the hypothesis that suspended oil droplets adhering to marine snow is likely one mechanism by which oil was transported to the sea floor. Furthermore, this mechanism may have been influenced by the large release of Mississippi River water between May and August 2010.
- During this same time period (August 2010), MODIS satellite observations detected a positive chlorophyll anomaly ($> 1 \text{ mg m}^{-3}$) in the NE GOM relative to an eight-year climatology (Hu et al. 2011 GRL), supporting the spatial extent of the in situ chlorophyll data.
- Zooplankton species composition, abundance, and biomass varied seasonally, interannually, and between locations. Eighty-one copepod species and 33 taxa/genera of copepods and other zooplankton taxa were identified from bongo tows. Copepods were the dominant component (55 - 90%) of the zooplankton community, followed by ostracods, chaetognaths, larvaceans, and decapods. Copepods typically ranged in size from about 1 – 6 mm. Total zooplankton densities during September 2011 (607 ind m^{-3}), one year after the oil spill, were about 2x higher than densities during August 2010 (311 ind m^{-3}) in the northern GOM. In general, zooplankton abundance and diversity were highest near-shore and decreased offshore. Biomass distributions, however, were more variable. Maximum zooplankton biomass (21.8 g DW) occurred near shore (Sta. PCB01) during May 2012, in part due to a doliolid bloom. The second highest biomass (12.8 g) during May 2012 was at a deep-water station (PCB11, 1200 m). Zooplankton abundance and biomass also were highest in the northern Gulf and decreased southward along the west Florida shelf. For example, the geomean biomass of all northern GOM cruises (5.68 g) was 2.8x higher than the geomean biomass on the west Florida shelf (2.03 g). In addition, a change in copepod species composition occurred during summer 2011. The historically dominant near-shore copepod, *Centropages velificatus* (maximum abundance $1,284 \text{ ind m}^{-3}$), had very low densities and was replaced by *Temora turbinata* (maximum abundance 643 ind m^{-3}) as the dominant species.
- It is uncertain at this time whether the observed changes in phytoplankton and zooplankton are due to the oil spill or a result of interannual changes in environmental conditions, or a

combination of both. These results highlight the critical need for continued time-series observations of the GOM ecosystem in order to accurately assess the spatial and seasonal and interannual changes in plankton communities in relation to human activities (i.e., oil spills, fishing) and climate change.

(2) *Develop new algorithms and image pattern recognition software to adapt the SIPPER for automated oil droplet sensing, as well as software development for improved zooplankton recognition in water with oil present (Goldgof, Kasturi, Hall: USF-Computer Science & Engineering)*

Results:

- The proposed method automatically detects particles in the water, classifies them, and provides an interface for visual display. The particles may be plankton, marine snow, oil droplets, fish eggs, and more. Image processing and machine learning techniques are applied to discern suspected unidentified spherical objects (such as oil droplets, fish eggs, etc.) from plankton and other particles present in the water adjacent to an oil spill. The contributions of this work are the following. We built an SVM classifier for detection of suspected oil droplets/fish eggs and trained it on the data obtained during one of the first research cruises to the site of the Deepwater Horizon oil spill. The classification accuracy of the suspected oil droplets/fish eggs was reported and analyzed. The proposed approach reliably finds oil/fish eggs when it is present with minimum involvement of a human expert.
- We also developed a method to exploit the characteristics of the support vector machine learning algorithm to identify potentially mislabeled examples. We were able to effectively correct mislabels. The work relied on looking at the Support Vectors of classes often confused with the one of interest. This is where the mislabeled examples tend to be.

(3) *Conduct preliminary laboratory toxicity studies on lethal and sublethal oil toxic effects of untreated and dispersed MC-252 crude oil water-accommodated fractions on dominant and ecologically relevant northeast Gulf of Mexico zooplankton species (Cohen: University of Delaware)*

Results:

- Laboratory and shipboard toxicity studies employed Chemical Response to Oil Spills: Ecological Research Forum (CROSERF) protocols to consistently prepare oil and dispersant solutions, as assessed by UV/VIS spectroscopy and GC-FID. To our knowledge this is the first attempt to use CROSERF protocols while at sea, and it was successful.
- Laboratory mortality studies with the marine copepod, *Labidocera aestiva*, showed that based on oil loadings, the water-accommodated fraction (WAF) of MC-252 crude oil alone (48h LC₅₀ = 5.0 mg oil/L) was less toxic than Chemically Enhanced Water Accommodated Fraction (CE-WAF) of dispersed oil (3.3 mg oil/L). However, WAF solutions were more toxic than CE-WAF when 48h LC50s were calculated based on total petroleum hydrocarbon (TPH) concentration (37.5 vs. 74.3 µg L⁻¹). This may be due to a combination of additional low-toxicity hydrocarbons from dispersant in CE-WAF, and changes in the hydrocarbon composition, as highly toxic naphthalenes represented a smaller fraction (though still the majority) of PAHs in our CE-WAF solutions. Copepods accumulated TPH in their tissues with increased exposure to TPH in solution. Loadings of Corexit EC9500A alone were the least toxic of the three solutions (48h LC₅₀ = 8.5 mg dispersant/L), but similar to the low values reported by the manufacturer for the small estuarine model copepod, *Acartia tonsa*, suggesting that copepods in general may be particularly sensitive to dispersants.
- Laboratory behavior studies found an instantaneous reduction in number and speed of swimming *L. aestiva* for CE-WAF (10 and 50 mg/L) and WAF (50 mg/L), suggesting narcotization. Dispersant alone at the 1:10 ratio used in CE-WAF did not appear to alter swimming behavior.

- Laboratory mortality studies with the ctenophore, *M. leidyi*, showed, among other results, higher sensitivity to dispersants in these gelatinous organisms (24h LC₅₀ = 5.2 mg/L) than was observed for smaller *L. aestiva* copepods (24h LC₅₀ = 12.9 mg/L). Ctenophore bioluminescent emission and respiration rate were reduced in animals that survived dispersant exposure above the LC₅₀.
- Shipboard mortality, behavioral, and physiological studies were conducted with *Callinectes sapidus* megalopae (decapod), *Temora turbinata* (copepod), *Pontella meadii* (copepod), *Candacia paenelongimana* (copepod), *Lestrigonus* sp. (amphipod), *Euphausia* sp. (euphausiid), *Beroe ovata* (ctenophore), and *Cyclosalpa* sp. (salp); additional taxa (e.g., chaetognaths, doliolids, pteropods) were tested, but high mortality in controls precluded further work with those species. Test concentrations were based on LC₅₀s for *L. aestiva* to provide a relative measure of sensitivity for a range of zooplankton taxa. Species varied considerably in their survival and sublethal effects. For example, *C. paenelongimana* mortality was similar to *L. aestiva*, while commercially important *C. sapidus* (blue crab) megalopae survived much better in 24 h exposures to WAF, CE-WAF, and dispersant, but showed disruption in molting following the dispersant exposures. Oil and dispersant lethal and sublethal effects on marine zooplankton are taxa-specific.

3) Cruises & field expeditions funded by FIO-BP or other sources

| Ship or Platform Name | Class (if applicable) | Chief Scientist | Objectives | Dates |
|------------------------------|-----------------------|-----------------|----------------------------------|---------------------|
| R/V Bellows* | | B. Donahue | Assess ecosystem response to oil | July 10-18 2010 |
| R/V Weatherbird* | | D. Hollander | Assess ecosystem response to oil | Aug 7-11 2010 |
| R/V Weatherbird | | D. Hollander | Assess ecosystem response to oil | Nov 30-Dec 8 2010 |
| R/V Weatherbird | | B. Donahue | Assess ecosystem response to oil | Jan 4-11 2011 |
| R/V Weatherbird | | B. Donahue | Assess ecosystem response to oil | Feb 17-27 2011 |
| R/V Weatherbird | | S. Murasko | Assess ecosystem response to oil | May 3-9 2011 |
| R/V Weatherbird | | C. Kovach | Assess ecosystem response to oil | Jun 25-Jul 1 2011 |
| R/V Weatherbird | | R. Larson | Assess ecosystem response to oil | Sep 20-29 2011 |
| R/V Weatherbird | | C. Kovach | Assess ecosystem response to oil | Nov 1-8 2011 |
| R/V Weatherbird | | L. Wade | Assess ecosystem response to oil | Feb 15-24 2012 |
| R/V Bellows ⁺ | | L. Wade | Assess ecosystem response to oil | Apr 23-28 2012 |
| R/V Weatherbird ⁺ | | L. Wade | Assess ecosystem response to oil | May 8-15 2012 |
| R/V Bellows ⁺ | | L. Wade | Assess ecosystem response to oil | June 29-July 1 2012 |
| R/V Weatherbird ⁺ | | L. Wade | Assess ecosystem response to oil | Aug 210 2012 |
| R/V Bellows ⁺ | | L. Wade | Assess ecosystem response to oil | Nov 13-15 2012 |

Ship time funded by * USF Research Foundation or ⁺GOMRI (C-IMAGE Project)

4) Peer-reviewed publications, if planned (Note: a special section will focus on student and post-doctoral publications)

- a. Published, peer-reviewed bibliography (Copies of the papers are requested)

Hu, C., R.H. Weisberg, Y.Liu, L. Zheng, K.L. Daly, D.C. English, J. Zhao, and G.A. Vargo. 2011. Did the northeastern Gulf of Mexico become greener after the Deepwater Horizon oil spill? *Geophysical Research Letters* 38, L09601, doi:10.1029/2011GL047184.

Fefilatyev, S., K. Kramer, L. Hall, D. Goldgof, R. Kasturi, A. Remsen, K. Daly. 2011. Detection of Anomalous Particles from the Deepwater Horizon Oil Spill Using the SIPPER3 Underwater Imaging Platform. *Proceedings of International Conference on Data Mining*: 741-748. Paper awarded the **Data Mining Practice Prize**.

b. Manuscripts submitted or in preparation (Please note target journal, and anticipated date of publication or submission)

- Fefilatyev, S., M. Shreve, K. Kramer, L. Hall, D. Goldgof, R. Kasturi, K. Daly, A. Remsen, H. Bunke. 2012. Label-Noise Reduction with Support Vector Machines. *International Conference on Pattern Recognition*, accepted.
- Fefilatyev, S., R. Ekambaram, M. Shreve, K. Kramer, L. Hall, D. Goldgof, R. Kasturi, K. Daly, A. Remsen, "Assessing Impact of Oil Spills in Maritime Environment through Detection of Anomalous Particles from Underwater Imaging Platform", to be submitted to *Ocean Engineering*, 2012.
- Ekambaram, R., S. Fefilatyev, M. Shreve, K. Kramer, L. Hall, D. Goldgof, R. Kasturi, K. Daly, A. Remsen, "Performance Comparison of 1-class and 2-class SVM for Supervised Label Noise Removal Approach", to be submitted to *International Journal of Machine Learning Research*, 2012.
- Cohen, J.H., L.R. McCormick, S.M. Burkhardt. Crude oil and chemical dispersant effects on marine zooplankton. I. Mortality and acute swimming behavior of a coastal marine copepod. (in preparation for *Marine Ecology Progress Series*, submission expected by 11/30/2012).
- Cohen, J.H., L.R. McCormick, R.F. Peiffer. Crude oil and chemical dispersant effects on marine zooplankton II: Lethal and sublethal effects on zooplankton in the Gulf of Mexico. (in preparation for *Marine Ecology Progress Series*, submission expected by 11/30/2012).
- Paul, J.H., D. Hollander, P. Coble, K.L. Daly, S. Murasko, D. English, L. McDaniel, C. Kovach. Toxicity and Mutagenicity of Gulf of Mexico Waters Contaminated by the Deepwater Horizon Oil Spill. *Environmental Science & Technology*.

