Spatiotemporal variability in fatty acid profiles of the copepod *Calanus marshallae* off the west coast of Vancouver Island

by

Daniel Bevan
BSc, Queen's University, 2009

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of the Requirements for the Degree of

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Supervisory Committee

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Abstract

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Factors affecting energy transfer to higher trophic levels can determine the survival and production of commercially important species and thus the success of fisheries management regimes. Juvenile salmon experience particularly high mortality during their early marine residence, but the root causes of this mortality remain uncertain. One potential contributing factor is the food quality encountered at this critical time. The nutritionally vital essential fatty acids (EFA) docosahexaenoic acid (DHA, 22:6n-3) and eicosapentaenoic acid (EPA, 20:5n-3) are essential to all marine heterotrophs, and their availability has the potential to affect energy transfer through a limitation-driven food quality effect. Assessing variability in DHA and EPA in an ecologically important prey species of juvenile salmon could give insight into the prevalence and severity of food quality effects. On the west coast of Vancouver Island (WCVI), one such species is the calanoid copepod *Calanus marshallae*. This omnivorous species possesses a high grazing capacity and the ability to store large amounts of lipids. As it is also an important prey item for a diverse array of predators, including juvenile Pacific salmon, *C. marshallae* plays a key role in energy transfer from phytoplankton to high-trophic consumers. This study quantified spatiotemporal variability in the quality of *C. marshallae* as prey for higher trophic levels using three polyunsaturated fatty acid indicators: DHA:EPA, %EFA and PUFA:SFA (polyunsaturated fatty acids to saturated fatty acids). Samples were collected on the WCVI in May and September of 2010 and May 2011. The environmental parameters included in the analysis were the phase of the Pacific Decadal Oscillation (PDO), sea surface temperature (SST), latitude, station depth, and season (spring versus late summer). Despite a phase shift in the PDO from positive to negative, overall means of the fatty acid indicators did not vary between May 2010 and May 2011. Same-station %EFA values rarely fluctuated more than 5%. DHA:EPA ratios were more variable but without a discernable pattern, while PUFA:SFA ratios decreased in shelf stations and increased offshore. Contrary to expectations, fatty acid indicators showed a weak positive correlation or no relationship with SST, nor was there a relationship with latitude. The narrow temperature range observed across all stations suggests that temperature may not play a significant role in PUFA availability off the WCVI. There were, however, significant relationships between the fatty acid indicators and bottom depth and season. Shelf and slope stations showed significantly higher %EFA and PUFA:SFA than did offshore stations (depth >800 m), with this gradient appearing stronger in May than September. While the food quality represented by *C. marshallae* was consistent across all shelf stations, the lower food quality observed offshore could potentially affect juvenile salmon growth along the WCVI where the shelf narrows to less than 5 km.

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Acknowledgments

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Chapter 1: General Introduction

1.1 Early Marine Growth, Mortality and Feeding in Juvenile Salmon

Immense interannual variability in the production of Pacific salmon has frequently confounded the efforts of fisheries managers to predict and effectively manage what are culturally, ecologically and economically vital species (Beamish et al. 2003). Two periods of significant mortality among juvenile salmon have become the focal point of recent research: (i) predation during the early marine residence period and (ii) overwinter starvation during the first year at sea (Beamish and Mahnken 2001; Beamish et al. 2004; Beamish et al. 2010). As the ability to avoid predators and to survive extended bouts of low food abundance both appear to be size-selective, early marine growth has garnered attention as a determinant of survival through the first year at sea (Beamish et al. 2004; Farley et al. 2007; Farley and Trudel 2009; Duffy and Beauchamp 2011). Slower-growing juveniles remain vulnerable to gape-limited predators for a longer period of time (Sogard 1997; Willette et al. 2001) and are also more susceptible to starvation during winter (Beamish et al. 2004; Farley et al. 2007). This has spurred an exhaustive investigation of the relationships between early marine mortality and the many physical and biological factors that can affect growth. These have included climate indices such as the Pacific Decadal Oscillation (PDO; Mantua and Hare 1997), ocean temperature (Mortensen et al. 2000; Mueter et al. 2002), competition and density (Peterman 1984), zooplankton abundance (Saito et al. 2009), secondary production (Mortensen at al. 2000), prey quantity (Weitkamp and Sturdevant 2008) and timing of marine entry (Duffy and Beauchamp 2011).

Juvenile salmon consume a range of zooplanktonic prey, ranging from larval fish to crustacean mesozooplankton such as euphausiids, copepods, gastropods, amphipods and crab larvae, to jellies. Diet composition also varies by region, season, ocean conditions and size and species of salmon (Perry et al. 1996; Davis et al. 1998; Armstrong et al. 2005; Brodeur et al. 2007; Weitkamp and Sturdevant, 2008). Juvenile salmon are also capable of prey selectivity (Schabetsberger et al. 2003; Price et al. 2013), for example towards food with higher fatty acid content (Daly et al. 2010). The zooplanktonic communities along the coast of British Columbia vary widely in biomass and community composition across multiple spatial scales as well as seasonally and interannually (Mackas et al. 1980; Mackas 1992; Brodeur and Ware 1992; Mackas et al. 2004). The inherently high spatiotemporal patchiness of this prey field poses many challenges to efforts attempting to relate survival and production of Pacific salmon to their early marine diet, in terms of both food quantity and food quality. Analyses of food quantity have generally been unable to completely account for swings in Pacific salmon production (Beamish and Mahnken 2001; Brodeur et al. 2007), leading some to suggest that food quality may be an equally important determinant of production as food quantity (Kainz et al. 2004). The food quality represented by zooplankton is largely determined by bottom-up factors such as nutrient availability and phytoplankton composition (Danielsdottir et al. 2007). Ultimately, relating variability in food quality to survival and production of Pacific salmon requires an understanding of biochemical variability between and within prey taxa.

1.2 Polyunsaturated Fatty Acids as Indicators of Food Quality

Various markers have been used to assess prey quality in marine ecosystems, including $\delta^{15}N$ and $\delta^{13}C$ stable isotope analysis (Post 2002; Sorensen et al. 2009) caloric content (Davis et al. 1998), C:N ratios (Matthews and Mazumder 2005), plus various forms of lipid analysis (Kainz et al. 2004; Arts et al. 2009; El-Sabaawi et al. 2009a; El-Sabaawi et al. 2010). Recently emerging as common proxies for food quality in marine ecosystems are the polyunsaturated fatty acids (PUFAs) docosahexaeonic acid (DHA, 22:6n-3) and eicosapentaeonic acid (EPA, 20:5n-3), known as essential fatty acids (EFAs), which are required by all marine heterotrophic species – almost none of which can synthesize them *de novo* (Arts et al. 2009; Lee et al. 2006). These compounds are required in large amounts by Pacific salmon and their deficiency can lead to decreased growth rates and a wide range of pathologies, including poor liver function, increased disease susceptibility and cardiomyopathy (Sargent et al. 1999; Feng and Qin 2006; Arts and Kohler 2009; Tocher 2010). Metrics to assess food quality with PUFAs include the total percent of EFAs in the fatty acid profile, their ratio to each other, and the sum of all PUFAs to saturated fatty acids – respectively %EFA, DHA:EPA and PUFA:SFA (Kainz et al. 2004; El-Sabaawi et al. 2009a; El-Sabaawi et al. 2009b).

EFAs are incorporated by herbivorous and omnivorous zooplankton from many phytoplanktonic sources (Iverson 2009). DHA and EPA are produced primarily by dinoflagellates and diatoms, respectively (Viso and Marty 1993). Their absolute and relative abundance in the phytoplankton and their availability to higher trophic levels can greatly influence the transfer of energy in marine ecosystems (Parrish 2009). Quantifying how EFA variability in a single species correlates to physical and biological parameters would therefore be most effective when using a species that feeds omnivorously on primary producers, stores large amounts of lipids and is a prey item of juvenile salmon or secondary consumers, such as larval fish, that are also salmon prey.

1.3 *Calanus marshallae* in British Columbia Coastal Ecosystems

Calanus marshallae is an omnivorous calanoid copepod measuring 2-3 mm in length which occurs in the shelf waters of the subarctic Pacific from January to early October (Peterson 1979). Although it is classified within the 'boreal shelf' copepod assemblage (Mackas et al. 2004), its range extends as far south as Oregon and north to Alaska. Its merits as an ecologically important species are threefold. First, it possesses a high grazing capacity on both diatoms and dinoflagellates (Peterson et al. 1979). Second, along with many other high-latitude copepod species, it is capable of accumulating large lipid stores for the survival of an extended diapause. These lipids are generally stored as wax esters in a single droplet that can account for 60% of the body cavity volume (Lee et al. 2006). Third, its abundance, high lipid content and size make *C. marshallae* an important prey item for predators including juvenile salmon and a range of other fish species, plus seabirds and marine mammals (Peterson et al. 1979). Together, these three factors make *C. marshallae* a key species in the transfer of energy through coastal food webs of the subarctic Pacific.

1.4 Physical Controls on PUFA Production in Coastal Ecosystems

Evidence suggests that the movement of PUFAs through marine ecosystems is correlated to many physical and biological variables, including temperature, depth, latitude and bottom-up processes that affect upwelling, nutrient availability and primary productivity (Arts et al. 2001; Arts et al. 2009; Iverson 2009; Brett et al. 2009). Basin-scale climate indices such as the Pacific Decadal Oscillation (PDO) also play a role. The PDO is an empirical orthogonal function of sea surface temperature (SST) in the North Pacific (Mantua et al. 1997; Mantua and Hare 2002). Negative PDO ('cold') conditions have been found to result in significantly higher production on the WCVI by affecting phytoplankton abundance (Harris et al. 2009), zooplankton abundance and community structure (Mackas et al. 2007; Kiester et al. 2011; Mackas et al. 2013). A broader inverse relationship has been observed between temperature and PUFA production in phytoplankton (Thompson et al. 1992; Nanton and Castell 1999; Jiang and Gao 2004; Fuschino et al. 2011). Negative PDO conditions have a similar effect on salmon production on the WCVI, although the inverse is true for Alaskan stocks (Mantua et al. 1997; Hare et al. 1999).

1.5 Hypotheses

Spatiotemporal variability in zooplankton composition, distribution and abundance can affect energy flow (and thus PUFA availability) to higher trophic levels (Mackas et al. 1985; Mackas et al. 2004; Brett et al. 2009; Kattner and Hagen 2009). Studies of seasonal fluctuations in primary and secondary production indicate that shelf and slope regions should have significantly higher availability of EFAs than offshore regions, particularly following the spring bloom but less so after the strong late spring to late summer upwelling season that is characteristic of the region (Mackas 1992).