5) Presentations and posters, if planned (Please provide copies of each) (Note: a special section will focus on student presentations)

| Title | Presenter | Authors | Meeting or Audience | Abstract published (Y/N) | Date |
|--|-----------|---|--|--------------------------|---------|
| Detection of Anomalous Particles from Deepwater Horizon Oil Spill Using SIPPER3 Underwater Imaging Platform. | L. Hall | Fefilatyeve, S., K. Kramer, L. Hall, D. Goldgof, R. Kasturi, A. Remsen, K. Daly | Eleventh IEEE International Conference on Data Mining, Vancouver, B.C. | Y | 12/11 |
| Plankton Dynamics Following the BP Oil Spill | K.L. Daly | Daly, K.L., A. Remsen, S. Murasko, D. Outram, and L. Wade | Ocean Sciences Meeting, Salt Lake City | Y | 2/12/12 |
| Lethal and sublethal effects of Corexit 9500A dispersant, MC-252 oil, and dispersed oil mixtures on marine zooplankton | J. Cohen | Cohen, J. L.R. McCormick, S.M. Burkhardt, R.F. Peiffer | Ocean Sciences Meeting, Salt Lake City | Y | 2/12/12 |

| | | | | | |
|--|------------|---|---|---|------------|
| Label-Noise Reduction with Support Vector Machines | D. Goldgof | S. Fefilatyeve, M. Shreve, K. Kramer, L. Hall, D. Goldgof, R. Kasturi, K. Daly, A. Remsen, H. Bunke | International Conference on Pattern Recognition | Y | 11/11/12 |
| Plankton Dynamics Following the BP Oil Spill | K.L. Daly | Daly, K.L., L. Schwierzke-Wade, K. Dreger, S. Murasko, D. Outram, A. Remsen | Gulf of Mexico Oil Spill and Ecosystem Science Conference | Y | 1/21-23/13 |
| Oil spills and overfishing led to increments of harmful algal blooms on the west Florida shelf, with public consequences: An isomorph? | J. Walsh | Walsh, J.J., J.M. Lenos, R.H. Weisberg, C. Hu, K.L. Daly | Gulf of Mexico Oil Spill and Ecosystem Science Conference | Y | 1/21-23/13 |
| The lethal and sublethal effects of chemical dispersant on the ctenophore <i>Mnemiopsis leidyi</i> | R. Peiffer | R. Peiffer, J.H. Cohen | Gulf of Mexico Oil Spill and Ecosystem Science Conference | Y | 1/21-23/13 |

6) Other products or deliverables

Please list (for example: maps, models, tools) and indicate where they can be located/obtained.

NA

7) Data

Please provide a spreadsheet indicating the metadata and ancillary information on the location and status of the archived samples. Also, indicate if there are any issues with respect to data archiving schedule and plan. If you have a lot of metadata, representative samples will suffice. This will all be incorporated into the GoMRI database at some point in the future.

Dr. K. Daly: As part of this final report, we are submitting analyzed CTD, chlorophyll, and SIPPER data for ten cruises listed below. Zooplankton bongo data are submitted for all cruises through November 2011. All data will be submitted to Dave Reed (GRI data management) and to USF's C-IMAGE Center data management site and, in turn, to the Harte Research Institute. The remaining bongo data for the FIO-BP funded cruise in Feb. 2012 will be reported as part of the C-IMAGE (GOMRI) data submission.

Dr. J. Cohen: See Appendix 1 spreadsheet for experimental data archive.

Daly: Metadata for data submission

| Cruise | Dates | Location | Data sets |
|------------------|-------------------|-------------------------|------------------------|
| R/V Bellows* | July 10-18 2010 | West Florida shelf | CTD. SIPPER. Bongo net |
| R/V Weatherbird* | Aug 7-11 2010 | Northern Gulf of Mexico | CTD. SIPPER. Bongo net |
| R/V Weatherbird | Nov 30-Dec 8 2010 | Northern Gulf of Mexico | CTD. SIPPER. Bongo net |
| R/V Weatherbird | Jan 4-11 2011 | West Florida shelf | CTD. SIPPER. Bongo net |
| R/V Weatherbird | Feb 17-27 2011 | Northern Gulf of Mexico | CTD. SIPPER. Bongo net |
| R/V Weatherbird | May 3-9 2011 | Northern Gulf of Mexico | CTD. SIPPER. Bongo net |
| R/V Weatherbird | Jun 25-Jul 1 2011 | West Florida shelf | CTD. SIPPER. Bongo net |
| R/V Weatherbird | Sep 20-29 2011 | Northern Gulf of Mexico | CTD. SIPPER. Bongo net |
| R/V Weatherbird | Nov 1-8 2011 | West Florida shelf | CTD. SIPPER. Bongo net |
| R/V Weatherbird | Feb 15-24 2012 | Northern Gulf of Mexico | CTD. SIPPER |

PARTICIPANTS AND COLLABORATORS

8) Project participants

Please list the participants of your project, their role(s) and contact information. No personal information will be released. **Note: Student/educational information will be collected elsewhere in this report.***

** We understand one person may fulfill more than one role; please list all applicable roles using the following standardized titles: Principal Investigator, Co-Principal Investigator, Scientific Participant, Technician, Lab Assistant, Administrative Support*

| First Name | Last Name | Role in Project | Institution | Email |
|------------|-----------------|------------------------|-----------------------|------------------------|
| Kendra | Daly | Lead PI | USF | kdaly@marine.usf.edu |
| Dmitry | Goldgof | Co-PI | USF | goldgof@gmail.com |
| Larry | Hall | Co-PI | USF | hall@cse.usf.edu |
| Rangachar | Kasturi | Co-PI | USF | r1k@cse.usf.edu |
| Jon | Cohen | Co-PI | Eckerd/ U Delaware | jhcohen@udel.edu |
| Andrew | Remsen | Scientific participant | USF | aremsen@marine.usf.edu |
| Karen | Dreger | Technician | USF | kdreger@mail.usf.edu |
| Sue | Murasko | Technician | USF/FWRI | Sue.Murasko@MYFWC.COM |
| Dawn | Outram | Technician | USF | doutram@gso.uri.edu |
| Leslie | Schwierzke-Wade | Technician | USF | lswade@mail.usf.edu |
| Stephanie | Burkhardt | Technician | Eckerd | burkasm@eckerd.edu |
| Lillian | McCormick | Technician | U Delaware | mccormlr@udel.Edu |

MENTORING AND TRAINING

9) Student and post-doctoral participants

Please list the student participants of your project, their educational role, and other information. No personal information will be released.

| First Name | Last Name | Post-doc / PhD / MS / BS | Thesis or research topic | Institution | Supervisor | Expected Completion year |
|------------|------------|--------------------------|--|-----------------------------|-------------------|--------------------------|
| Tim | Lee | PhD | Zooplankton dynamics | USF | Daly | 2016 |
| Sergiy | Fefilyayev | PhD | Algorithms for visual maritime surveillance with rapidly moving camera | USF | Goldgof/Hall | 2012 |
| Rajmadhan | Ekambaram | PhD | Label Noise Cleansing | University of South Florida | Rangachar Kasturi | |
| Matthew | Shreve | PhD | Facial Motion Analysis for Expression and Human Identification | USF | Goldgof | 2013 |
| Ryan | Peiffer | MS | Physiology and behavior of marine zooplankton in response to oil/dispersants | U Delaware | Cohen | 2014 |

10) Student and post-doctoral publications, if planned

- a. Published, peer-reviewed bibliography (Copies of the papers are requested)
- b. Manuscripts submitted or in preparation (Please note target journal, and anticipated date of submission or publication)

Publications with S. Fefilatjev as lead author are listed in Section 4.

11) Student and post-doctoral presentations and posters, if planned (Please provide copies of each)

Presentation by S. Fefilatjev as lead author (presented by his supervisor, L. Hall) is listed in Section 5.

| Title | Presenter | Authors | Meeting or Audience | Abstract published (Y/N) | Date |
|--|------------|------------------------------|--|--------------------------|---------|
| Lethal and sublethal effects of chemical dispersant on the coastal ctenophore <i>Mnemiopsis leidyi</i> | R. Peiffer | Peiffer, R.F. and J.H. Cohen | Gulf of Mexico Oil Spill & Ecosystem Science Conference, New Orleans, LA | Y | 1/22/13 |

12) Images

Please attach high-resolution image and provide details including a description of the image, location, credit, date, etc. Of note: Image may be used in GoMRI promotions, make sure you have rights to use the image. Note: GoMRI will establish a Flickr site to share these images through the GoMRI website and with media and the public.

13) Continuing Research

If you are continuing this research under another grant, please include granting authority and title of award and a very brief synopsis (2-3 sentences).

Dr. K. Daly: Our Gulf of Mexico oil response research is continuing as part of USF’s Center of Integrated Modeling and Analysis of the Gulf Ecosystem (C-IMAGE) project funded by the Gulf of Mexico Research Initiative. The title of the award is C-IMAGE: Environmental Impacts on Plankton. We are continuing our cruises to the northern Gulf of Mexico and the west Florida shelf to investigate the impact of environmental conditions on the seasonal abundance and distribution of phytoplankton and zooplankton.

Dr. J. Cohen: This work generated GoMRI RFP 2 and NOAA/CRRC Dispersant Initiative proposals in 2012, but these were not funded. We do not otherwise anticipate continuing this research beyond R. Peiffer’s MS thesis.

APPENDIX 1

DR. J. COHEN: Spreadsheet for Experimental Data Archive.