Drawing from trends observed in the literature, we can establish hypotheses regarding how temperature, latitude, depth and season will affect the presence of EFAs in *C. marshallae* and, thus, the food quality that it represents for its predators. In particular, we might expect to find higher food quality in negative PDO years and at lower local temperatures. Spatially, higher food quality should be expected on the shelf (i.e. versus offshore) and at higher latitudes due to the increasing energy density of salmon smolts at higher latitudes (Tucker et al. 2009; Kattner and Hagen 2009). We can also expect to see a seasonal fluctuation whereby PUFA availability is higher in the weeks following the spring bloom than in the late summer. Establishing the presence and degree of these changes in an ecologically important species such as *C. marshallae* will prove valuable in determining whether food quality plays a role in early marine growth and survival of juvenile salmon.

Chapter 2: Quantifying interannual, seasonal and spatial variability in fatty acid profiles of the copepod *Calanus marshallae* along the west coast of Vancouver Island

2.1 Introduction

A strong understanding of the factors that affect the transfer of energy from primary producers to fish is essential for effective fisheries management (Ware and Thompson 2005). Erratic variability in the survival and production of Pacific salmon (*Oncorhynchus* spp.) has brought this notion to the foreground of recent research. Upon entering marine ecosystems in the summer months, juvenile salmon face the twofold mortality risks of predation and starvation due to low food availability during winter (Beamish and Mahnken 2001; Beamish et al. 2004). As a result, rapid early marine growth and the accumulation of adequate energy stores are necessary to mitigate these risks and survive to maturity (Beamish et al. 2004). Survivability and production of juvenile salmon therefore depend heavily on the ability of individuals to capitalize on a widely variable zooplanktonic prey field.

While zooplankton biomass is known to be extremely variable across many spatial and temporal scales, production at higher trophic levels can also be disproportionately affected by the availability of polyunsaturated fatty acids (PUFAs), which are a prominent component of marine food webs (Tocher 2003, Arts et al. 2009), particularly at higher latitudes (Kattner et al. 2006; Kattner and Hagen 2009). Most notable among the PUFAs are the essential fatty acids (EFAs) docosahexaenoic acid (DHA, 22:6n-3) and eicosapentaenoic acid (EPA, 20:5n-3), which are manufactured primarily by dinoflagellates and diatoms, respectively (Viso and Marty 1993). While these compounds are required in significant amounts by nearly all marine consumers, few heterotrophic species are able to synthesize them *de novo*, making many species susceptible to PUFA-related food quality effects (Bell et al. 2007; Ahlgren et al. 2009; Tocher 2010). EFAs are directly incorporated and stored in large quantities by calanoid copepods (Lee et al. 1971; Bell and Tocher 2009) in which they are the most abundant of all fatty acids (Brett et al. 2009). EFA deficiency can cause a range of complications in copepods, including reduced growth, egg viability and egg production rates (Ianora et al. 2003; Arendt et al. 2005; Dahl et al. 2009) and can severely impede growth and immune response in both juvenile and adult fish (Adams 1999; Sargent et al. 1999; Arts and Kohler 2009; Tocher 2010). The potential for these compounds to act as bottlenecks on commercially vital marine populations has prompted a need to understand how they vary naturally in ecologically important species.

Calanus marshallae is often the most abundant copepod of its size range (2-3 mm) in the shelf waters off the west coast of Vancouver Island (WCVI), British Columbia, where robust planktonic communities support high biomass of predators such as seabirds, marine mammals and commercially important fisheries (Mackas et al. 2004). The Vancouver Island coastal current is the dominant nearshore ocean current in the region year round (Freeland et al. 1984; Mackas 1992). This current carries high-nutrient and low-salinity water northwest out of the Juan de Fuca Strait and gradually weakens towards the north end of the island. In summer months the region is transited by large numbers of juvenile salmon, including stocks local to Vancouver Island and from as far south as the Columbia River (Beacham et al. 2014). Gut content analyses of juvenile sockeye (*Oncorhynchus nerka*), pink (*O. gorbuscha*), coho (*O. kisutch*) and chum (*O. keta*) salmon have found *C. marshallae* and other copepod species in the diet of individuals with fork lengths between 100mm and 400mm (Davis et al. 1998; Armstrong et al. 2005; Brodeur et al. 2007). *C. marshallae* plays a key role in energy transfer through the WCVI food web by way of its remarkable grazing capacity on both dinoflagellates and diatoms and its ability to stockpile lipids derived from a variety of food sources (Mackas et al. 2004; Lee et al. 2006). These lipid reserves, stored by many calanoid copepods in the form of wax esters, can occupy more than half of the body cavity volume and are particularly critical at high latitudes for survival during diapause and for fueling sustained egg production in unfavorable conditions (Lee et al. 2006). Its high lipid content and relatively large size therefore make *C. marshallae* a high-quality mesozooplanktonic food item that is available to a variety of predators (Ji et al. 2012), including juvenile salmon.

Crustacean zooplankton production on the WCVI can be heavily influenced by changes in surface temperature (SST) related to the Pacific Decadal Oscillation (PDO), which is an empirical orthogonal function of SST in the North Pacific (Mantua et al. 1997; Mantua and Hare 2002). In particular, positive forcing of the PDO causes strengthened northward advection of surface water and "warm" conditions along the coasts of Washington and British Columbia, whereas increased southward transport and "cold" conditions are associated with the negative phase of the PDO (Chhak et al. 2009; Keister et al. 2011). Negative PDO and El Niño Southern Oscillation (ENSO) values also correspond with a deeper mixed layer and higher phytoplankton abundance and biomass on the WCVI (Harris et al. 2009). These transport effects manifest locally as both changes in temperature and in the relative abundance of various zooplankton assemblages. The northward advection caused by a positive PDO, for instance, brings an influx of smaller “southern” copepod species, whereas the “cold” conditions of a negative PDO result in the dominance of larger, seasonally-driven and lipid-rich “subarctic oceanic” and “boreal shelf” copepod species, including *C. marshallae* (Mackas et al. 2007; Keister et al. 2011). Indices such as the PDO generally show closest correlation with biological phenomena in the zooplankton when their values are averaged over the several months preceding sample collection (Mackas et al. 2013). This can be attributed to time lags between physical processes, nutrient dynamics and energy transfer through the food web.

“Cold” conditions on the WCVI (periods of negative PDO) have been found to correlate strongly with growth and survivability of juvenile salmon and other higher trophic level species (Hare et al. 1999; Mackas et al. 2007). This correlation may be due to a food quality effect resulting from the inherent nutritional differences of zooplankton assemblages or from temperature-regulated changes in the production of PUFAs by primary producers. The production of PUFAs as well as the PUFA:SFA ratio display an inverse relationship with temperature in a variety of diatom and dinoflagellate species (Thompson et al. 1992; Nanton and Castell 1999; Jiang and Gao 2004; Fuschino et al. 2011).

Here, we analyzed the fatty acid content of *C. marshallae* collected from the WCVI in 2010 and 2011 using three fatty acid indicators (DHA:EPA, PUFA:SFA (saturated fatty acids) and %EFA). Our goals were to (i) quantify interannual, seasonal and spatial variability in the food quality represented by *C. marshallae* for higher trophic levels and (ii) relate this variability to temperature and the PDO to test the prevailing hypothesis that “cold” conditions create a higher-quality prey field for juvenile salmon. The DHA:EPA ratio is an important indicator for production in marine food webs because the metabolic requirement in fish is much higher for DHA than EPA (Tocher 2003; Ianora et al. 2003, Glencross 2009). For example, DHA:EPA values as high as seven have been observed in juvenile salmon along the WCVI (Rana El-Sabaawi, University of Victoria, unpublished data). In copepods, DHA promotes increased egg production and body size (Hartwich et al. 2012). The %EFA and the PUFA:SFA ratio both measure the presence of these fatty acids relative to the entire fatty acid profile. %EFA is the sum of DHA and EPA over the entire profile while PUFA:SFA is the proportion of polyunsaturated fatty acids to saturated fatty acids. Higher values in all three indicators thus represent better food quality for higher trophic levels (El-Sabaawi et al. 2009a), while the extent of variability in the data will illustrate the potential for *C. marshallae* to affect production at higher trophic levels by way of a food quality effect. Such an effect has the potential to affect the early marine growth and thus survival of juvenile salmon in the coastal waters of British Columbia.

2.2 Methods

2.2.1 Sample collection:

Zooplankton samples were collected aboard the *CCGS John P. Tully* during surveys conducted in May and September 2010 and May 2011 along the west coast of Vancouver Island (Figure 1). This area lies at the southern end of the divergence zone between the Alaska and California Currents and is thus within the range of both the southern and subarctic zooplankton assemblages (Mackas et al. 2004).

Vertical zooplankton net tows were conducted at seventeen locations routinely sampled by the Department of Fisheries and Oceans (Canada) La Perouse monitoring program. Sampling coverage varied between cruises and was occasionally limited by time and weather constraints. At each station, a 236 μm mesh bongo net was deployed to within 10 m of the ocean bottom (or to a maximum depth of 250 m). Water column temperature, salinity and dissolved oxygen were recorded at each location from bottom to surface using a SBE25 Seabird conductivity, temperature and depth (CTD) recorder. Immediately following the tow, copepods were identified to species, placed on filter paper in a small vial, flash frozen in liquid N_2 and stored onboard in a -80°C freezer. Individual *C. marshallae*, all at stage C4 or C5, were pooled in groups of 10-15 to provide sufficient tissue to perform fatty acid analyses.

2.2.2 Laboratory analysis:

In the laboratory, fatty acid analysis was conducted through the formation of fatty acid methyl esters (FAMEs) using a technique recently modified from Folch et al. (1957) by

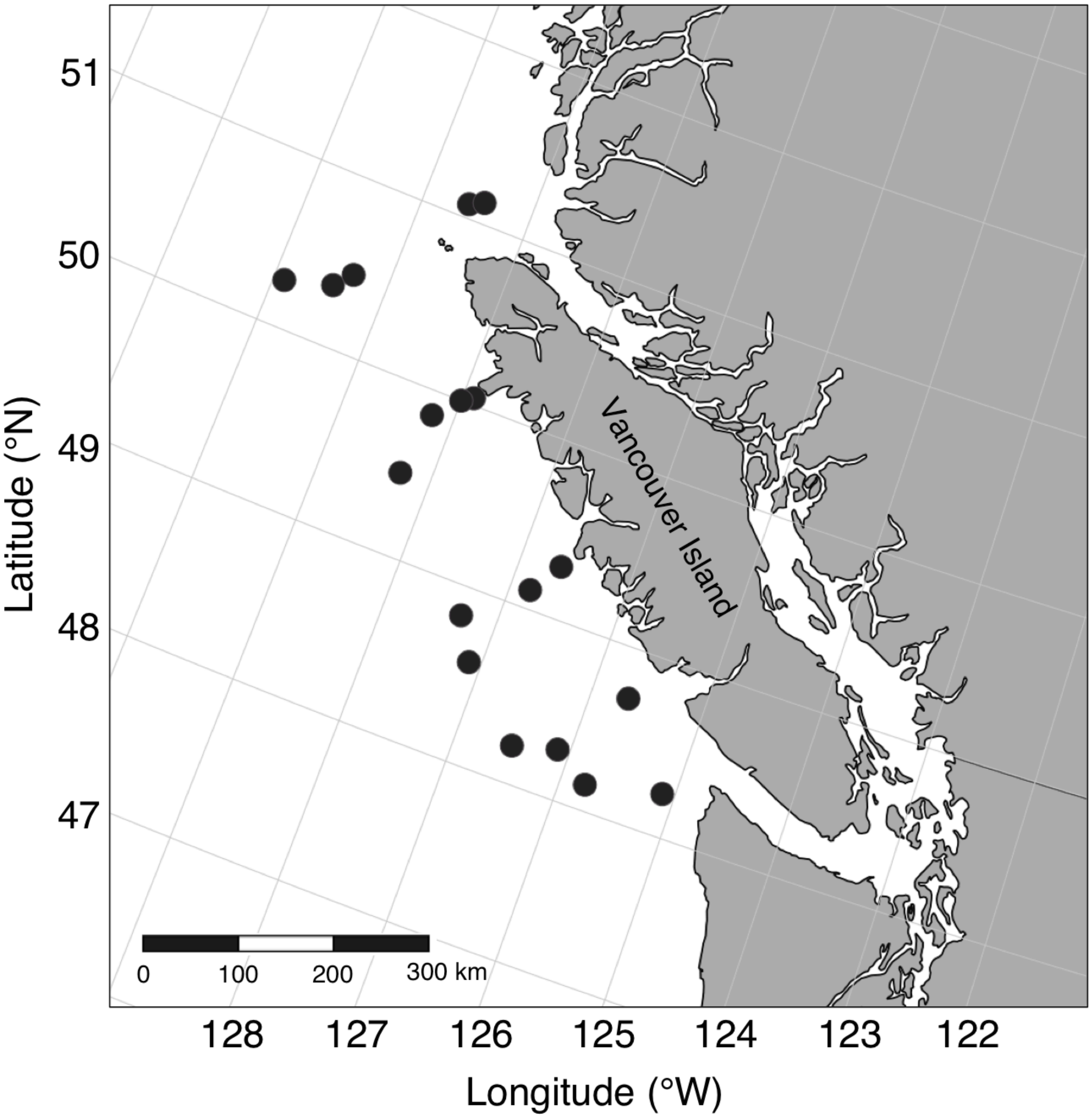

Figure 1. Map of the west coast of Vancouver Island showing locations sampled in this study (black circles). Not all stations were sampled on every cruise; sampling coverage was occasionally limited by time constraints and weather conditions. Map was generated using software available at http://www.simplemappr.net.

Kainz et al. (2004). Briefly, samples were freeze-dried for 48 hours and stored in 4 mL HPLC chloroform at -4°C under N_2 gas to prevent exposure to oxygen while awaiting analysis. Samples were extracted in a 4:2:1 solution of chloroform:methanol:water to isolate lipids from other residues. The lipid layer was extracted and stored under N_2 at -80°C. This process was repeated three times to maximize the extraction efficiency. Extracted fatty acids were transferred to hexane and exposed to 14% BF_3-CH_3OH at 85°C for 1 hour to form FAMEs. Fatty acid concentrations were determined at the University of Victoria using a Varian CP-3800 gas chromatograph (GC) equipped with a flame ionization detector and a Supelco SP-2560 column operated with constant He flow of 1 mL/min. The GC temperature program was set to start at 100°C and gradually increase at 3°C per minute to 230°C, with a total run time of 62 minutes. The injector operated at 260°C. Concentrations (µg/mL) of each fatty acid were determined by pairing ionization peaks with the known retention times of fatty acids in a Sigma 37-component FAME reference standard, and were also calibrated against Nu-Chek reference and internal standards.

2.2.3 Data analyses:

Fatty acid data were transformed from raw concentrations (µg/mL) to percent of profile and analyzed using the JMP 10 statistical package. Regression analyses were used to examine correlations between indicators and environmental variables using a linear fit model. Analyses of variance (ANOVA) and pair-wise Tukey-Kramer HSD tests were conducted between sample groups to determine levels of significance.

2.3 Results

2.3.1 Temperature and PDO in 2010-2011

A five-month period of positive (PDO) values directly preceded the first sampling period in May 2010 (Figure 2A). A rapid transition was then initiated in May 2010 followed by prolonged negative PDO phase that extended from September 2010 through the end of 2011. Time-averaged over the six preceding months, PDO values at our sampling times were 0.60 (May 2010), -0.46 (Sept 2010) and -0.74 (May 2011). Although these values are not extreme when compared to historical PDO values (Mantua and Hare 2002), May 2010 and May 2011 can still be contrasted as warm and cool conditions. This warm to cool transition was reflected in the sea surface temperature anomaly data obtained from lighthouses at the northern (Egg Island; 51°15’N) and southern (Amphitrite Point; 48°55’N) ends of the sampling range (Figure 2B-C). Egg Island and Amphitrite Point both experienced warmer conditions between January and March 2010, with temperature anomalies at both locations exceeding 1.0°C. This was followed by a transition to cooler-than-average temperatures that were sustained at Egg Island through May 2011, although temperature anomalies in this period were limited to a minimum of -0.5°C. Amphitrite Point, however, returned to warmer-than-average conditions in late winter and early spring 2011. SST at the time of sampling in May and September 2010 decreased with latitude from above 11.5°C to 10°C at the northern edge of the sampling range (Figure 3). In contrast, this gradient was not observed in May 2011, when SST at 51°N exceeded those found further south, thereby suggesting a more complex temperature structure along the WCVI at that time.

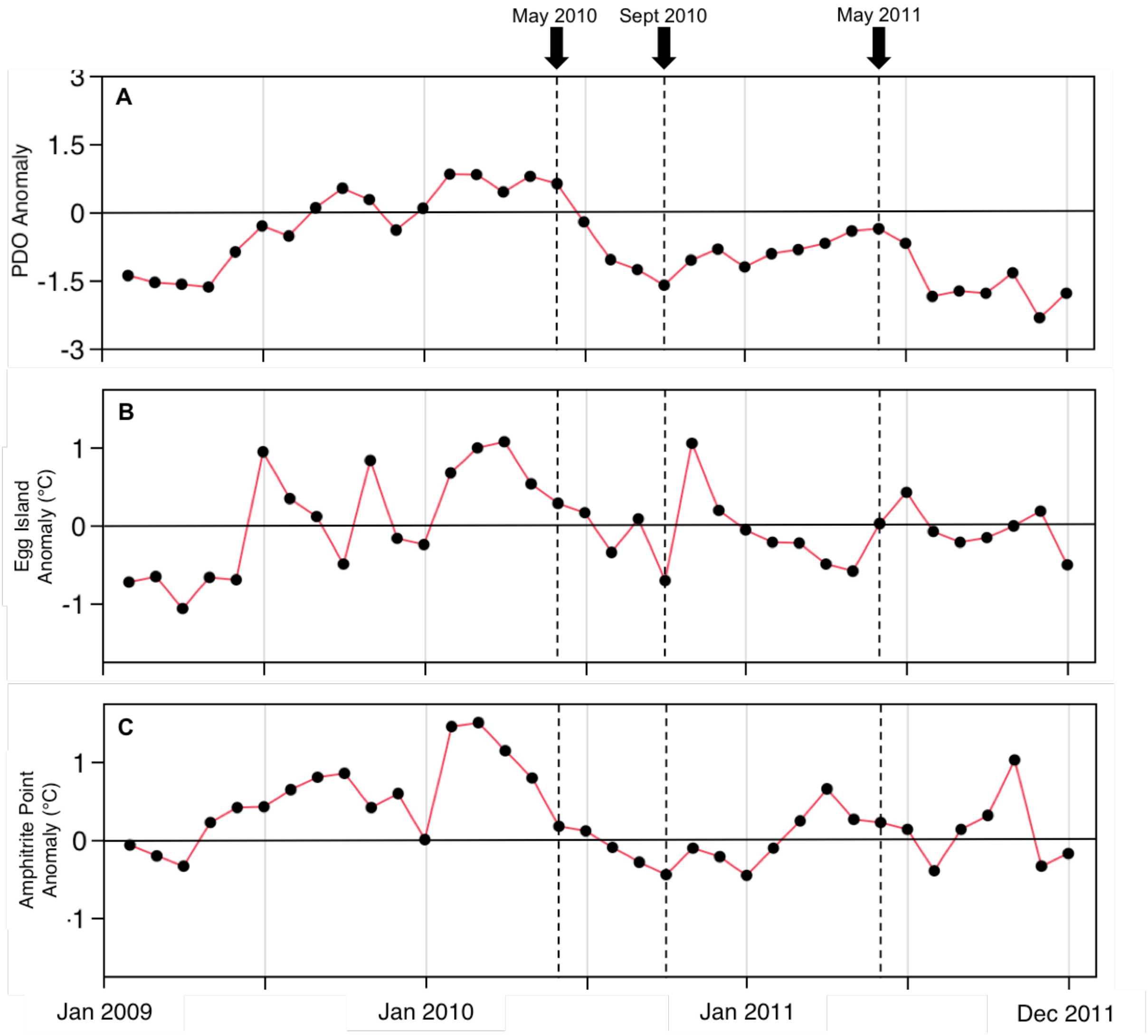

Figure 2. PDO anomaly (A), Egg Island (51°15'N) SST anomaly (B) and Amphitrite Point (48°55'N) SST anomaly (C) for January 2009 to December 2011. Vertical dashed lines denote sampling times. Data accessed July 2012 from jisao.washington.edu/pdo/PDO.latest (A), www.pac.dfo-mpo.gc.ca/science/oceans/data-donnees/lighthouses-phares/index-eng.htm (B, C), and www.pfeg.noaa.gov/products/las.html (D, E).