| Species | Cruise | Date | Station | Experiment | Treatment | Bottle # | #Alive 24h | #Dead 24h | #Alive 48h | Total Dead 48h |
|-------------------------------------|------------|---------|------------|------------|-------------------|----------|------------|-----------|------------|----------------|
| <i>Beroe ovata</i> | WBII 09-11 | 9/23/11 | NE Line 01 | Sept.11.2 | 22.6 mg/L Corexit | 11 | 0 | 1 | -- | -- |
| <i>Beroe ovata</i> | WBII 09-11 | 9/23/11 | NE Line 01 | Sept.11.2 | 22.6 mg/L Corexit | 15 | 0 | 1 | -- | -- |
| <i>Beroe ovata</i> | WBII 09-11 | 9/23/11 | NE Line 01 | Sept.11.2 | 22.6 mg/L Corexit | 10 | 0 | 1 | -- | -- |
| <i>Beroe ovata</i> | WBII 09-11 | 9/23/11 | NE Line 01 | Sept.11.2 | FSW | 13 | 1 | 0 | -- | -- |
| <i>Beroe ovata</i> | WBII 09-11 | 9/23/11 | NE Line 01 | Sept.11.2 | FSW | 23 | 1 | 0 | -- | -- |
| <i>Beroe ovata</i> | WBII 09-11 | 9/23/11 | NE Line 01 | Sept.11.2 | FSW | 14 | 0 | 1 | -- | -- |
| <i>Beroe ovata</i> | WBII 09-11 | 9/24/11 | DSH 08 | Sept.11.3 | 22.6 mg/L Corexit | 30 | 1 | 0 | -- | -- |
| <i>Beroe ovata</i> | WBII 09-11 | 9/24/11 | DSH 08 | Sept.11.3 | 22.6 mg/L Corexit | 33 | 0 | 1 | -- | -- |
| <i>Beroe ovata</i> | WBII 09-11 | 9/24/11 | DSH 08 | Sept.11.3 | 22.6 mg/L Corexit | 42 | 0 | 1 | -- | -- |
| <i>Beroe ovata</i> | WBII 09-11 | 9/24/11 | DSH 08 | Sept.11.3 | 22.6 mg/L Corexit | 14 | 0 | 1 | -- | -- |
| <i>Beroe ovata</i> | WBII 09-11 | 9/24/11 | DSH 08 | Sept.11.3 | FSW | 27 | 1 | 0 | -- | -- |
| <i>Beroe ovata</i> | WBII 09-11 | 9/24/11 | DSH 08 | Sept.11.3 | FSW | 21 | 1 | 0 | -- | -- |
| <i>Beroe ovata</i> | WBII 09-11 | 9/24/11 | DSH 08 | Sept.11.3 | FSW | 4 | 0 | 1 | -- | -- |
| <i>Beroe ovata</i> | WBII 09-11 | 9/24/11 | DSH 08 | Sept.11.3 | FSW | 20 | 1 | 0 | -- | -- |
| <i>Beroe ovata</i> | WBII 09-11 | 9/26/11 | DSH 07 | Sept.11.5 | 11.3 mg/L Corexit | 18 | 0 | 1 | -- | -- |
| <i>Beroe ovata</i> | WBII 09-11 | 9/26/11 | DSH 07 | Sept.11.5 | 11.3 mg/L Corexit | 47 | 1 | 0 | -- | -- |
| <i>Beroe ovata</i> | WBII 09-11 | 9/26/11 | DSH 07 | Sept.11.5 | 11.3 mg/L Corexit | 39 | 1 | 0 | -- | -- |
| <i>Beroe ovata</i> | WBII 09-11 | 9/26/11 | DSH 07 | Sept.11.5 | 11.3 mg/L Corexit | 24 | 1 | 0 | -- | -- |
| <i>Beroe ovata</i> | WBII 09-11 | 9/26/11 | DSH 07 | Sept.11.5 | 11.3 mg/L Corexit | 12 | 1 | 0 | -- | -- |
| <i>Beroe ovata</i> | WBII 09-11 | 9/27/11 | PCB 04 | Sept.11.7 | 8.0 mg/L CE-WAF | 8 | 1 | 0 | -- | -- |
| <i>Beroe ovata</i> | WBII 09-11 | 9/27/11 | PCB 04 | Sept.11.7 | 8.0 mg/L CE-WAF | 17 | 1 | 0 | -- | -- |
| <i>Beroe ovata</i> | WBII 09-11 | 9/27/11 | PCB 04 | Sept.11.7 | 8.0 mg/L CE-WAF | 2 | 1 | 0 | -- | -- |
| <i>Beroe ovata</i> | WBII 09-11 | 9/27/11 | PCB 04 | Sept.11.7 | 8.0 mg/L CE-WAF | 23 | 1 | 0 | -- | -- |
| <i>Calinectes sapidus megalopae</i> | WBII 09-11 | 9/24/11 | DSH 08 | Sept.11.3 | 22.6 mg/L Corexit | 36 | 1 | 0 | -- | -- |
| <i>Calinectes sapidus megalopae</i> | WBII 09-11 | 9/24/11 | DSH 08 | Sept.11.3 | 22.6 mg/L Corexit | 39 | 1 | 0 | -- | -- |
| <i>Calinectes sapidus megalopae</i> | WBII 09-11 | 9/24/11 | DSH 08 | Sept.11.3 | 22.6 mg/L Corexit | 24 | 1 | 0 | -- | -- |
| <i>Calinectes sapidus megalopae</i> | WBII 09-11 | 9/24/11 | DSH 08 | Sept.11.3 | 22.6 mg/L Corexit | 12 | 1 | 0 | -- | -- |
| <i>Calinectes sapidus megalopae</i> | WBII 09-11 | 9/24/11 | DSH 08 | Sept.11.3 | FSW | 47 | 1 | 0 | -- | -- |
| <i>Calinectes sapidus megalopae</i> | WBII 09-11 | 9/24/11 | DSH 08 | Sept.11.3 | FSW | 48 | 1 | 0 | -- | -- |
| <i>Calinectes sapidus megalopae</i> | WBII 09-11 | 9/24/11 | DSH 08 | Sept.11.3 | FSW | 37 | 1 | 0 | -- | -- |
| <i>Calinectes sapidus megalopae</i> | WBII 09-11 | 9/24/11 | DSH 08 | Sept.11.3 | FSW | 18 | 1 | 0 | -- | -- |
| <i>Calinectes sapidus megalopae</i> | WBII 09-11 | 9/25/11 | PCB 11 | Sept.11.4 | 11.3 mg/L Corexit | 38 | 1 | 0 | -- | -- |
| <i>Calinectes sapidus megalopae</i> | WBII 09-11 | 9/25/11 | PCB 11 | Sept.11.4 | 11.3 mg/L Corexit | 19 | 1 | 0 | -- | -- |
| <i>Calinectes sapidus megalopae</i> | WBII 09-11 | 9/25/11 | PCB 11 | Sept.11.4 | 11.3 mg/L Corexit | 25 | 1 | 0 | -- | -- |
| <i>Calinectes sapidus megalopae</i> | WBII 09-11 | 9/25/11 | PCB 11 | Sept.11.4 | 11.3 mg/L Corexit | 26 | 1 | 0 | -- | -- |
| <i>Calinectes sapidus megalopae</i> | WBII 09-11 | 9/25/11 | PCB 11 | Sept.11.4 | 11.3 mg/L Corexit | 28 | 1 | 0 | -- | -- |
| <i>Calinectes sapidus megalopae</i> | WBII 09-11 | 9/25/11 | PCB 11 | Sept.11.4 | 11.3 mg/L Corexit | 13 | 0 | 1 | -- | -- |
| <i>Calinectes sapidus megalopae</i> | WBII 09-11 | 9/25/11 | PCB 11 | Sept.11.4 | 11.3 mg/L Corexit | 10 | 1 | 0 | -- | -- |
| <i>Calinectes sapidus megalopae</i> | WBII 09-11 | 9/25/11 | PCB 11 | Sept.11.4 | FSW | 2 | 1 | 0 | -- | -- |
| <i>Calinectes sapidus megalopae</i> | WBII 09-11 | 9/25/11 | PCB 11 | Sept.11.4 | FSW | 5 | 1 | 0 | -- | -- |
| <i>Calinectes sapidus megalopae</i> | WBII 09-11 | 9/25/11 | PCB 11 | Sept.11.4 | FSW | 3 | 1 | 0 | -- | -- |
| <i>Calinectes sapidus megalopae</i> | WBII 09-11 | 9/25/11 | PCB 11 | Sept.11.4 | FSW | 17 | 1 | 0 | -- | -- |
| <i>Calinectes sapidus megalopae</i> | WBII 09-11 | 9/25/11 | PCB 11 | Sept.11.4 | FSW | 22 | 1 | 0 | -- | -- |

| | | | | | | | | | | |
|---------------------------------|------------|---------|--------------|----------|-------------------|--------|---|---|----|----|
| <i>Candancia paenelongimana</i> | WBII 05-12 | 5/14/12 | PCB 06 | May.12.6 | 8 mg/L CEWAF | 54 | 0 | 1 | -- | -- |
| <i>Candancia paenelongimana</i> | WBII 05-12 | 5/14/12 | PCB 06 | May.12.6 | 8 mg/L CEWAF | 79 | 0 | 1 | -- | -- |
| <i>Candancia paenelongimana</i> | WBII 05-12 | 5/14/12 | PCB 06 | May.12.6 | 8.8 mg/L WAF | 20 | 1 | 0 | -- | -- |
| <i>Candancia paenelongimana</i> | WBII 05-12 | 5/14/12 | PCB 06 | May.12.6 | 8.8 mg/L WAF | 19 | 1 | 0 | -- | -- |
| <i>Candancia paenelongimana</i> | WBII 05-12 | 5/14/12 | PCB 06 | May.12.6 | 8.8 mg/L WAF | 21 | 1 | 0 | -- | -- |
| <i>Candancia paenelongimana</i> | WBII 05-12 | 5/14/12 | PCB 06 | May.12.6 | 8.8 mg/L WAF | 65 | 1 | 0 | -- | -- |
| <i>Candancia paenelongimana</i> | WBII 05-12 | 5/14/12 | PCB 06 | May.12.6 | 8.8 mg/L WAF | 87 | 1 | 0 | -- | -- |
| <i>Candancia paenelongimana</i> | WBII 05-12 | 5/14/12 | PCB 06 | May.12.6 | 8.8 mg/L WAF | 22 | 0 | 1 | -- | -- |
| <i>Candancia paenelongimana</i> | WBII 05-12 | 5/14/12 | PCB 06 | May.12.6 | 8.8 mg/L WAF | 41 | 0 | 1 | -- | -- |
| <i>Candancia paenelongimana</i> | WBII 05-12 | 5/14/12 | PCB 06 | May.12.6 | 8.8 mg/L WAF | 18 | 0 | 1 | -- | -- |
| <i>Candancia paenelongimana</i> | WBII 05-12 | 5/14/12 | PCB 06 | May.12.6 | 8.8 mg/L WAF | 9 | 0 | 1 | -- | -- |
| <i>Candancia paenelongimana</i> | WBII 05-12 | 5/14/12 | PCB 06 | May.12.6 | FSW | 76 | 1 | 0 | -- | -- |
| <i>Candancia paenelongimana</i> | WBII 05-12 | 5/14/12 | PCB 06 | May.12.6 | FSW | 97 | 1 | 0 | -- | -- |
| <i>Candancia paenelongimana</i> | WBII 05-12 | 5/14/12 | PCB 06 | May.12.6 | FSW | 66 | 1 | 0 | -- | -- |
| <i>Candancia paenelongimana</i> | WBII 05-12 | 5/14/12 | PCB 06 | May.12.6 | FSW | 86 | 1 | 0 | -- | -- |
| <i>Candancia paenelongimana</i> | WBII 05-12 | 5/14/12 | PCB 06 | May.12.6 | FSW | 71 | 1 | 0 | -- | -- |
| <i>Candancia paenelongimana</i> | WBII 05-12 | 5/14/12 | PCB 06 | May.12.6 | FSW | 24 | 1 | 0 | -- | -- |
| <i>Candancia paenelongimana</i> | WBII 05-12 | 5/14/12 | PCB 06 | May.12.6 | FSW | 61 | 1 | 0 | -- | -- |
| <i>Candancia paenelongimana</i> | WBII 05-12 | 5/14/12 | PCB 06 | May.12.6 | FSW | 37 | 1 | 0 | -- | -- |
| <i>Candancia paenelongimana</i> | WBII 05-12 | 5/14/12 | PCB 06 | May.12.6 | FSW | 95 | 1 | 0 | -- | -- |
| <i>Candancia paenelongimana</i> | WBII 05-12 | 5/14/12 | PCB 06 | May.12.6 | FSW | 12 | 0 | 1 | -- | -- |
| <i>Candancia paenelongimana</i> | WBII 08-12 | 8/7/12 | PCB 11 | Aug.12.1 | 11.3 mg/L Corexit | 40-118 | 0 | 1 | -- | -- |
| <i>Candancia paenelongimana</i> | WBII 08-12 | 8/7/12 | PCB 11 | Aug.12.1 | 11.3 mg/L Corexit | 40-65 | 0 | 1 | -- | -- |
| <i>Candancia paenelongimana</i> | WBII 08-12 | 8/7/12 | PCB 11 | Aug.12.1 | 11.3 mg/L Corexit | 40-52 | 0 | 1 | -- | -- |
| <i>Candancia paenelongimana</i> | WBII 08-12 | 8/7/12 | PCB 11 | Aug.12.1 | 22.6 mg/L Corexit | 40-68 | 0 | 1 | -- | -- |
| <i>Candancia paenelongimana</i> | WBII 08-12 | 8/7/12 | PCB 11 | Aug.12.1 | 22.6 mg/L Corexit | 40-66 | 0 | 1 | -- | -- |
| <i>Candancia paenelongimana</i> | WBII 08-12 | 8/7/12 | PCB 11 | Aug.12.1 | 22.6 mg/L Corexit | 40-3 | 0 | 1 | -- | -- |
| <i>Candancia paenelongimana</i> | WBII 08-12 | 8/7/12 | PCB 11 | Aug.12.1 | 8 mg/L CEWAF | 40-4 | 1 | 0 | -- | -- |
| <i>Candancia paenelongimana</i> | WBII 08-12 | 8/7/12 | PCB 11 | Aug.12.1 | 8 mg/L CEWAF | 40-62 | 1 | 0 | -- | -- |
| <i>Candancia paenelongimana</i> | WBII 08-12 | 8/7/12 | PCB 11 | Aug.12.1 | 8 mg/L CEWAF | 40-63 | 0 | 1 | -- | -- |
| <i>Candancia paenelongimana</i> | WBII 08-12 | 8/7/12 | PCB 11 | Aug.12.1 | 8.8 mg/L WAF | 40-113 | 1 | 0 | -- | -- |
| <i>Candancia paenelongimana</i> | WBII 08-12 | 8/7/12 | PCB 11 | Aug.12.1 | 8.8 mg/L WAF | 40-39 | 1 | 0 | -- | -- |
| <i>Candancia paenelongimana</i> | WBII 08-12 | 8/7/12 | PCB 11 | Aug.12.1 | 8.8 mg/L WAF | 40-59 | 1 | 0 | -- | -- |
| <i>Candancia paenelongimana</i> | WBII 08-12 | 8/7/12 | PCB 11 | Aug.12.1 | FSW | 40-2 | 1 | 0 | -- | -- |
| <i>Candancia paenelongimana</i> | WBII 08-12 | 8/7/12 | PCB 11 | Aug.12.1 | FSW | 40-61 | 0 | 1 | -- | -- |
| <i>Candancia paenelongimana</i> | WBII 08-12 | 8/7/12 | PCB 11 | Aug.12.1 | FSW | 40-35 | 0 | 1 | -- | -- |
| <i>Candancia paenelongimana</i> | WBII 08-12 | 8/8/12 | DHW Wellhead | Aug.12.2 | 11.3 mg/L Corexit | 10 | 1 | 0 | -- | -- |
| <i>Candancia paenelongimana</i> | WBII 08-12 | 8/8/12 | DHW Wellhead | Aug.12.2 | 11.3 mg/L Corexit | 73 | 1 | 0 | -- | -- |
| <i>Candancia paenelongimana</i> | WBII 08-12 | 8/8/12 | DHW Wellhead | Aug.12.2 | 11.3 mg/L Corexit | 85 | 0 | 1 | -- | -- |
| <i>Candancia paenelongimana</i> | WBII 08-12 | 8/8/12 | DHW Wellhead | Aug.12.2 | 11.3 mg/L Corexit | 78 | 0 | 1 | -- | -- |
| <i>Candancia paenelongimana</i> | WBII 08-12 | 8/8/12 | DHW Wellhead | Aug.12.2 | 22.6 mg/L Corexit | 66 | 0 | 1 | -- | -- |
| <i>Candancia paenelongimana</i> | WBII 08-12 | 8/8/12 | DHW Wellhead | Aug.12.2 | 22.6 mg/L Corexit | 72 | 0 | 1 | -- | -- |
| <i>Candancia paenelongimana</i> | WBII 08-12 | 8/8/12 | DHW Wellhead | Aug.12.2 | 22.6 mg/L Corexit | 26 | 0 | 1 | -- | -- |
| <i>Candancia paenelongimana</i> | WBII 08-12 | 8/8/12 | DHW Wellhead | Aug.12.2 | 8 mg/L CEWAF | 19 | 1 | 0 | -- | -- |

| | | | | | | | | | | |
|---------------------------------|------------|---------|--------------|-----------|-------------------|----|---|---|----|----|
| <i>Candancia paenelongimana</i> | WBII 08-12 | 8/8/12 | DHW Wellhead | Aug.12.2 | 8 mg/L CEWAF | 12 | 1 | 0 | -- | -- |
| <i>Candancia paenelongimana</i> | WBII 08-12 | 8/8/12 | DHW Wellhead | Aug.12.2 | 8 mg/L CEWAF | 95 | 1 | 0 | -- | -- |
| <i>Candancia paenelongimana</i> | WBII 08-12 | 8/8/12 | DHW Wellhead | Aug.12.2 | 8.8 mg/L WAF | 37 | 1 | 0 | -- | -- |
| <i>Candancia paenelongimana</i> | WBII 08-12 | 8/8/12 | DHW Wellhead | Aug.12.2 | 8.8 mg/L WAF | 93 | 0 | 1 | -- | -- |
| <i>Candancia paenelongimana</i> | WBII 08-12 | 8/8/12 | DHW Wellhead | Aug.12.2 | 8.8 mg/L WAF | 86 | 0 | 1 | -- | -- |
| <i>Candancia paenelongimana</i> | WBII 08-12 | 8/8/12 | DHW Wellhead | Aug.12.2 | FSW | 71 | 1 | 0 | -- | -- |
| <i>Candancia paenelongimana</i> | WBII 08-12 | 8/8/12 | DHW Wellhead | Aug.12.2 | FSW | 97 | 1 | 0 | -- | -- |
| <i>Candancia paenelongimana</i> | WBII 08-12 | 8/8/12 | DHW Wellhead | Aug.12.2 | FSW | 96 | 1 | 0 | -- | -- |
| <i>Euphasia</i> sp. | WBII 09-11 | 9/26/11 | DSH 07 | Sept.11.5 | 11.3 mg/L Corexit | 36 | 0 | 1 | -- | -- |
| <i>Euphasia</i> sp. | WBII 09-11 | 9/26/11 | DSH 07 | Sept.11.5 | 11.3 mg/L Corexit | 21 | 0 | 1 | -- | -- |
| <i>Euphasia</i> sp. | WBII 09-11 | 9/26/11 | DSH 07 | Sept.11.5 | 11.3 mg/L Corexit | 4 | 0 | 1 | -- | -- |
| <i>Euphasia</i> sp. | WBII 09-11 | 9/26/11 | DSH 07 | Sept.11.5 | 11.3 mg/L Corexit | 37 | 0 | 1 | -- | -- |
| <i>Euphasia</i> sp. | WBII 09-11 | 9/26/11 | DSH 07 | Sept.11.5 | 11.3 mg/L Corexit | 48 | 0 | 1 | -- | -- |
| <i>Euphasia</i> sp. | WBII 09-11 | 9/26/11 | PCB 05 | Sept.11.6 | 8.8 mg/L WAF | 25 | 0 | 1 | -- | -- |
| <i>Euphasia</i> sp. | WBII 09-11 | 9/26/11 | PCB 05 | Sept.11.6 | 8.8 mg/L WAF | 7 | 0 | 1 | -- | -- |
| <i>Euphasia</i> sp. | WBII 09-11 | 9/26/11 | PCB 05 | Sept.11.6 | 8.8 mg/L WAF | 28 | 0 | 1 | -- | -- |
| <i>Euphasia</i> sp. | WBII 09-11 | 9/26/11 | PCB 05 | Sept.11.6 | 8.8 mg/L WAF | 38 | 0 | 1 | -- | -- |
| <i>Euphasia</i> sp. | WBII 09-11 | 9/26/11 | PCB 05 | Sept.11.6 | 8.8 mg/L WAF | 3 | 0 | 1 | -- | -- |
| <i>Euphasia</i> sp. | WBII 09-11 | 9/26/11 | DSH 07 | Sept.11.5 | FSW | 42 | 0 | 1 | -- | -- |
| <i>Euphasia</i> sp. | WBII 09-11 | 9/26/11 | DSH 07 | Sept.11.5 | FSW | 14 | 1 | 0 | -- | -- |
| <i>Euphasia</i> sp. | WBII 09-11 | 9/26/11 | DSH 07 | Sept.11.5 | FSW | 30 | 1 | 0 | -- | -- |
| <i>Euphasia</i> sp. | WBII 09-11 | 9/26/11 | DSH 07 | Sept.11.5 | FSW | 27 | 1 | 0 | -- | -- |
| <i>Euphasia</i> sp. | WBII 09-11 | 9/26/11 | DSH 07 | Sept.11.5 | FSW | 20 | 1 | 0 | -- | -- |
| <i>Euphasia</i> sp. | WBII 09-11 | 9/26/11 | PCB 05 | Sept.11.8 | 8.8 mg/L WAF | 37 | 0 | 1 | -- | -- |
| <i>Euphasia</i> sp. | WBII 09-11 | 9/26/11 | PCB 05 | Sept.11.8 | 8.8 mg/L WAF | 12 | 0 | 1 | -- | -- |
| <i>Lestrigonus</i> sp. | WBII 11-11 | 11/3/11 | ST 18 | Nov.11.1 | 22.6 mg/L Corexit | 47 | 1 | 0 | -- | -- |
| <i>Lestrigonus</i> sp. | WBII 11-11 | 11/3/11 | ST 18 | Nov.11.1 | 22.6 mg/L Corexit | 28 | 0 | 1 | -- | -- |
| <i>Lestrigonus</i> sp. | WBII 11-11 | 11/3/11 | ST 18 | Nov.11.1 | 22.6 mg/L Corexit | 19 | 0 | 1 | -- | -- |
| <i>Lestrigonus</i> sp. | WBII 11-11 | 11/3/11 | ST 18 | Nov.11.1 | 22.6 mg/L Corexit | 25 | 1 | 0 | -- | -- |
| <i>Lestrigonus</i> sp. | WBII 11-11 | 11/3/11 | ST 18 | Nov.11.1 | 22.6 mg/L Corexit | 13 | 0 | 1 | -- | -- |
| <i>Lestrigonus</i> sp. | WBII 11-11 | 11/3/11 | ST 18 | Nov.11.1 | 22.6 mg/L Corexit | 18 | 0 | 1 | -- | -- |
| <i>Lestrigonus</i> sp. | WBII 11-11 | 11/3/11 | ST 18 | Nov.11.1 | 22.6 mg/L Corexit | 36 | 0 | 1 | -- | -- |
| <i>Lestrigonus</i> sp. | WBII 11-11 | 11/3/11 | ST 18 | Nov.11.1 | FSW | 51 | 1 | 0 | -- | -- |
| <i>Lestrigonus</i> sp. | WBII 11-11 | 11/3/11 | ST 18 | Nov.11.1 | FSW | 52 | 1 | 0 | -- | -- |
| <i>Lestrigonus</i> sp. | WBII 11-11 | 11/3/11 | ST 18 | Nov.11.1 | FSW | 53 | 1 | 0 | -- | -- |
| <i>Lestrigonus</i> sp. | WBII 11-11 | 11/3/11 | ST 18 | Nov.11.1 | FSW | 54 | 1 | 0 | -- | -- |
| <i>Lestrigonus</i> sp. | WBII 11-11 | 11/3/11 | ST 18 | Nov.11.1 | FSW | 55 | 1 | 0 | -- | -- |
| <i>Lestrigonus</i> sp. | WBII 11-11 | 11/3/11 | ST 18 | Nov.11.1 | FSW | 56 | 0 | 1 | -- | -- |
| <i>Lestrigonus</i> sp. | WBII 11-11 | 11/3/11 | ST 18 | Nov.11.1 | FSW | 57 | 1 | 0 | -- | -- |
| <i>Lestrigonus</i> sp. | WBII 05-12 | 5/10/12 | DSH 09 | May.12.1 | 11.3 mg/L Corexit | 96 | 1 | 0 | -- | -- |
| <i>Lestrigonus</i> sp. | WBII 05-12 | 5/10/12 | DSH 09 | May.12.1 | 11.3 mg/L Corexit | 68 | 1 | 0 | -- | -- |
| <i>Lestrigonus</i> sp. | WBII 05-12 | 5/10/12 | DSH 09 | May.12.1 | 11.3 mg/L Corexit | 93 | 1 | 0 | -- | -- |
| <i>Lestrigonus</i> sp. | WBII 05-12 | 5/10/12 | DSH 09 | May.12.1 | 11.3 mg/L Corexit | 94 | 1 | 0 | -- | -- |
| <i>Lestrigonus</i> sp. | WBII 05-12 | 5/10/12 | DSH 09 | May.12.1 | 11.3 mg/L Corexit | 91 | 1 | 0 | -- | -- |