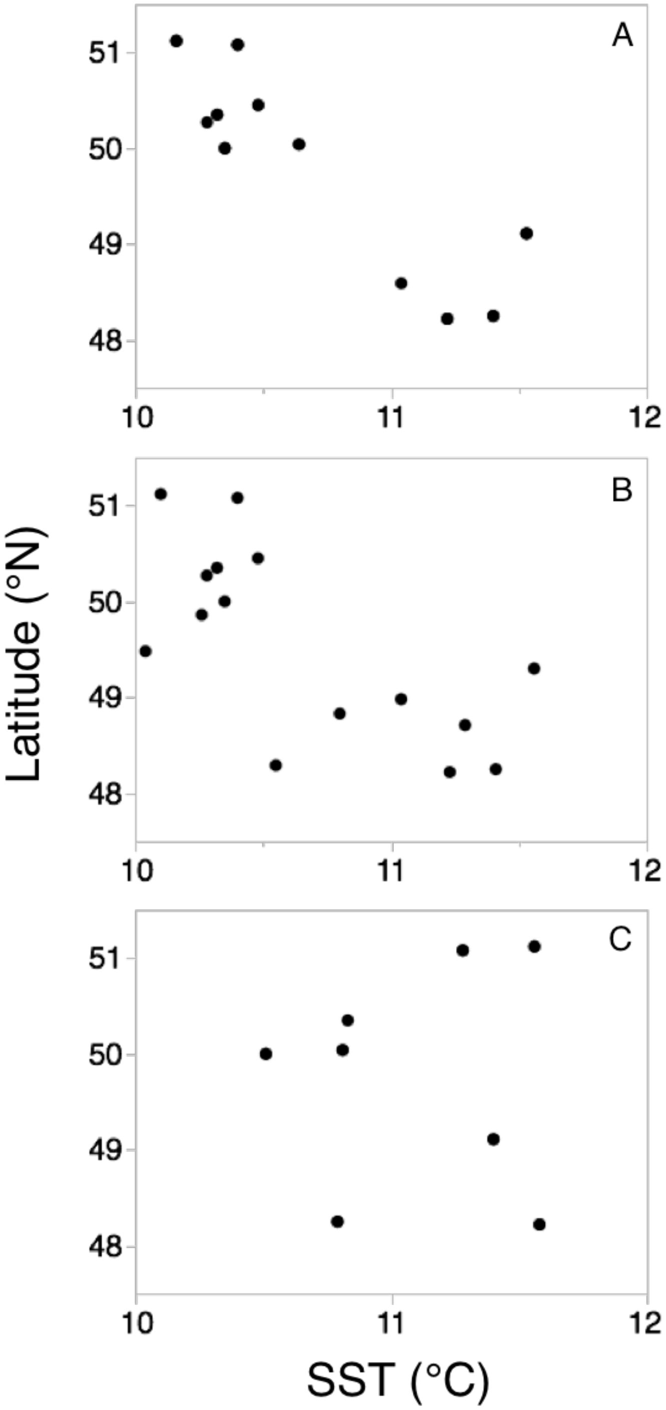

Figure 3. Sea surface temperature (°C) at sampling stations from the west coast of Vancouver Island at time of sampling in May 2010 (A), September 2010 (B) and May 2011 (C).

2.3.2 Relationships to Temperature and Latitude

When data from all three sampling times were pooled, PUFA:SFA and DHA:EPA did not show any significant relationships with SST. In contrast, weak significant positive relationships were found between SST and %EPA, %DHA and %EFA (Figure 4). Samples showed an overall three-fold range for %DHA and %EPA (between 0.1 and 0.3), and for %EFA (between 0.2 and 0.6). When data were grouped by sampling time, a positive relationship between DHA:EPA and SST emerged for May 2010 and May 2011, but not for September 2011 (Figure 5A-C). However, no significant relationships with SST were found for the other indicators (Figure 5D-I).

With one exception, DHA:EPA, %EFA and PUFA:SFA did not show any significant trends with latitude (Figure 6). In May 2010 there was a significant decrease in DHA:EPA towards the northern end of the sampling range (Figure 6A). During the same period, there were discernable but non-significant trends between latitude and %EFA (Figure 6D) and PUFA:SFA (Figure 6G). In contrast, no trends were observed with latitude at all during September 2010 and May 2011.

2.3.3 Seasonal and Interannual Variability

While all indicators varied widely within sampling periods, mean values did not fluctuate significantly over time (Figure 7). For example, mean DHA:EPA was highest in September 2010 but not significantly higher than in either May 2010 or May 2011 (Figure 7A). This increase is due to a significant decrease in the presence of EPA rather than an increase in DHA (Figure 7D-E). No significant differences were found between sampling times for %EFA and PUFA:SFA.

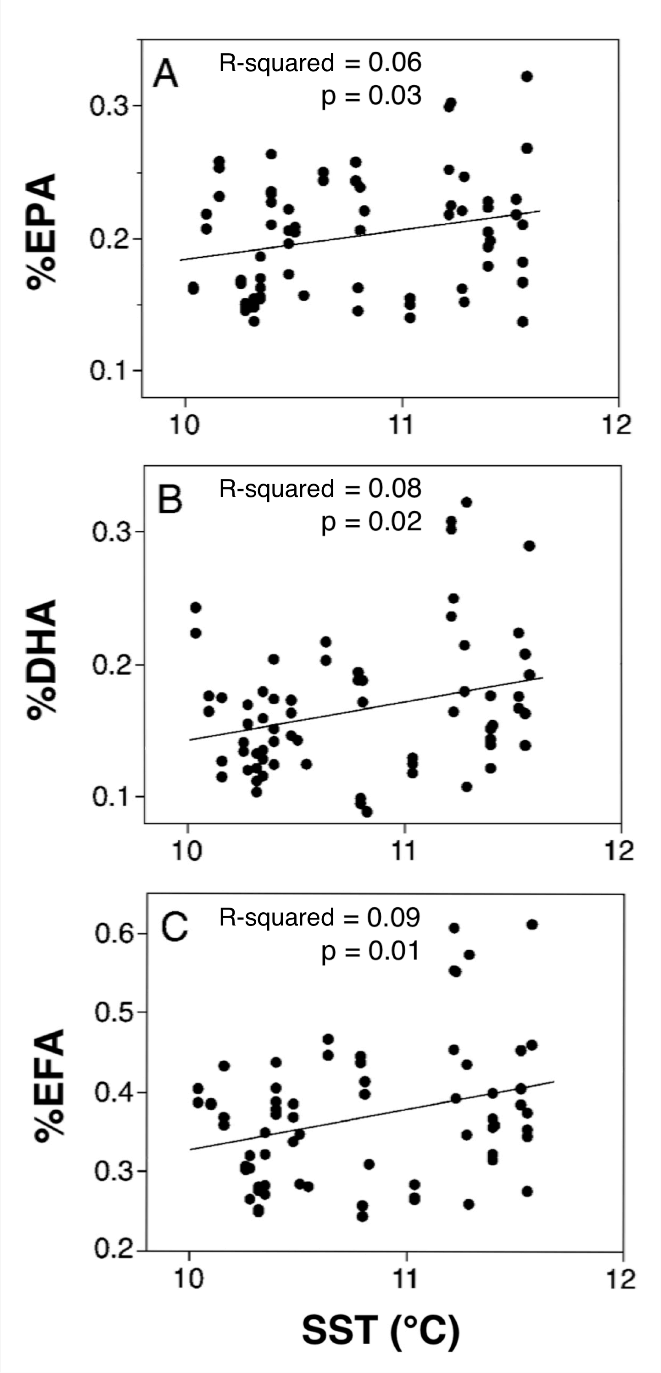

Figure 4. Change with contemporaneous SST in %EPA (A), %DHA (B) and total EFAs (C) for *Calanus marshallae* samples collected along the west coast of Vancouver Island. Data are pooled to include all sampling times. Significance was determined using least squares regression.

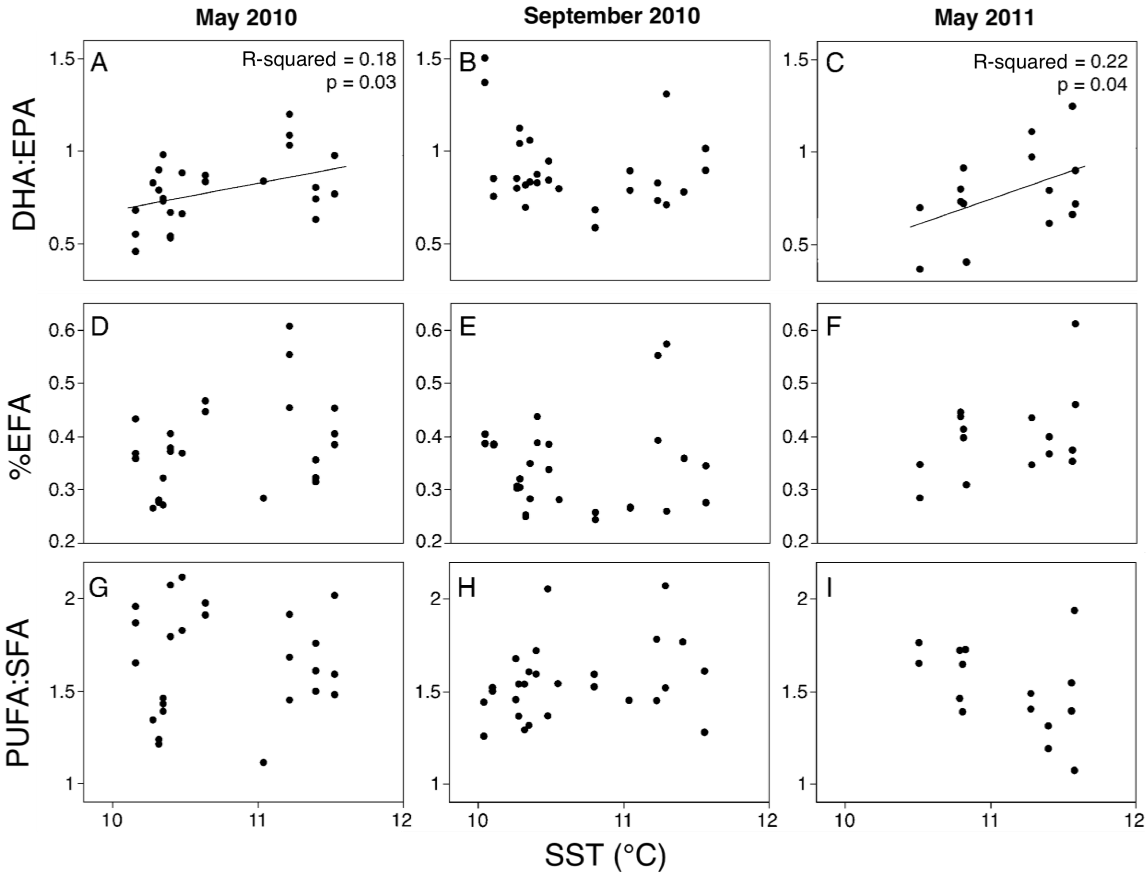

Figure 5. Change with contemporaneous SST for three fatty acid indicators, DHA:EPA (A-C), %EFA (D-F) and PUFA:SFA (G-I) for *Calanus marshallae* during May 2010, September 2010 and May 2011. Significance was determined using least squares regression. R-squared and p-values are reported where significant relationships were found.

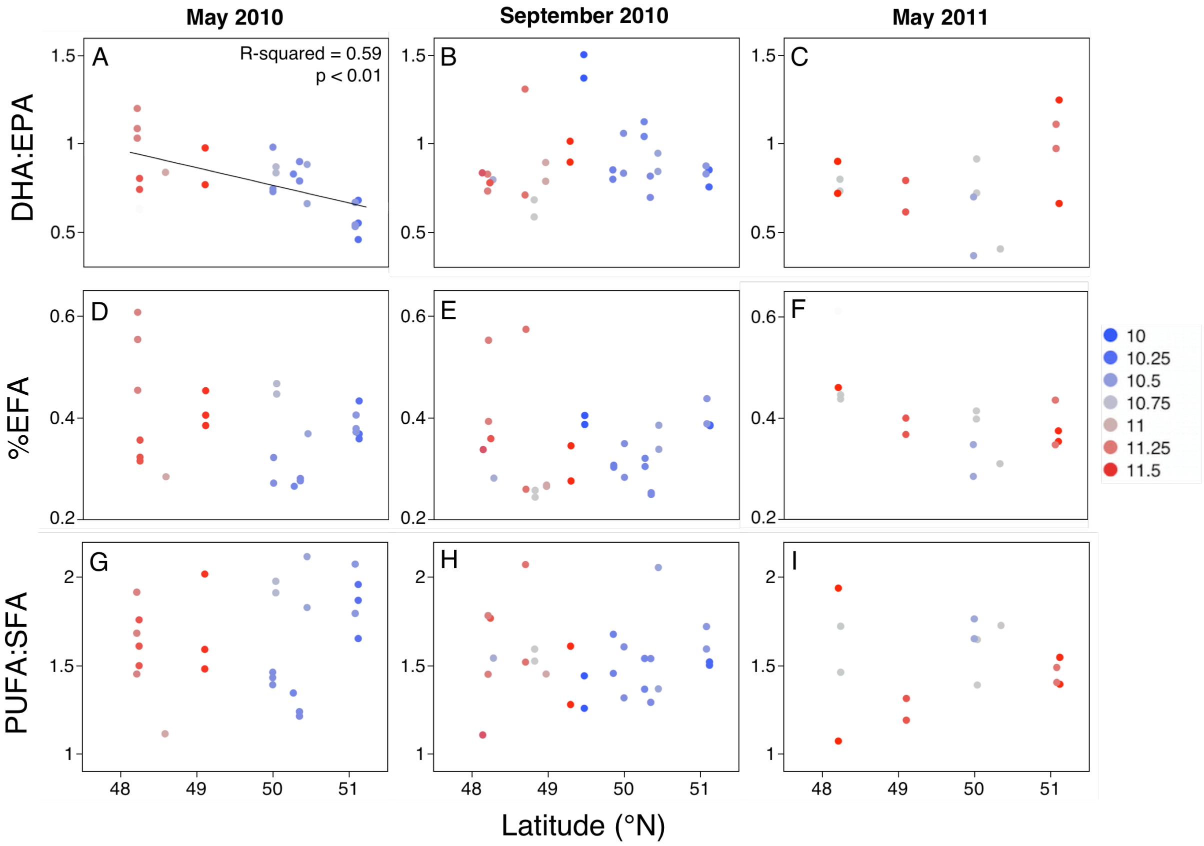

Figure 6. Change with latitude for three fatty acid indicators, DHA:EPA (A-C), %EFA (D-F) and PUFA:SFA (G-I), in *Calanus marshallae* along the west coast of Vancouver Island during May 2010, September 2010 and May 2011. Black line denotes a significant relationship. Legend at right denotes temperature (°C).

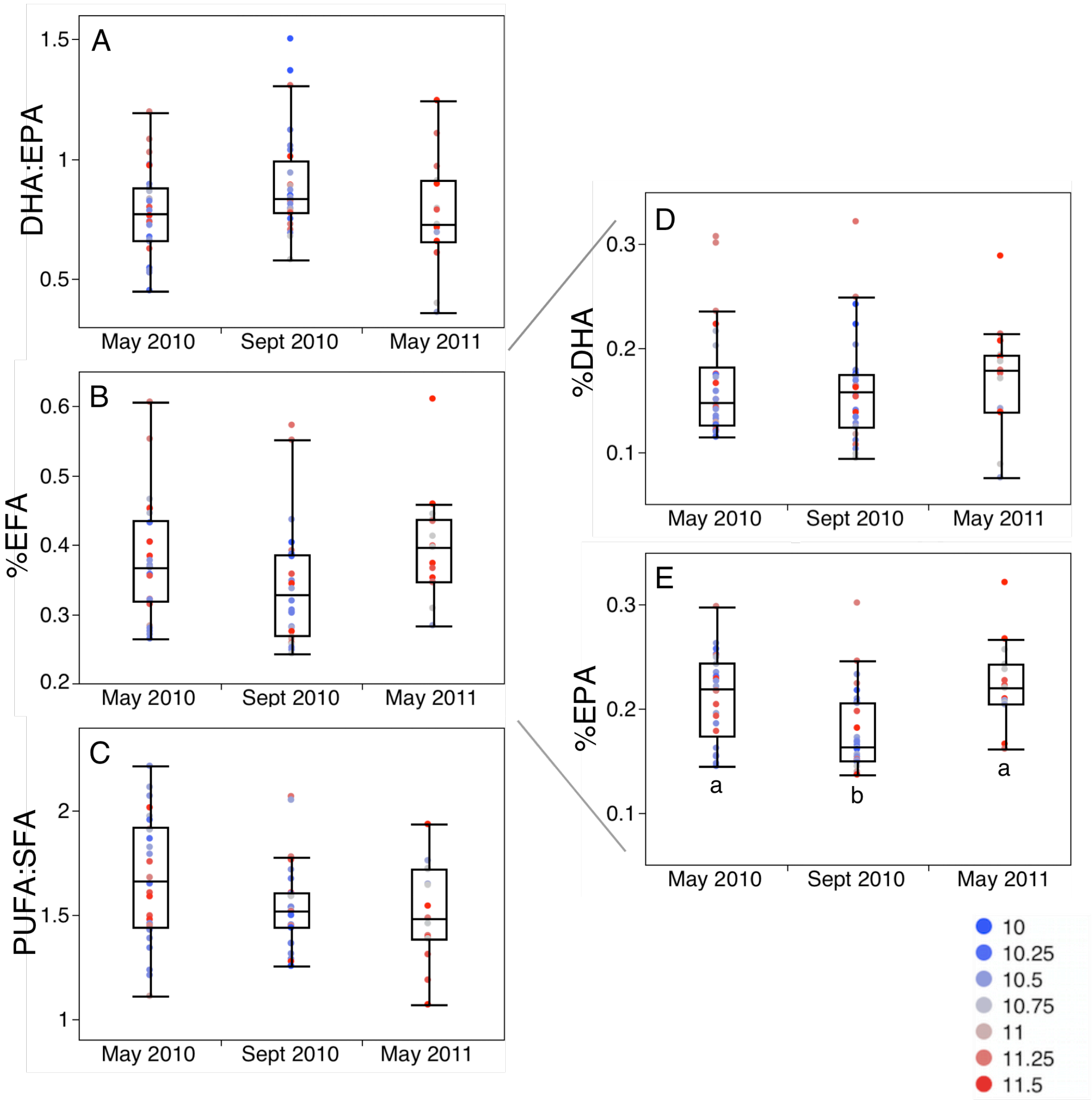

Figure 7. Distributions of fatty acid indicators for *Calanus marshallae* samples collected along the west coast of Vancouver Island. Data are pooled by sampling time. Where significant differences were found between sampling times, significance levels are shown using lower case letters, with ‘a’ denoting the highest level of significance. Legend at bottom right denotes temperature (°C).

2.3.4 Relationships to Depth

Samples were also grouped by depth, where the categories of 0-200 m, 200-800 m and >800 m reflected shelf, slope and offshore locations respectively (Figure 8). %EFA and PUFA:SFA were found to vary significantly between station depths, whereas DHA:EPA did not. Offshore stations were significantly lower than shelf and slope stations in both %EFA and PUFA:SFA. Mean %EFA and PUFA:SFA were both highest in the slope stations, but only for %EFA was the mean for the slope stations significantly higher than for the shelf stations. When data were divided by sampling time, the offshore stations from May 2010 were significantly lower in DHA:EPA, %EFA and PUFA:SFA than were the shelf and slope stations from the same period (Figure 9A, D, G). These differences did not occur in September 2010 (Figure 9B, E, H) but reappeared in May 2011 for DHA:EPA and %EFA (Figure 9C, F, I), although the low availability of slope and offshore samples limits the calculation of accurate means.

Of the seventeen stations, eight were sampled in both May 2010 and May 2011 (Table 1): five stations on the shelf, one on the slope and two offshore. %EFA changed between May 2010 and May 2011 by more than 5% at only one station, while DHA:EPA and PUFA:SFA fluctuated more dramatically. DHA:EPA showed positive and negative changes as great as 0.46 and -0.44 respectively, while PUFA:SFA changed by as much as 0.50 and -0.58. In May 2011, PUFA:SFA was lower in all shelf and slope stations and higher in both offshore stations. Differences between adjacent shelf and offshore stations are shown using LBP02 and LBP05 as a representative example (Table 2). Percent EFA was dramatically lower at LBP05 than LBP02 in both May 2010 and 2011, despite both stations' proximity to each other and to the coastline.

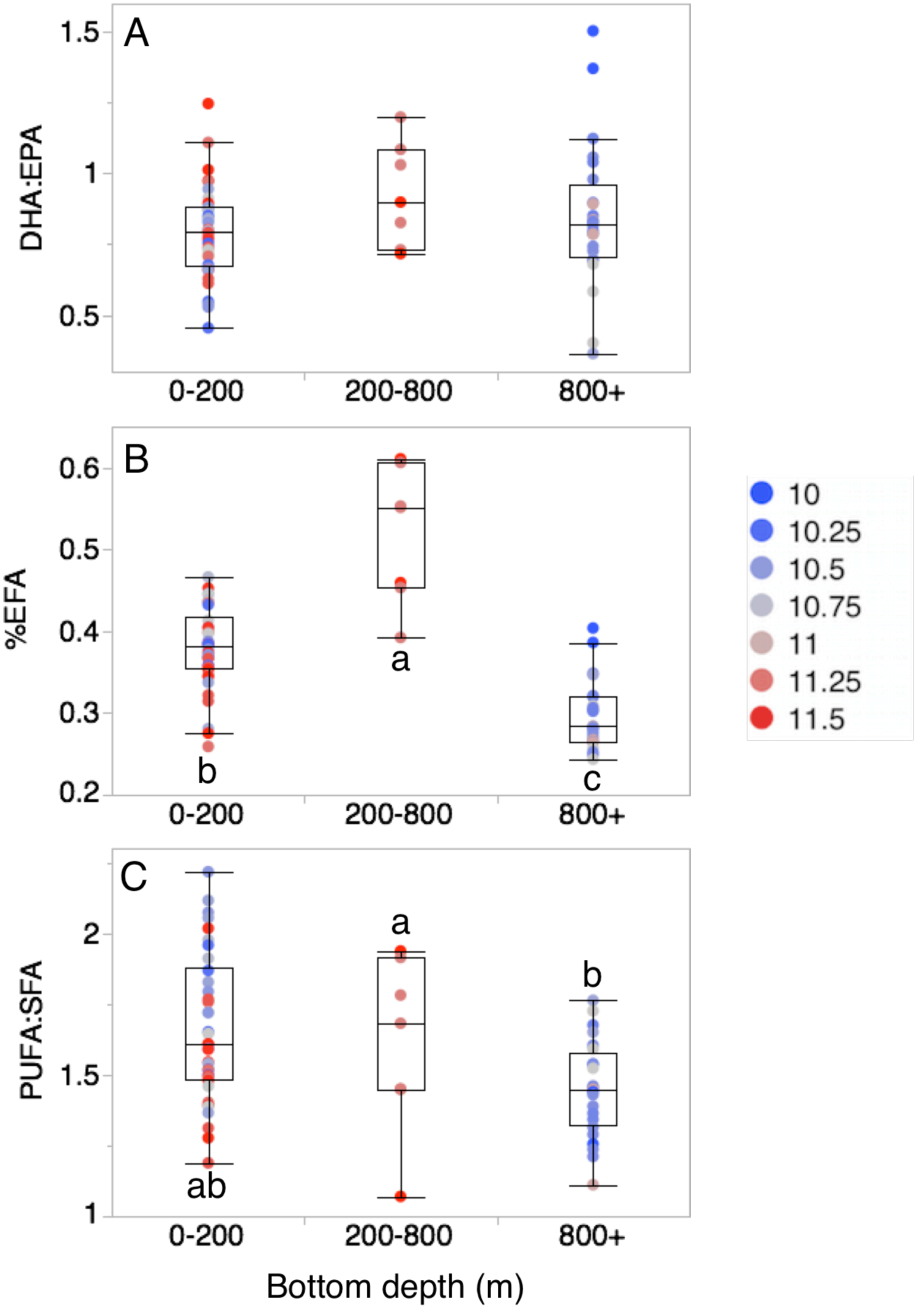

Figure 8. Change with bottom depth of fatty acid indicators DHA:EPA (A), %EFA (B) and PUFA:SFA (C) for *Calanus marshallae* samples collected along the west coast of Vancouver Island. Lower case letters denote significance levels; depth groups labelled with the same letter are not significantly different. Legend at right denotes temperature (°C).