| | | | | | | | | | | |
|------------------------|------------|---------|--------------|----------|-------------------|----|---|---|----|----|
| <i>Lestrigonus</i> sp. | WBII 05-12 | 5/10/12 | DSH 09 | May.12.1 | 22.6 mg/L Corexit | 67 | 1 | 0 | -- | -- |
| <i>Lestrigonus</i> sp. | WBII 05-12 | 5/10/12 | DSH 09 | May.12.1 | 22.6 mg/L Corexit | 65 | 1 | 0 | -- | -- |
| <i>Lestrigonus</i> sp. | WBII 05-12 | 5/10/12 | DSH 09 | May.12.1 | 22.6 mg/L Corexit | 92 | 1 | 0 | -- | -- |
| <i>Lestrigonus</i> sp. | WBII 05-12 | 5/10/12 | DSH 09 | May.12.1 | 22.6 mg/L Corexit | 89 | 1 | 0 | -- | -- |
| <i>Lestrigonus</i> sp. | WBII 05-12 | 5/10/12 | DSH 09 | May.12.1 | 22.6 mg/L Corexit | 90 | 1 | 0 | -- | -- |
| <i>Lestrigonus</i> sp. | WBII 05-12 | 5/10/12 | DHW Wellhead | May.12.2 | 8 mg/L CEWAF | 64 | 1 | 0 | -- | -- |
| <i>Lestrigonus</i> sp. | WBII 05-12 | 5/10/12 | DHW Wellhead | May.12.2 | 8 mg/L CEWAF | 71 | 1 | 0 | -- | -- |
| <i>Lestrigonus</i> sp. | WBII 05-12 | 5/10/12 | DHW Wellhead | May.12.2 | 8 mg/L CEWAF | 70 | 1 | 0 | -- | -- |
| <i>Lestrigonus</i> sp. | WBII 05-12 | 5/10/12 | DHW Wellhead | May.12.2 | 8 mg/L CEWAF | 61 | 1 | 0 | -- | -- |
| <i>Lestrigonus</i> sp. | WBII 05-12 | 5/10/12 | DHW Wellhead | May.12.2 | 8 mg/L CEWAF | 59 | 0 | 1 | -- | -- |
| <i>Lestrigonus</i> sp. | WBII 05-12 | 5/10/12 | DHW Wellhead | May.12.2 | 8.8 mg/L WAF | 60 | 1 | 0 | -- | -- |
| <i>Lestrigonus</i> sp. | WBII 05-12 | 5/10/12 | DHW Wellhead | May.12.2 | 8.8 mg/L WAF | 62 | 1 | 0 | -- | -- |
| <i>Lestrigonus</i> sp. | WBII 05-12 | 5/10/12 | DHW Wellhead | May.12.2 | 8.8 mg/L WAF | 51 | 1 | 0 | -- | -- |
| <i>Lestrigonus</i> sp. | WBII 05-12 | 5/10/12 | DHW Wellhead | May.12.2 | 8.8 mg/L WAF | 54 | 1 | 0 | -- | -- |
| <i>Lestrigonus</i> sp. | WBII 05-12 | 5/10/12 | DHW Wellhead | May.12.2 | 8.8 mg/L WAF | 58 | 0 | 1 | -- | -- |
| <i>Lestrigonus</i> sp. | WBII 05-12 | 5/10/12 | DSH 09 | May.12.1 | FSW | 81 | 1 | 0 | -- | -- |
| <i>Lestrigonus</i> sp. | WBII 05-12 | 5/10/12 | DSH 09 | May.12.1 | FSW | 83 | 1 | 0 | -- | -- |
| <i>Lestrigonus</i> sp. | WBII 05-12 | 5/10/12 | DSH 09 | May.12.1 | FSW | 99 | 1 | 0 | -- | -- |
| <i>Lestrigonus</i> sp. | WBII 05-12 | 5/10/12 | DSH 09 | May.12.1 | FSW | 97 | 1 | 0 | -- | -- |
| <i>Lestrigonus</i> sp. | WBII 05-12 | 5/10/12 | DSH 09 | May.12.1 | FSW | 66 | 1 | 0 | -- | -- |
| <i>Lestrigonus</i> sp. | WBII 05-12 | 5/10/12 | DSH 09 | May.12.1 | FSW | 75 | 1 | 0 | -- | -- |
| <i>Lestrigonus</i> sp. | WBII 05-12 | 5/10/12 | DSH 09 | May.12.1 | FSW | 76 | 1 | 0 | -- | -- |
| <i>Lestrigonus</i> sp. | WBII 05-12 | 5/10/12 | DSH 09 | May.12.1 | FSW | 74 | 1 | 0 | -- | -- |
| <i>Lestrigonus</i> sp. | WBII 05-12 | 5/10/12 | DHW Wellhead | May.12.2 | FSW | 56 | 1 | 0 | -- | -- |
| <i>Lestrigonus</i> sp. | WBII 05-12 | 5/10/12 | DHW Wellhead | May.12.2 | FSW | 49 | 1 | 0 | -- | -- |
| <i>Lestrigonus</i> sp. | WBII 05-12 | 5/10/12 | DHW Wellhead | May.12.2 | FSW | 9 | 1 | 0 | -- | -- |
| <i>Lestrigonus</i> sp. | WBII 05-12 | 5/10/12 | DHW Wellhead | May.12.2 | FSW | 38 | 1 | 0 | -- | -- |
| <i>Lestrigonus</i> sp. | WBII 05-12 | 5/10/12 | DSH 09 | May.12.1 | FSW | 82 | 0 | 1 | -- | -- |
| <i>Lestrigonus</i> sp. | WBII 05-12 | 5/12/12 | PCB 03 | May.12.3 | 8 mg/L CEWAF | 13 | 1 | 0 | -- | -- |
| <i>Lestrigonus</i> sp. | WBII 05-12 | 5/12/12 | PCB 03 | May.12.3 | 8 mg/L CEWAF | 72 | 1 | 0 | -- | -- |
| <i>Lestrigonus</i> sp. | WBII 05-12 | 5/12/12 | PCB 03 | May.12.3 | 8 mg/L CEWAF | 73 | 1 | 0 | -- | -- |
| <i>Lestrigonus</i> sp. | WBII 05-12 | 5/12/12 | PCB 03 | May.12.3 | 8 mg/L CEWAF | 61 | 1 | 0 | -- | -- |
| <i>Lestrigonus</i> sp. | WBII 05-12 | 5/12/12 | PCB 03 | May.12.3 | 8 mg/L CEWAF | 71 | 1 | 0 | -- | -- |
| <i>Lestrigonus</i> sp. | WBII 05-12 | 5/12/12 | PCB 03 | May.12.3 | 8 mg/L CEWAF | 59 | 1 | 0 | -- | -- |
| <i>Lestrigonus</i> sp. | WBII 05-12 | 5/12/12 | PCB 03 | May.12.3 | 8 mg/L CEWAF | 25 | 1 | 0 | -- | -- |
| <i>Lestrigonus</i> sp. | WBII 05-12 | 5/12/12 | PCB 03 | May.12.3 | 8 mg/L CEWAF | 12 | 1 | 0 | -- | -- |
| <i>Lestrigonus</i> sp. | WBII 05-12 | 5/12/12 | PCB 03 | May.12.3 | 8.8 mg/L WAF | 3 | 1 | 0 | -- | -- |
| <i>Lestrigonus</i> sp. | WBII 05-12 | 5/12/12 | PCB 03 | May.12.3 | 8.8 mg/L WAF | 28 | 1 | 0 | -- | -- |
| <i>Lestrigonus</i> sp. | WBII 05-12 | 5/12/12 | PCB 03 | May.12.3 | 8.8 mg/L WAF | 26 | 1 | 0 | -- | -- |
| <i>Lestrigonus</i> sp. | WBII 05-12 | 5/12/12 | PCB 03 | May.12.3 | 8.8 mg/L WAF | 5 | 1 | 0 | -- | -- |
| <i>Lestrigonus</i> sp. | WBII 05-12 | 5/12/12 | PCB 03 | May.12.3 | 8.8 mg/L WAF | 37 | 1 | 0 | -- | -- |
| <i>Lestrigonus</i> sp. | WBII 05-12 | 5/12/12 | PCB 03 | May.12.3 | 8.8 mg/L WAF | 85 | 1 | 0 | -- | -- |
| <i>Lestrigonus</i> sp. | WBII 05-12 | 5/12/12 | PCB 03 | May.12.3 | 8.8 mg/L WAF | 95 | 1 | 0 | -- | -- |
| <i>Lestrigonus</i> sp. | WBII 05-12 | 5/12/12 | PCB 03 | May.12.3 | FSW | 96 | 1 | 0 | -- | -- |

| | | | | | | | | | | |
|---------------------------|------------|---------|----------------|-----------|-------------------|-------|----|----|----|----|
| <i>Pontella meadii</i> | WBII 08-12 | 8/5/12 | PCB 02 | Aug.12.3 | FSW | 40-8 | 1 | 0 | -- | -- |
| <i>Pontella meadii</i> | WBII 08-12 | 8/5/12 | PCB 02 | Aug.12.3 | FSW | 40-9 | 1 | 0 | -- | -- |
| <i>Pontella meadii</i> | WBII 08-12 | 8/5/12 | PCB 02 | Aug.12.3 | FSW | 40-10 | 1 | 0 | -- | -- |
| <i>Pontella meadii</i> | WBII 08-12 | 8/5/12 | PCB 02 | Aug.12.3 | FSW | 40-11 | 1 | 0 | -- | -- |
| <i>Pontella meadii</i> | WBII 08-12 | 8/5/12 | PCB 02 | Aug.12.3 | FSW | 40-12 | 0 | 1 | -- | -- |
| <i>Pontella meadii</i> | WBII 08-12 | 8/5/12 | PCB 02 | Aug.12.3 | FSW | 40-13 | 1 | 0 | -- | -- |
| <i>Pontella meadii</i> | WBII 08-12 | 8/5/12 | PCB 02 | Aug.12.3 | FSW | 40-14 | 1 | 0 | -- | -- |
| <i>Pontella meadii</i> | WBII 08-12 | 8/5/12 | PCB 02 | Aug.12.3 | FSW | 40-15 | 1 | 0 | -- | -- |
| <i>Temora turbinata</i> | WBII 09-11 | 9/23/11 | DHW Wellhead | Sept.11.1 | 22.6 mg/L Corexit | 27 | 0 | 7 | -- | -- |
| <i>Temora turbinata</i> | WBII 09-11 | 9/23/11 | DHW Wellhead | Sept.11.1 | 22.6 mg/L Corexit | 33 | 2 | 6 | -- | -- |
| <i>Temora turbinata</i> | WBII 09-11 | 9/23/11 | DHW Wellhead | Sept.11.1 | 22.6 mg/L Corexit | 16 | 2 | 5 | -- | -- |
| <i>Temora turbinata</i> | WBII 09-11 | 9/23/11 | DHW Wellhead | Sept.11.1 | 22.6 mg/L Corexit | 34 | 3 | 6 | -- | -- |
| <i>Temora turbinata</i> | WBII 09-11 | 9/23/11 | DHW Wellhead | Sept.11.1 | FSW | 4 | 7 | 0 | -- | -- |
| <i>Temora turbinata</i> | WBII 09-11 | 9/23/11 | DHW Wellhead | Sept.11.1 | FSW | 43 | 7 | 1 | -- | -- |
| <i>Temora turbinata</i> | WBII 09-11 | 9/23/11 | DHW Wellhead | Sept.11.1 | FSW | 21 | 8 | 2 | -- | -- |
| <i>Temora turbinata</i> | WBII 09-11 | 9/23/11 | DHW Wellhead | Sept.11.1 | FSW | 45 | 6 | 2 | -- | -- |
| <i>Temora turbinata</i> | WBII 09-11 | 9/25/11 | PCB 11 | Sept.11.4 | 11.3 mg/L Corexit | 23 | 0 | 10 | -- | -- |
| <i>Temora turbinata</i> | WBII 09-11 | 9/25/11 | PCB 11 | Sept.11.4 | 11.3 mg/L Corexit | 31 | 1 | 9 | -- | -- |
| <i>Temora turbinata</i> | WBII 09-11 | 9/25/11 | PCB 11 | Sept.11.4 | 11.3 mg/L Corexit | 46 | 0 | 9 | -- | -- |
| <i>Temora turbinata</i> | WBII 09-11 | 9/25/11 | PCB 11 | Sept.11.4 | 11.3 mg/L Corexit | 29 | 2 | 7 | -- | -- |
| <i>Temora turbinata</i> | WBII 09-11 | 9/25/11 | PCB 11 | Sept.11.4 | 11.3 mg/L Corexit | 35 | 1 | 8 | -- | -- |
| <i>Temora turbinata</i> | WBII 09-11 | 9/25/11 | PCB 11 | Sept.11.4 | FSW | 1 | 5 | 5 | -- | -- |
| <i>Temora turbinata</i> | WBII 09-11 | 9/25/11 | PCB 11 | Sept.11.4 | FSW | 40 | 6 | 2 | -- | -- |
| <i>Temora turbinata</i> | WBII 09-11 | 9/25/11 | PCB 11 | Sept.11.4 | FSW | 6 | 8 | 1 | -- | -- |
| <i>Temora turbinata</i> | WBII 09-11 | 9/25/11 | PCB 11 | Sept.11.4 | FSW | 8 | 6 | 2 | -- | -- |
| <i>Temora turbinata</i> | WBII 09-11 | 9/25/11 | PCB 11 | Sept.11.4 | FSW | 41 | 8 | 3 | -- | -- |
| <i>Temora turbinata</i> | WBII 09-11 | 9/26/11 | PCB 05 | Sept.11.6 | 8.8 mg/L WAF | 5 | 7 | 0 | -- | -- |
| <i>Temora turbinata</i> | WBII 09-11 | 9/26/11 | PCB 05 | Sept.11.6 | 8.8 mg/L WAF | 41 | 6 | 0 | -- | -- |
| <i>Temora turbinata</i> | WBII 09-11 | 9/26/11 | PCB 05 | Sept.11.6 | 8.8 mg/L WAF | 9 | 2 | 3 | -- | -- |
| <i>Temora turbinata</i> | WBII 09-11 | 9/27/11 | PCB 04 | Sept.11.7 | 8.8 mg/L WAF | 1 | 5 | 5 | -- | -- |
| <i>Temora turbinata</i> | WBII 09-11 | 9/27/11 | PCB 04 | Sept.11.7 | 8.0 mg/L CE-WAF | 32 | 1 | 7 | -- | -- |
| <i>Temora turbinata</i> | WBII 09-11 | 9/27/11 | PCB 04 | Sept.11.7 | 8.0 mg/L CE-WAF | 33 | 4 | 5 | -- | -- |
| <i>Temora turbinata</i> | WBII 09-11 | 9/27/11 | PCB 04 | Sept.11.7 | 8.0 mg/L CE-WAF | 16 | 3 | 5 | -- | -- |
| <i>Temora turbinata</i> | WBII 09-11 | 9/27/11 | PCB 04 | Sept.11.7 | 8.0 mg/L CE-WAF | 43 | 7 | 4 | -- | -- |
| <i>Temora turbinata</i> | WBII 09-11 | 9/27/11 | JL 01 | Sept.11.8 | 8.8 mg/L WAF | 3 | 7 | 3 | -- | -- |
| <i>Temora turbinata</i> | WBII 09-11 | 9/27/11 | JL 01 | Sept.11.8 | 8.8 mg/L WAF | 7 | 7 | 1 | -- | -- |
| <i>Temora turbinata</i> | WBII 09-11 | 9/27/11 | JL 01 | Sept.11.8 | 8.8 mg/L WAF | 21 | 11 | 2 | -- | -- |
| <i>Temora turbinata</i> | WBII 09-11 | 9/27/11 | JL 01 | Sept.11.8 | 8.8 mg/L WAF | 24 | 7 | 1 | -- | -- |
| <i>Temora turbinata</i> | WBII 09-11 | 9/28/11 | JL 01 | Sept.11.9 | 8.0 mg/L CE-WAF | 4 | 7 | 2 | -- | -- |
| <i>Temora turbinata</i> | WBII 09-11 | 9/28/11 | JL 01 | Sept.11.9 | 8.0 mg/L CE-WAF | 14 | 7 | 4 | -- | -- |
| <i>Labidocera aestiva</i> | Eck Col | 8/1/11 | Boca Ciega Bay | | 6 1 mg/L CEWAF | 23 | 5 | 0 | 3 | 2 |
| <i>Labidocera aestiva</i> | Eck Col | 8/1/11 | Boca Ciega Bay | | 6 1 mg/L CEWAF | 25 | 5 | 0 | 5 | 0 |
| <i>Labidocera aestiva</i> | Eck Col | 8/1/11 | Boca Ciega Bay | | 6 1 mg/L CEWAF | 6 | 5 | 0 | 4 | 1 |
| <i>Labidocera aestiva</i> | Eck Col | 8/1/11 | Boca Ciega Bay | | 6 1 mg/L CEWAF | 22 | 4 | 1 | 4 | 1 |

| | | | | | | | | | | |
|---------------------------|---------|--------|----------------|---|-----------------|----|---|---|---|---|
| <i>Labidocera aestiva</i> | Eck Col | 8/1/11 | Boca Ciega Bay | 6 | 1 mg/L CEWAF | 1 | 4 | 1 | 4 | 1 |
| <i>Labidocera aestiva</i> | Eck Col | 8/1/11 | Boca Ciega Bay | 6 | 1 mg/L CEWAF | 40 | 5 | 0 | 4 | 1 |
| <i>Labidocera aestiva</i> | Eck Col | 8/1/11 | Boca Ciega Bay | 6 | 1 mg/L CEWAF | 17 | 5 | 0 | 4 | 1 |
| <i>Labidocera aestiva</i> | Eck Col | 8/1/11 | Boca Ciega Bay | 6 | 1 mg/L CEWAF | 5 | 5 | 0 | 3 | 2 |
| <i>Labidocera aestiva</i> | Eck Col | 8/1/11 | Boca Ciega Bay | 6 | 10 mg/L CEWAF | 38 | 4 | 1 | 0 | 5 |
| <i>Labidocera aestiva</i> | Eck Col | 8/1/11 | Boca Ciega Bay | 6 | 10 mg/L CEWAF | 9 | 2 | 4 | 1 | 5 |
| <i>Labidocera aestiva</i> | Eck Col | 8/1/11 | Boca Ciega Bay | 6 | 10 mg/L CEWAF | 37 | 1 | 4 | 0 | 5 |
| <i>Labidocera aestiva</i> | Eck Col | 8/1/11 | Boca Ciega Bay | 6 | 10 mg/L CEWAF | 24 | 2 | 3 | 0 | 5 |
| <i>Labidocera aestiva</i> | Eck Col | 8/1/11 | Boca Ciega Bay | 6 | 10 mg/L CEWAF | 46 | 2 | 4 | 0 | 6 |
| <i>Labidocera aestiva</i> | Eck Col | 8/1/11 | Boca Ciega Bay | 6 | 10 mg/L CEWAF | 3 | 3 | 2 | 0 | 5 |
| <i>Labidocera aestiva</i> | Eck Col | 8/1/11 | Boca Ciega Bay | 6 | 10 mg/L CEWAF | 18 | 3 | 2 | 0 | 5 |
| <i>Labidocera aestiva</i> | Eck Col | 8/1/11 | Boca Ciega Bay | 6 | 10 mg/L CEWAF | 19 | 2 | 3 | 0 | 5 |
| <i>Labidocera aestiva</i> | Eck Col | 8/1/11 | Boca Ciega Bay | 6 | 50 mg/L CEWAF | 35 | 0 | 5 | 0 | 5 |
| <i>Labidocera aestiva</i> | Eck Col | 8/1/11 | Boca Ciega Bay | 6 | 50 mg/L CEWAF | 28 | 0 | 5 | 0 | 5 |
| <i>Labidocera aestiva</i> | Eck Col | 8/1/11 | Boca Ciega Bay | 6 | 50 mg/L CEWAF | 26 | 0 | 5 | 0 | 5 |
| <i>Labidocera aestiva</i> | Eck Col | 8/1/11 | Boca Ciega Bay | 6 | 50 mg/L CEWAF | 13 | 0 | 5 | 0 | 5 |
| <i>Labidocera aestiva</i> | Eck Col | 8/1/11 | Boca Ciega Bay | 6 | 50 mg/L CEWAF | 29 | 0 | 5 | 0 | 5 |
| <i>Labidocera aestiva</i> | Eck Col | 8/1/11 | Boca Ciega Bay | 6 | 50 mg/L CEWAF | 41 | 0 | 5 | 0 | 5 |
| <i>Labidocera aestiva</i> | Eck Col | 8/1/11 | Boca Ciega Bay | 6 | 50 mg/L CEWAF | 10 | 0 | 5 | 0 | 5 |
| <i>Labidocera aestiva</i> | Eck Col | 8/1/11 | Boca Ciega Bay | 6 | 50 mg/L CEWAF | 8 | 0 | 5 | 0 | 5 |
| <i>Labidocera aestiva</i> | Eck Col | 7/1/11 | Boca Ciega Bay | 1 | 3 mg/L Corexit | 1 | 5 | 1 | 3 | 3 |
| <i>Labidocera aestiva</i> | Eck Col | 7/1/11 | Boca Ciega Bay | 1 | 3 mg/L Corexit | 22 | 5 | 0 | 4 | 1 |
| <i>Labidocera aestiva</i> | Eck Col | 7/1/11 | Boca Ciega Bay | 1 | 3 mg/L Corexit | 28 | 6 | 0 | 0 | 6 |
| <i>Labidocera aestiva</i> | Eck Col | 7/1/11 | Boca Ciega Bay | 1 | 3 mg/L Corexit | 13 | 4 | 0 | 0 | 4 |
| <i>Labidocera aestiva</i> | Eck Col | 7/1/11 | Boca Ciega Bay | 1 | 3 mg/L Corexit | 34 | 5 | 1 | 5 | 1 |
| <i>Labidocera aestiva</i> | Eck Col | 7/1/11 | Boca Ciega Bay | 1 | 3 mg/L Corexit | 16 | 5 | 0 | 0 | 5 |
| <i>Labidocera aestiva</i> | Eck Col | 7/1/11 | Boca Ciega Bay | 1 | 3 mg/L Corexit | 3 | 5 | 0 | 1 | 4 |
| <i>Labidocera aestiva</i> | Eck Col | 7/1/11 | Boca Ciega Bay | 1 | 3 mg/L Corexit | 30 | 3 | 2 | 0 | 5 |
| <i>Labidocera aestiva</i> | Eck Col | 7/1/11 | Boca Ciega Bay | 1 | 10 mg/L Corexit | 48 | 4 | 1 | 3 | 2 |
| <i>Labidocera aestiva</i> | Eck Col | 7/1/11 | Boca Ciega Bay | 1 | 10 mg/L Corexit | 24 | 4 | 2 | 1 | 5 |
| <i>Labidocera aestiva</i> | Eck Col | 7/1/11 | Boca Ciega Bay | 1 | 10 mg/L Corexit | 6 | 5 | 0 | 1 | 4 |
| <i>Labidocera aestiva</i> | Eck Col | 7/1/11 | Boca Ciega Bay | 1 | 10 mg/L Corexit | 40 | 3 | 2 | 2 | 3 |
| <i>Labidocera aestiva</i> | Eck Col | 7/1/11 | Boca Ciega Bay | 1 | 10 mg/L Corexit | 20 | 3 | 2 | 1 | 4 |
| <i>Labidocera aestiva</i> | Eck Col | 7/1/11 | Boca Ciega Bay | 1 | 10 mg/L Corexit | 26 | 5 | 0 | 5 | 0 |
| <i>Labidocera aestiva</i> | Eck Col | 7/1/11 | Boca Ciega Bay | 1 | 10 mg/L Corexit | 18 | 6 | 0 | 3 | 3 |
| <i>Labidocera aestiva</i> | Eck Col | 7/1/11 | Boca Ciega Bay | 1 | 10 mg/L Corexit | 19 | 5 | 0 | 5 | 0 |
| <i>Labidocera aestiva</i> | Eck Col | 7/1/11 | Boca Ciega Bay | 1 | 20 mg/L Corexit | 8 | 1 | 4 | 0 | 5 |
| <i>Labidocera aestiva</i> | Eck Col | 7/1/11 | Boca Ciega Bay | 1 | 20 mg/L Corexit | 11 | 3 | 2 | 2 | 3 |
| <i>Labidocera aestiva</i> | Eck Col | 7/1/11 | Boca Ciega Bay | 1 | 20 mg/L Corexit | 31 | 2 | 3 | 0 | 5 |
| <i>Labidocera aestiva</i> | Eck Col | 7/1/11 | Boca Ciega Bay | 1 | 20 mg/L Corexit | 29 | 3 | 2 | 2 | 3 |
| <i>Labidocera aestiva</i> | Eck Col | 7/1/11 | Boca Ciega Bay | 1 | 20 mg/L Corexit | 14 | 2 | 3 | 2 | 3 |
| <i>Labidocera aestiva</i> | Eck Col | 7/1/11 | Boca Ciega Bay | 1 | 20 mg/L Corexit | 9 | 4 | 1 | 0 | 4 |
| <i>Labidocera aestiva</i> | Eck Col | 7/1/11 | Boca Ciega Bay | 1 | 20 mg/L Corexit | 35 | 4 | 1 | 1 | 4 |
| <i>Labidocera aestiva</i> | Eck Col | 7/1/11 | Boca Ciega Bay | 1 | 20 mg/L Corexit | 33 | 4 | 0 | 1 | 3 |