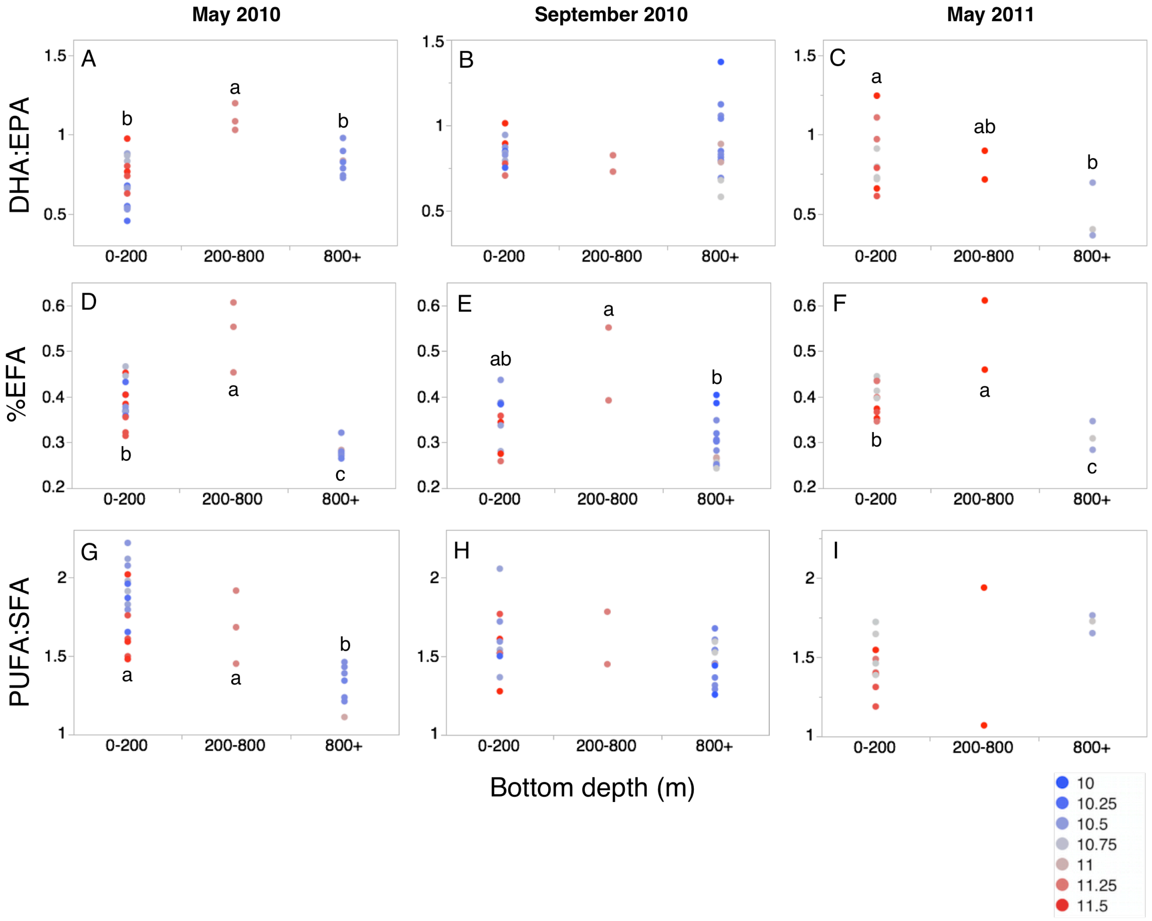

Figure 9. Change with bottom depth for three fatty acid indicators, DHA:EPA (A-C), %EFA (D-F) and PUFA:SFA (G-I), in *Calanus marshallae* along the west coast of Vancouver Island during May 2010, September 2010 and May 2011. Lower case letters denote significance levels; depth groups labelled with the same letter are not significantly different. Low sample size in the 200-800 m category can be attributed to the rarity of stations on the slope.

Table 1. Change in SST, %EFA, DHA:EPA and PUFA:SFA at stations on the WCVI where data was available for both May 2010 and May 2011. Stations are grouped by bottom depth.

Depth (m)	Station	Latitude	Δ May 2010/May 2011			
			SST (°C)	**%EFA**	**DHA:EPA**	**PUFA:SFA**
0-200	C2	48.25	-0.6	0.11	0.04	-0.03
	LG04	49.11	-0.1	-0.03	-0.13	-0.44
	LBP02	50.04	0.2	-0.05	-0.04	-0.42
	CS08	51.08	0.9	0.01	0.46	-0.58
	CS09	51.12	1.4	-0.03	0.10	-0.43
200-800	A2	48.22	0.4	0.00	-0.30	-0.18
800+	LBP05	50	0.2	0.01	-0.29	0.28
	CS01	50.35	0.5	0.03	-0.44	0.50

Table 2. Fatty acid indicator data for samples collected at two stations near Brooks Peninsula (51°N 128°W) in May 2010 and May 2011.

Depth (m)	Station	Distance from shore (km)	%EFA		DHA:EPA		PUFA:SFA	
			May 2010	May 2011	May 2010	May 2011	May 2010	May 2011
0-200	LBP02	4.2	0.46	0.41	0.85	0.82	1.94	1.43
800+	LBP05	16.4	0.30	0.32	0.82	0.53	1.52	1.71

2.4 Discussion

2.4.1 Contrasting PDO Conditions in 2010 and 2011

When overlaid with PDO values for 2009-2011, the three sampling times in this study coincide well with a shift from positive to negative PDO values. A similar shift in the El Niño Southern Oscillation also occurred within this timeframe (Lubbecke and McPhaden 2014). While the PDO values observed during this period are not particularly extreme relative to historical values (i.e. above 2.0 or below -2.0 standard deviations), the shift from 0.9 to -1.5 that began in May 2010 is of a moderate magnitude (Mantua and Hare 2002). However, the transition to colder conditions in May 2011 was not reflected by SST at the time of our sampling. In fact, SST was actually higher in May 2011 at six of the eight stations where year-to-year data could be directly compared. Temperatures at the northernmost stations of the sampling range (CS08 and CS09) were 1 to 1.5°C warmer in May 2011 than the previous year, possibly due to stronger stratification and weak or reduced upwelling in the region (Cummins and Masson 2014). These unexpectedly warm temperatures deviated from the strong latitudinal gradient of colder conditions to the north of the sampling range that was observed in May and September 2010. Interestingly, PUFA:SFA and %EFA values at stations CS08 and CS09 seemed to be unaffected by this anomaly. DHA:EPA values, however, were the highest of the sampling period. A reduced influence of diatoms in these samples is likely a result of greater stratification, lower nutrient availability and higher temperatures (Harris et al. 2009).

2.4.2 Interannual Variability in PUFA Indicators

Despite a basin-scale shift in conditions from warmer to colder temperatures, the pooled mean values of the three indicators, as well as of %DHA and %EPA, were not significantly different between May 2010 and May 2011. The overall ranges were wider and maximum values were higher for %DHA and %EPA (0.07-0.31 and 0.13-0.32 respectively) than values for *C. marshallae* reported from the Strait of Georgia reported by El-Sabaawi et al. (2009), suggesting that *C. marshallae* on the WCVI are particularly rich in PUFA. However, the similarity between sampling times in the overall ranges for each indicator suggests that small-scale and local processes may have played a more significant role than basin-scale indices (such as the PDO) in determining the availability of PUFAs to consumers such as *C. marshallae* and their resulting fatty acid composition.

Trends emerged when stations that were sampled in both years were analyzed individually. The difference in %EFA between sampling times rarely exceeded 5%, whereas DHA:EPA and PUFA:SFA both showed wide deviations between years. Furthermore, PUFA:SFA values were notably lower in 2011 in all shelf and slope stations but were higher offshore. The similarity of EFA levels between years suggests that they did not play a role in the observed changes in PUFA:SFA. For the shelf stations, this change in PUFA:SFA can be attributed to reductions in the fatty acids 18:(1n-9) and 18:(2n-6), respectively carnivory and terrestrial ecosystem markers (Dalsgaard et al. 2003), and increases in the fatty acid 14:0. The elevated PUFA:SFA observed offshore in 2011 can be attributed mainly to an increase in the fatty acid ratio 16(1n-7)/16:0, a diatom marker (Ederington et al. 1995), from 0.4 to 0.8. Interestingly, two well-known diatom markers show a divergence in these samples – EPA was lower while 16(1n-7)/16:0 was higher offshore in May 2011, although Brett et al. (2009) note that overlap in fatty acid composition between phytoplankton groups makes it difficult to attribute individual fatty acids in the composition of a consumer to one particular dietary source.

2.4.3 Relationship between PUFA Indicators and Temperature

The weak positive relationships between SST, PUFA:SFA and %EFA suggest higher production of PUFAs by phytoplankton at warmer temperatures, and thus a greater availability of PUFAs to consumers. These results run counter to well-established literature showing an inverse relationship between temperature and EFA production in a wide range of autotrophic species (Thompson et al. 1992; Nanton and Castell 1999; Jiang and Gao 2004; Fuschino et al. 2011). However, the SST range for the samples in this study was less than 2°C, whereas empirical studies have generally used temperature increments of 5°C between laboratory cultures and a total range of at least 10°C to demonstrate this relationship (Thompson et al. 1992; Nanton and Castell 1999). Such a wide range exceeds the natural SST variability of the WCVI, even in extreme years (Mackas et al. 2007). It is therefore likely that the narrow temperature range observed in our samples is not biologically relevant and may preclude temperature from acting as a significant driver of PUFA production on the WCVI and in other areas where spatial variability in SST is modest.