| | | | | | | | | | | |
|---------------------------|---------|---------|----------------|---|-----------------|----|---|---|---|---|
| <i>Labidocera aestiva</i> | Eck Col | 7/1/11 | Boca Ciega Bay | 1 | 30 mg/L Corexit | 25 | 1 | 4 | 1 | 4 |
| <i>Labidocera aestiva</i> | Eck Col | 7/1/11 | Boca Ciega Bay | 1 | 30 mg/L Corexit | 2 | 1 | 5 | 0 | 6 |
| <i>Labidocera aestiva</i> | Eck Col | 7/1/11 | Boca Ciega Bay | 1 | 30 mg/L Corexit | 23 | 2 | 3 | 0 | 5 |
| <i>Labidocera aestiva</i> | Eck Col | 7/1/11 | Boca Ciega Bay | 1 | 30 mg/L Corexit | 17 | 1 | 4 | 0 | 5 |
| <i>Labidocera aestiva</i> | Eck Col | 7/1/11 | Boca Ciega Bay | 1 | 30 mg/L Corexit | 10 | 0 | 5 | 0 | 5 |
| <i>Labidocera aestiva</i> | Eck Col | 7/1/11 | Boca Ciega Bay | 1 | 30 mg/L Corexit | 38 | 1 | 4 | 0 | 5 |
| <i>Labidocera aestiva</i> | Eck Col | 7/1/11 | Boca Ciega Bay | 1 | 30 mg/L Corexit | 37 | 0 | 5 | 0 | 5 |
| <i>Labidocera aestiva</i> | Eck Col | 7/1/11 | Boca Ciega Bay | 1 | 30 mg/L Corexit | 36 | 0 | 5 | 0 | 5 |
| <i>Labidocera aestiva</i> | Eck Col | 7/5/11 | Boca Ciega Bay | 2 | 5 mg/L Corexit | 10 | 5 | 0 | 4 | 1 |
| <i>Labidocera aestiva</i> | Eck Col | 7/5/11 | Boca Ciega Bay | 2 | 5 mg/L Corexit | 29 | 5 | 0 | 3 | 2 |
| <i>Labidocera aestiva</i> | Eck Col | 7/5/11 | Boca Ciega Bay | 2 | 5 mg/L Corexit | 48 | 5 | 0 | 5 | 0 |
| <i>Labidocera aestiva</i> | Eck Col | 7/5/11 | Boca Ciega Bay | 2 | 5 mg/L Corexit | 14 | 5 | 0 | 2 | 3 |
| <i>Labidocera aestiva</i> | Eck Col | 7/5/11 | Boca Ciega Bay | 2 | 5 mg/L Corexit | 11 | 5 | 0 | 2 | 3 |
| <i>Labidocera aestiva</i> | Eck Col | 7/5/11 | Boca Ciega Bay | 2 | 5 mg/L Corexit | 17 | 5 | 0 | 2 | 3 |
| <i>Labidocera aestiva</i> | Eck Col | 7/5/11 | Boca Ciega Bay | 2 | 5 mg/L Corexit | 6 | 4 | 1 | 4 | 1 |
| <i>Labidocera aestiva</i> | Eck Col | 7/5/11 | Boca Ciega Bay | 2 | 5 mg/L Corexit | 19 | 5 | 0 | 4 | 1 |
| <i>Labidocera aestiva</i> | Eck Col | 7/5/11 | Boca Ciega Bay | 2 | 10 mg/L Corexit | 37 | 2 | 3 | 1 | 4 |
| <i>Labidocera aestiva</i> | Eck Col | 7/5/11 | Boca Ciega Bay | 2 | 10 mg/L Corexit | 36 | 4 | 1 | 1 | 4 |
| <i>Labidocera aestiva</i> | Eck Col | 7/5/11 | Boca Ciega Bay | 2 | 10 mg/L Corexit | 38 | 2 | 3 | 0 | 5 |
| <i>Labidocera aestiva</i> | Eck Col | 7/5/11 | Boca Ciega Bay | 2 | 10 mg/L Corexit | 8 | 4 | 1 | 4 | 1 |
| <i>Labidocera aestiva</i> | Eck Col | 7/5/11 | Boca Ciega Bay | 2 | 10 mg/L Corexit | 34 | 3 | 2 | 2 | 3 |
| <i>Labidocera aestiva</i> | Eck Col | 7/5/11 | Boca Ciega Bay | 2 | 10 mg/L Corexit | 22 | 3 | 2 | 0 | 5 |
| <i>Labidocera aestiva</i> | Eck Col | 7/5/11 | Boca Ciega Bay | 2 | 10 mg/L Corexit | 23 | 5 | 0 | 4 | 1 |
| <i>Labidocera aestiva</i> | Eck Col | 7/5/11 | Boca Ciega Bay | 2 | 10 mg/L Corexit | 18 | 3 | 2 | 1 | 4 |
| <i>Labidocera aestiva</i> | Eck Col | 7/5/11 | Boca Ciega Bay | 2 | 35 mg/L Corexit | 28 | 0 | 5 | 0 | 5 |
| <i>Labidocera aestiva</i> | Eck Col | 7/5/11 | Boca Ciega Bay | 2 | 35 mg/L Corexit | 30 | 0 | 5 | 0 | 5 |
| <i>Labidocera aestiva</i> | Eck Col | 7/5/11 | Boca Ciega Bay | 2 | 35 mg/L Corexit | 9 | 0 | 5 | 0 | 5 |
| <i>Labidocera aestiva</i> | Eck Col | 7/5/11 | Boca Ciega Bay | 2 | 35 mg/L Corexit | 3 | 0 | 5 | 0 | 5 |
| <i>Labidocera aestiva</i> | Eck Col | 7/5/11 | Boca Ciega Bay | 2 | 35 mg/L Corexit | 1 | 0 | 5 | 0 | 5 |
| <i>Labidocera aestiva</i> | Eck Col | 7/5/11 | Boca Ciega Bay | 2 | 35 mg/L Corexit | 2 | 0 | 5 | 0 | 5 |
| <i>Labidocera aestiva</i> | Eck Col | 7/5/11 | Boca Ciega Bay | 2 | 35 mg/L Corexit | 40 | 0 | 5 | 0 | 5 |
| <i>Labidocera aestiva</i> | Eck Col | 7/5/11 | Boca Ciega Bay | 2 | 35 mg/L Corexit | 25 | 0 | 5 | 0 | 5 |
| <i>Labidocera aestiva</i> | Eck Col | 7/18/11 | Boca Ciega Bay | 3 | FSW | 20 | 5 | 0 | 5 | 0 |
| <i>Labidocera aestiva</i> | Eck Col | 7/18/11 | Boca Ciega Bay | 3 | FSW | 39 | 5 | 1 | 4 | 2 |
| <i>Labidocera aestiva</i> | Eck Col | 7/18/11 | Boca Ciega Bay | 3 | FSW | 26 | 5 | 0 | 5 | 0 |
| <i>Labidocera aestiva</i> | Eck Col | 7/18/11 | Boca Ciega Bay | 3 | FSW | 24 | 4 | 1 | 3 | 2 |
| <i>Labidocera aestiva</i> | Eck Col | 7/18/11 | Boca Ciega Bay | 3 | FSW | 5 | 5 | 0 | 5 | 0 |
| <i>Labidocera aestiva</i> | Eck Col | 7/18/11 | Boca Ciega Bay | 3 | FSW | 35 | 6 | 0 | 5 | 1 |
| <i>Labidocera aestiva</i> | Eck Col | 7/18/11 | Boca Ciega Bay | 3 | FSW | 31 | 3 | 0 | 2 | 1 |
| <i>Labidocera aestiva</i> | Eck Col | 7/18/11 | Boca Ciega Bay | 3 | FSW | 13 | 5 | 0 | 4 | 1 |
| <i>Labidocera aestiva</i> | Eck Col | 7/18/11 | Boca Ciega Bay | 3 | 500 mg/L WAF | 1 | 0 | 5 | 0 | 5 |
| <i>Labidocera aestiva</i> | Eck Col | 7/18/11 | Boca Ciega Bay | 3 | 500 mg/L WAF | 2 | 1 | 4 | 0 | 5 |
| <i>Labidocera aestiva</i> | Eck Col | 7/18/11 | Boca Ciega Bay | 3 | 500 mg/L WAF | 3 | 0 | 5 | 0 | 5 |
| <i>Labidocera aestiva</i> | Eck Col | 7/18/11 | Boca Ciega Bay | 3 | 500 mg/L WAF | 30 | 0 | 5 | 0 | 5 |

| | | | | | | | | | | |
|---------------------------|---------|---------|----------------|---|--------------|----|---|---|---|---|
| <i>Labidocera aestiva</i> | Eck Col | 7/18/11 | Boca Ciega Bay | 3 | 500 mg/L WAF | 28 | 0 | 5 | 0 | 5 |
| <i>Labidocera aestiva</i> | Eck Col | 7/18/11 | Boca Ciega Bay | 3 | 500 mg/L WAF | 25 | 0 | 5 | 0 | 5 |
| <i>Labidocera aestiva</i> | Eck Col | 7/18/11 | Boca Ciega Bay | 3 | 500 mg/L WAF | 9 | 0 | 5 | 0 | 5 |
| <i>Labidocera aestiva</i> | Eck Col | 7/18/11 | Boca Ciega Bay | 3 | 500 mg/L WAF | 40 | 0 | 6 | 0 | 6 |
| <i>Labidocera aestiva</i> | Eck Col | 7/20/11 | Boca Ciega Bay | 4 | FSW | 7 | 6 | 0 | 6 | 0 |
| <i>Labidocera aestiva</i> | Eck Col | 7/20/11 | Boca Ciega Bay | 4 | FSW | 38 | 6 | 0 | 6 | 0 |
| <i>Labidocera aestiva</i> | Eck Col | 7/20/11 | Boca Ciega Bay | 4 | FSW | 9 | 5 | 0 | 1 | 4 |
| <i>Labidocera aestiva</i> | Eck Col | 7/20/11 | Boca Ciega Bay | 4 | FSW | 28 | 5 | 0 | 4 | 1 |
| <i>Labidocera aestiva</i> | Eck Col | 7/20/11 | Boca Ciega Bay | 4 | FSW | 1 | 3 | 2 | 2 | 3 |
| <i>Labidocera aestiva</i> | Eck Col | 7/20/11 | Boca Ciega Bay | 4 | FSW | 47 | 5 | 0 | 4 | 1 |
| <i>Labidocera aestiva</i> | Eck Col | 7/20/11 | Boca Ciega Bay | 4 | FSW | 40 | 5 | 0 | 5 | 0 |
| <i>Labidocera aestiva</i> | Eck Col | 7/20/11 | Boca Ciega Bay | 4 | FSW | 48 | 5 | 0 | 5 | 0 |
| <i>Labidocera aestiva</i> | Eck Col | 7/20/11 | Boca Ciega Bay | 4 | 125 mg/L WAF | 10 | 0 | 5 | 0 | 5 |
| <i>Labidocera aestiva</i> | Eck Col | 7/20/11 | Boca Ciega Bay | 4 | 125 mg/L WAF | 22 | 0 | 5 | 0 | 5 |
| <i>Labidocera aestiva</i> | Eck Col | 7/20/11 | Boca Ciega Bay | 4 | 125 mg/L WAF | 6 | 0 | 5 | 0 | 5 |
| <i>Labidocera aestiva</i> | Eck Col | 7/20/11 | Boca Ciega Bay | 4 | 125 mg/L WAF | 36 | 0 | 6 | 0 | 6 |
| <i>Labidocera aestiva</i> | Eck Col | 7/20/11 | Boca Ciega Bay | 4 | 125 mg/L WAF | 29 | 0 | 5 | 0 | 5 |
| <i>Labidocera aestiva</i> | Eck Col | 7/20/11 | Boca Ciega Bay | 4 | 125 mg/L WAF | 8 | 0 | 5 | 0 | 5 |
| <i>Labidocera aestiva</i> | Eck Col | 7/20/11 | Boca Ciega Bay | 4 | 125 mg/L WAF | 17 | 0 | 5 | 0 | 5 |
| <i>Labidocera aestiva</i> | Eck Col | 7/20/11 | Boca Ciega Bay | 4 | 125 mg/L WAF | 37 | 0 | 5 | 0 | 5 |
| <i>Labidocera aestiva</i> | Eck Col | 7/20/11 | Boca Ciega Bay | 4 | 250 mg/L WAF | 3 | 0 | 5 | 0 | 5 |
| <i>Labidocera aestiva</i> | Eck Col | 7/20/11 | Boca Ciega Bay | 4 | 250 mg/L WAF | 19 | 0 | 5 | 0 | 5 |
| <i>Labidocera aestiva</i> | Eck Col | 7/20/11 | Boca Ciega Bay | 4 | 250 mg/L WAF | 18 | 0 | 5 | 0 | 5 |
| <i>Labidocera aestiva</i> | Eck Col | 7/20/11 | Boca Ciega Bay | 4 | 250 mg/L WAF | 25 | 0 | 5 | 0 | 5 |
| <i>Labidocera aestiva</i> | Eck Col | 7/20/11 | Boca Ciega Bay | 4 | 250 mg/L WAF | 46 | 0 | 5 | 0 | 5 |
| <i>Labidocera aestiva</i> | Eck Col | 7/20/11 | Boca Ciega Bay | 4 | 250 mg/L WAF | 23 | 0 | 5 | 0 | 5 |
| <i>Labidocera aestiva</i> | Eck Col | 7/20/11 | Boca Ciega Bay | 4 | 250 mg/L WAF | 41 | 0 | 5 | 0 | 5 |
| <i>Labidocera aestiva</i> | Eck Col | 7/20/11 | Boca Ciega Bay | 4 | 250 mg/L WAF | 12 | 0 | 5 | 0 | 5 |
| <i>Labidocera aestiva</i> | Eck Col | 7/25/11 | Boca Ciega Bay | 5 | FSW | 7 | 6 | 0 | 6 | 0 |
| <i>Labidocera aestiva</i> | Eck Col | 7/25/11 | Boca Ciega Bay | 5 | FSW | 38 | 6 | 0 | 6 | 0 |
| <i>Labidocera aestiva</i> | Eck Col | 7/25/11 | Boca Ciega Bay | 5 | FSW | 9 | 5 | 0 | 1 | 4 |
| <i>Labidocera aestiva</i> | Eck Col | 7/25/11 | Boca Ciega Bay | 5 | FSW | 28 | 5 | 0 | 4 | 1 |
| <i>Labidocera aestiva</i> | Eck Col | 7/25/11 | Boca Ciega Bay | 5 | FSW | 1 | 3 | 2 | 2 | 3 |
| <i>Labidocera aestiva</i> | Eck Col | 7/25/11 | Boca Ciega Bay | 5 | FSW | 47 | 5 | 0 | 4 | 1 |
| <i>Labidocera aestiva</i> | Eck Col | 7/25/11 | Boca Ciega Bay | 5 | FSW | 40 | 5 | 0 | 5 | 0 |
| <i>Labidocera aestiva</i> | Eck Col | 7/25/11 | Boca Ciega Bay | 5 | FSW | 48 | 5 | 0 | 5 | 0 |
| <i>Labidocera aestiva</i> | Eck Col | 7/25/11 | Boca Ciega Bay | 5 | 0.1 mg/L WAF | 22 | 6 | 0 | 6 | 0 |
| <i>Labidocera aestiva</i> | Eck Col | 7/25/11 | Boca Ciega Bay | 5 | 0.1 mg/L WAF | 17 | 5 | 0 | 5 | 0 |
| <i>Labidocera aestiva</i> | Eck Col | 7/25/11 | Boca Ciega Bay | 5 | 0.1 mg/L WAF | 6 | 5 | 0 | 5 | 0 |
| <i>Labidocera aestiva</i> | Eck Col | 7/25/11 | Boca Ciega Bay | 5 | 0.1 mg/L WAF | 18 | 5 | 0 | 4 | 1 |
| <i>Labidocera aestiva</i> | Eck Col | 7/25/11 | Boca Ciega Bay | 5 | 0.1 mg/L WAF | 41 | 4 | 1 | 4 | 1 |
| <i>Labidocera aestiva</i> | Eck Col | 7/25/11 | Boca Ciega Bay | 5 | 0.1 mg/L WAF | 23 | 5 | 0 | 5 | 0 |
| <i>Labidocera aestiva</i> | Eck Col | 7/25/11 | Boca Ciega Bay | 5 | 0.1 mg/L WAF | 8 | 5 | 0 | 5 | 0 |
| <i>Labidocera aestiva</i> | Eck Col | 7/25/11 | Boca Ciega Bay | 5 | 0.1 mg/L WAF | 10 | 5 | 0 | 4 | 1 |

| | | | | | | | | | | |
|---------------------------|---------|---------|----------------|---|-------------|----|---|---|---|---|
| <i>Labidocera aestiva</i> | Eck Col | 7/25/11 | Boca Ciega Bay | 5 | 1 mg/L WAF | 25 | 4 | 0 | 4 | 0 |
| <i>Labidocera aestiva</i> | Eck Col | 7/25/11 | Boca Ciega Bay | 5 | 1 mg/L WAF | 38 | 4 | 1 | 4 | 1 |
| <i>Labidocera aestiva</i> | Eck Col | 7/25/11 | Boca Ciega Bay | 5 | 1 mg/L WAF | 9 | 5 | 0 | 1 | 4 |
| <i>Labidocera aestiva</i> | Eck Col | 7/25/11 | Boca Ciega Bay | 5 | 1 mg/L WAF | 12 | 4 | 1 | 4 | 1 |
| <i>Labidocera aestiva</i> | Eck Col | 7/25/11 | Boca Ciega Bay | 5 | 1 mg/L WAF | 1 | 3 | 2 | 3 | 2 |
| <i>Labidocera aestiva</i> | Eck Col | 7/25/11 | Boca Ciega Bay | 5 | 1 mg/L WAF | 40 | 5 | 0 | 3 | 2 |
| <i>Labidocera aestiva</i> | Eck Col | 7/25/11 | Boca Ciega Bay | 5 | 1 mg/L WAF | 48 | 5 | 0 | 2 | 3 |
| <i>Labidocera aestiva</i> | Eck Col | 7/25/11 | Boca Ciega Bay | 5 | 1 mg/L WAF | 47 | 4 | 0 | 1 | 3 |
| <i>Labidocera aestiva</i> | Eck Col | 7/25/11 | Boca Ciega Bay | 5 | 50 mg/L WAF | 31 | 0 | 5 | 0 | 5 |
| <i>Labidocera aestiva</i> | Eck Col | 7/25/11 | Boca Ciega Bay | 5 | 50 mg/L WAF | 24 | 1 | 4 | 0 | 5 |
| <i>Labidocera aestiva</i> | Eck Col | 7/25/11 | Boca Ciega Bay | 5 | 50 mg/L WAF | 26 | 2 | 3 | 1 | 4 |
| <i>Labidocera aestiva</i> | Eck Col | 7/25/11 | Boca Ciega Bay | 5 | 50 mg/L WAF | 13 | 1 | 4 | 0 | 5 |
| <i>Labidocera aestiva</i> | Eck Col | 7/25/11 | Boca Ciega Bay | 5 | 50 mg/L WAF | 35 | 2 | 3 | 2 | 3 |
| <i>Labidocera aestiva</i> | Eck Col | 7/25/11 | Boca Ciega Bay | 5 | 50 mg/L WAF | 5 | 1 | 4 | 1 | 4 |
| <i>Labidocera aestiva</i> | Eck Col | 7/25/11 | Boca Ciega Bay | 5 | 50 mg/L WAF | 2 | 0 | 5 | 0 | 5 |
| <i>Labidocera aestiva</i> | Eck Col | 7/25/11 | Boca Ciega Bay | 5 | 50 mg/L WAF | 39 | 0 | 5 | 0 | 5 |