2.4.4 Contrasting PUFA Indicators in Spring and Late Summer

An organism's lipid profile at the time of collection is an integration of its feeding and metabolic activity over the previous several weeks (Lee et al. 2006). Therefore, individual *C. marshallae* collected in May and September of 2010 can be compared to assess whether seasonal changes in feeding habits affect the food quality that they represent for higher trophic levels. *C. marshallae* are found at stage C4 and C5 in the upper water column from January to early October (Peterson et al. 1979); however, individuals in the May and September cohorts are separated by at least one generation (Peterson 1979) and would therefore not possess overlapping fatty acid signatures. The diatom-heavy spring phytoplankton bloom is the predominant food source for *C. marshallae* collected in May, whereas late-season populations are sustained by a regional upwelling season that can persist into early fall (Mackas 1992). As a result of the increased availability of diatoms due to the spring bloom, %EPA was significantly higher in both May sampling periods than in September 2010 while %DHA remained relatively constant across all three sampling periods. The reduced presence of EPA after the spring bloom produced noticeable but non-significant effects on the other indicators as well – predictably, DHA:EPA was higher and %EFA and PUFA:SFA were lower in September than in May 2010. The inverse relationship between DHA:EPA and the other indicators makes it difficult to determine at which time period *C. marshallae* could be considered a higher quality food item for higher trophic levels – while the total availability of PUFAs and EFAs were lower later in the season, DHA and EPA were available in a more favourable ratio (Glencross 2009).

Seasonal changes in the availability of PUFAs have the potential to greatly impact the early marine growth of juvenile salmon. Investigations of match-mismatch dynamics between marine entry timing of juveniles and peak food availability have found correlations between earlier marine entry and increased growth rates and survival (Cross et al. 2007; Scheuerell et al. 2009; Chittenden et al. 2010). This is assumed to be related to the timing of the spring bloom and peak food availability (Willette et al. 2001). Our results certainly support the notion that food quality on the WCVI shelf is higher in May than in September. There is speculation that climate change may shift the average timing of the spring bloom earlier, potentially further exacerbating trophic mismatch and selecting against late marine entry salmon stocks (Edwards and Richardson 2004).

2.4.5 Variability in PUFA Indicators with Depth

A variety of physical processes, including wind-driven upwelling, tidal mixing and estuarine input, can drive exceptionally high levels of primary production and a strong spring bloom in the shelf waters of the WCVI (Mackas et al. 1980; Crawford and Dewey 1989). Production offshore from the shelf break is somewhat limited by low nutrient availability and reaches its peak levels in the mid-late summer (Mackas 1992). These patterns were quite apparent when samples were grouped by bottom depth. The lower availability of PUFAs offshore suggests a dramatic reduction in food quality beyond the shelf break, although this pattern was far more pronounced in May 2010 and May 2011 (i.e. following the spring bloom) than in September 2010. These early-season differences are likely maintained by the high retention of shelf waters above the slope that is characteristic of the region (Denman et al. 1989). Following the seasonal production patterns detailed by Mackas (1992), the strength of the nearshore spring bloom increased the availability of PUFAs relative to offshore stations in May, while by September the sustained maxima of summer production have reduced this nearshore to offshore gradient.

The pronounced shelf-offshore gradient in spring PUFA availability and overall quality of *C. marshallae* has important implications for higher trophic levels when considering the structure of the continental shelf along the WCVI. At the outflow of the Juan de Fuca Strait to the south of Vancouver Island, the width of the continental shelf exceeds 75 km. However, moving northward up the coast, the shelf gradually narrows to less than 5 km at Brooks Peninsula (50°N) before widening again to about 30 km at Cape Scott. Predators engaging in a northwesterly migration, such as juvenile salmon (Beacham et al. 2014), could thus face a drastically narrowing corridor of higher quality zooplanktonic prey which bottlenecks at Brooks Peninsula. Individuals feeding within this corridor could therefore face increased competition for lower available prey per capita. This notion is supported by Perry et al. (1996), who found that late-spring density of juvenile chum salmon on the WCVI was highest at the shelf bottleneck around Brooks Peninsula. The shelf-offshore gradient is strikingly apparent when data from neighbouring shelf and offshore stations are compared (LBP02 and LBP05; Table 2). While these stations are just 12.2 km apart, and while LBP05 is only 16.4 km from shore, *C. marshallae* samples at LBP05 displayed dramatically lower %EFA than at LBP02 in May 2010 and May 2011. Samples were not available for LBP02 in September 2010 so it is uncertain if this gradient persisted into the late summer, although it is unlikely based on the previously noted trends discussed by Mackas (1992).

2.4.6 Conclusions

In summary, wide variability was observed in all of the PUFA indicators within sampling times, suggesting that food quality effects on higher trophic levels are driven primarily by local rather than regional conditions. Interannual, latitudinal and temperature variability were minimal while seasonal and nearshore-offshore effects were pronounced. These results validate the notion that a single species of zooplanktonic prey can vary greatly in the food quality that it represents to its predators. However, further research is needed to establish links between PUFA availability in the zooplankton and the production of juvenile salmon. Efforts should also be made to link PUFA variability to other oceanographic variables such as upwelling, nutrients, phytoplankton abundance and community structure. Establishing these connections may prove difficult, however, because bottom-up drivers determine the fatty acid signature of a consumer over the scale of weeks or months and not at a single point in time (Lee et al. 2006). Further studies should also seek to quantify variability in other important juvenile salmon prey items in the zooplankton to compare their value as prey items relative to that of *C. marshallae*.

Chapter 3: Conclusions and Synthesis

3.1 Within-Species Variability and Potential Food Quality Effects

The extent of within-species variability in all PUFA indicators warrants further exploration. Considering all of the *C. marshallae* samples used in this study, DHA:EPA, %EFA and PUFA:SFA ranged between 0.38 and 1.5, 0.24 and 0.62, and 1.1 and 2.2 respectively. Mean %DHA and %EPA were also found to be higher than values previously reported for *C. marshallae* in the Strait of Georgia by El-Sabaawi et al. (2009), and also ranged more widely than in calanoid species from the same region which do not engage in diapause over the winter (Persson and Vrede 2006). These large ranges show quite clearly that even zooplanktonic prey fields with similar species composition are not necessarily equal from the standpoint of consumers such as juvenile salmon who require high dietary amounts of PUFA. These results support suggestions in the literature that food quality may be variable enough to play a significant role in juvenile salmon survival (Beamish and Mahnken 2001; Kainz et al. 2004). Further studies should also compare the extent of PUFA variability within *C. marshallae* to other important zooplanktonic prey species on the WCVI.

In order for a EFA-related food quality effect to occur in juvenile salmon, the natural variability in the EFA content of their prey (which our results suggest is quite wide) must be sufficient to overwhelm the ability of juvenile salmon to buffer against unfavourable conditions by synthesizing the deficient fatty acids from others present in the diet. This ability is very limited in virtually all marine vertebrates (Brett et al. 2009). As an example, Atlantic salmon possess enzymes capable of producing DHA from 18:3n-3, but not in sufficient quantities to maintain DHA levels when it is removed from the diet (Bell et al. 1997). Most importantly, EFA deficiency can have an immediate negative impact on growth rates of juvenile salmon and causes reduced lipid content and energy storage over time (Ruyter et al. 2000). These effects both relate to the largest sources of mortality faced by juvenile salmon: individuals with reduced growth rates spend more time at risk of gape-limited predators (Sogard 1997; Willette et al. 2001), and individuals with reduced energy storage are less likely to survive overwinter starvation (Beamish et al. 2004; Farley et al. 2007). Therefore, even short bouts of EFA deficiency may have a large impact on an individual's probability of survival even without posing an immediate health risk. While it is unlikely that juvenile salmon in their early marine residence period will encounter a prey field that is completely devoid of EFAs, our results highlight the risks associated with even minor EFA deficiencies.

3.2 Local Oceanography versus Large-Scale Variables

The influences of the PDO, temperature and latitude on the PUFA composition of *C. marshallae* were surprisingly limited, especially considering the size of the sampling area, which spanned nearly 400 km and three degrees of latitude. This indicates that broad-scale environmental variables may not affect the quality of the zooplanktonic prey field as much as the oceanographic processes that govern phytoplankton and zooplankton community structure at smaller scales. Zooplankton communities are notoriously patchy, with biomass varying on scales less than 1 km and composition varying at about 30 km (Mackas 1984). Juvenile salmon are capable of a horizontal migration distance exceeding 40 km/d (Morris et al. 2007; Melnychuk et al. 2010), allowing them the potential to transit multiple prey fields of varying quality within a single day. Should this be the case, individuals who survive long enough will experience a broader-scale "averaging out" of the food quality conditions that they encounter along their migration.

However, it is difficult to measure bottom-up phenomena in a way that is relevant to the data set collected here. Nutrient and phytoplankton data have limited connection to zooplankton samples collected at the same time. Substantial time lag exists between, for example, episodes of phytoplankton growth and the resulting turnover in the fatty acid signature of a zooplankter. This time lag is species-specific and depends heavily on the growth rate of the consumer and the ratio of previously stored lipids to consumption of new lipids (Brett et al. 2009). For example, Graeve et al. (2005) found that under optimal feeding conditions, *C. hyperboreus* were able to almost completely turn over their lipid pool in 11 days, while after 14 days *C. finmarchicus* and *C. glacialis* had only exchanged 22% and 45% (respectively) of their lipids. This wide time range and the episodic nature of *in situ* zooplankton feeding pose substantial obstacles in exploring bottom-up influences on zooplankton fatty acid signatures; both high-resolution and time-lagged data are required to effectively make these connections.

Bottom depth and season were more important than SST or latitude as determinants of PUFA indicators. Offshore stations were far lower in food quality, especially in May. Broadly speaking, juvenile salmon are rarely found in water deeper than 250 m compared to shelf waters (Fisher et al. 2007), suggesting an evolved avoidance of habitually low-quality prey fields. However, the nearshore-offshore quality gradient may still be a cause of food limitation in areas where the shelf narrows and the density of juvenile salmon increases (Perry et al. 1996), such as the area around Brooks Peninsula. This gradient, however, is likely dampened by the effects of the summer upwelling season.

A similar site-specific dynamic has recently been suggested in Johnstone Strait, at the north end of the Strait of Georgia, where strong tidal mixing limits primary productivity by constantly moving phytoplankton out of the euphotic zone. In proposing the "Trophic Gauntlet Hypothesis", McKinnell et al. (2014) suggested that juvenile salmon encounter increased competition for fewer and lower quality food resources at Johnstone Strait, and that they exit the area in relatively poor condition on an annual basis. The implications of this theory are that the adverse conditions in this small area, and the ability of juvenile salmon to recover from them upon entering the Queen Charlotte Sound, may have a disproportionate effect on their overall survival. Our results suggest that Brooks Peninsula and other narrow shelf areas may cause similar pressures on juvenile salmon by narrowing the shelf corridor of higher quality food and forcing individuals into lower quality areas offshore. However, it must be noted that the narrowest area of the shelf is less than 25 km across and could be transited by migrating juvenile salmon in 1-2 days (Morris et al. 2007; Melnychuk et al. 2010). This theory could be explored by comparing the density of juvenile salmon offshore at Brooks Peninsula to the surrounding areas where the shelf widens, or, as McKinnell et al. suggest, by determining if the energy density or condition of juveniles is significantly lower when leaving the area in question than when they entered it.

3.3 Future Research Directions

Our results support the potential for natural variability in zooplanktonic PUFA content to affect juvenile salmon survival by way of a food quality effect. However, many new questions arise from our data which could serve as starting points for future research. For example:

- Our results show that the PDO and SST have very little influence on PUFA levels relative to local oceanographic variables and seasonally influenced changes in zooplankton communities. However, local SST anomalies and climatic indices suggest that neither 2010 nor 2011 were extreme years. The effects of a strong El Niño year on primary productivity (Harris et al. 2009) suggest lower zooplanktonic food quality for juvenile salmon in an El Niño year. By repeating these methods in more extreme years, we could better assess the full interannual range of food quality variability and the extent of its potential influence on juvenile salmon survival.
- Small scale oceanographic processes seem to play a greater role in *C. marshallae* fatty acid profiles than do large scale climate indices, but a gap in our understanding will remain without high-resolution data that properly accounts for the time lag between nutrient availability, phytoplankton growth and the formation of the zooplanktonic fatty acid signature. Making these connections may help to account for the widely variable fatty acid profiles found in this study.
- The fatty acid profiles of *C. marshallae* could be compared to other zooplanktonic species to determine their relative qualities as prey for juvenile salmon. The results discussed in this thesis cover only a small portion of the larger data set that was collected for this project. Samples were also collected from the Strait of Georgia and the coast of northern British Columbia and include many more important juvenile salmon prey taxa such as euphausiids, amphipods and decapod larvae. It would thus be interesting to compare interspecific spatiotemporal variability in PUFAs from these other taxa with our results for *C.*

marshallae. Preliminary data showing patterns of interspecies variability appear in Appendix A, and the full dataset of all samples is included in Appendix B.

- Methodologies utilized in this project were met with some limitations. Mass data was collected for all zooplankton samples with the intention of measuring lipid and PUFA content by organism mass. However, accurately weighing such small and fragile organisms proved difficult. This data could be potentially useful in assessing how per milligram body mass values of PUFA vary within and between zooplanktonic species.

Pacific salmon will continue to be a cultural, economic and ecological touchstone of the Pacific Northwest. The encroaching threat of climate change, as well as the anthropogenic threats of habitat destruction and overfishing, will also continue to threaten the stability of this resource. Management efforts must continue to evolve through an ever-advancing understanding of the determinants of salmon survival and production, especially in the early marine residence period. Our results suggest that EFA availability may play a role in early marine growth, but further study is required to link oceanographic variables to processes at higher trophic levels that ultimately determine juvenile salmon survival.

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Appendix A: Additional Figures

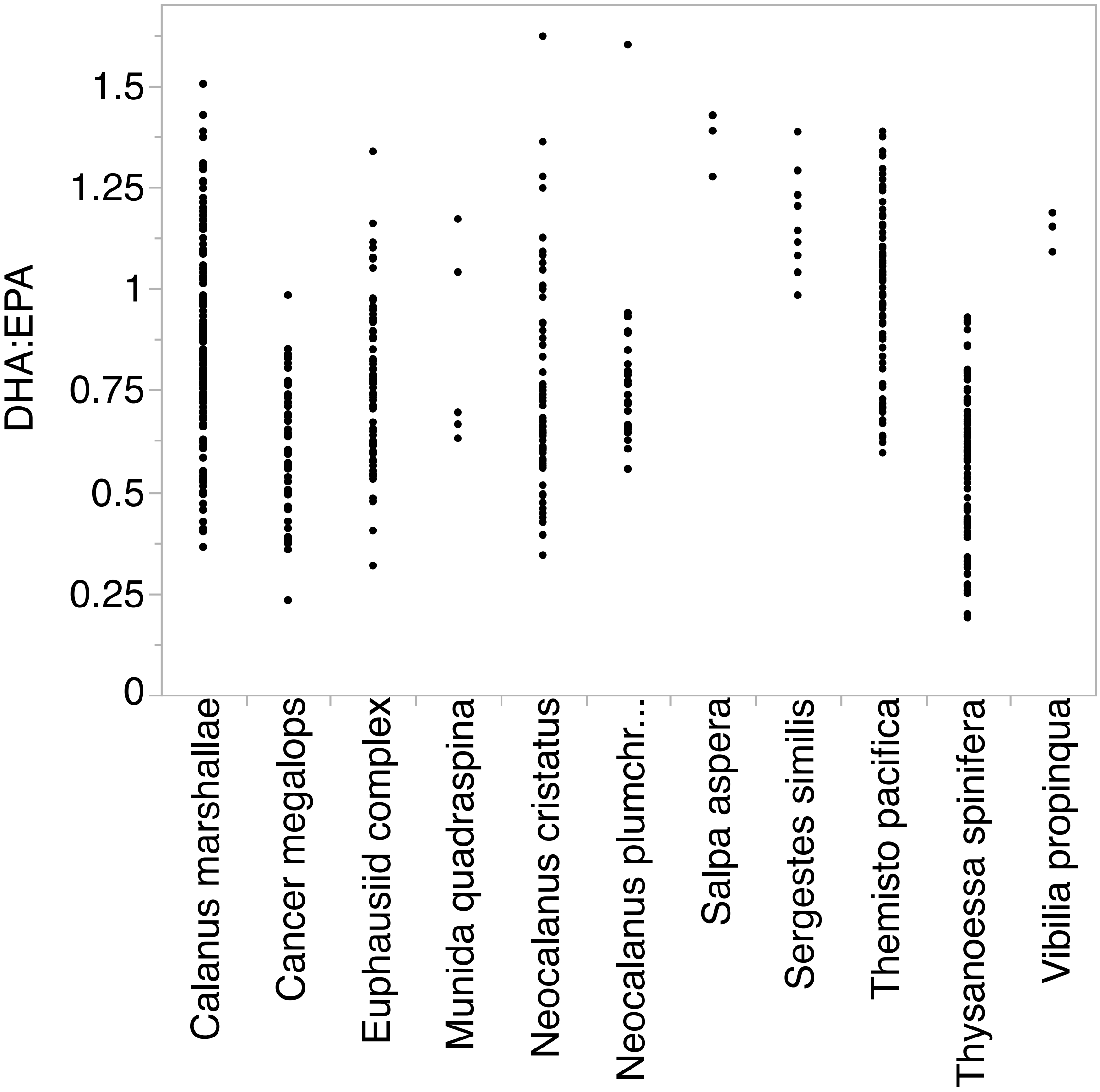

Figure A1. DHA:EPA for eleven zooplankton taxa collected on the west coast of Vancouver Island, Strait of Georgia and north coast of British Columbia in 2010-2011.

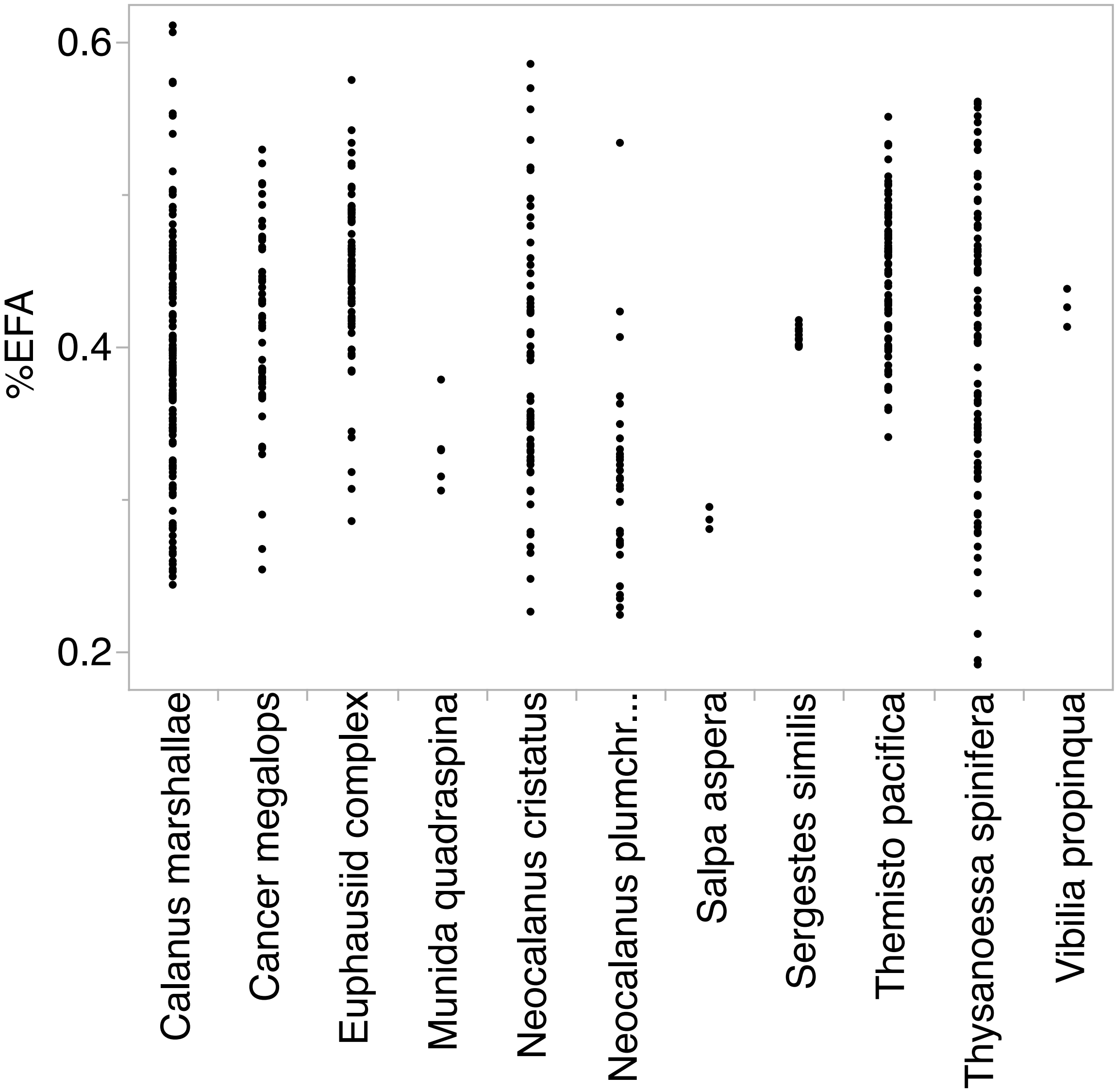

Figure A2. %EFA for eleven zooplankton taxa collected on the west coast of Vancouver Island, Strait of Georgia and north coast of British Columbia in 2010-2011.

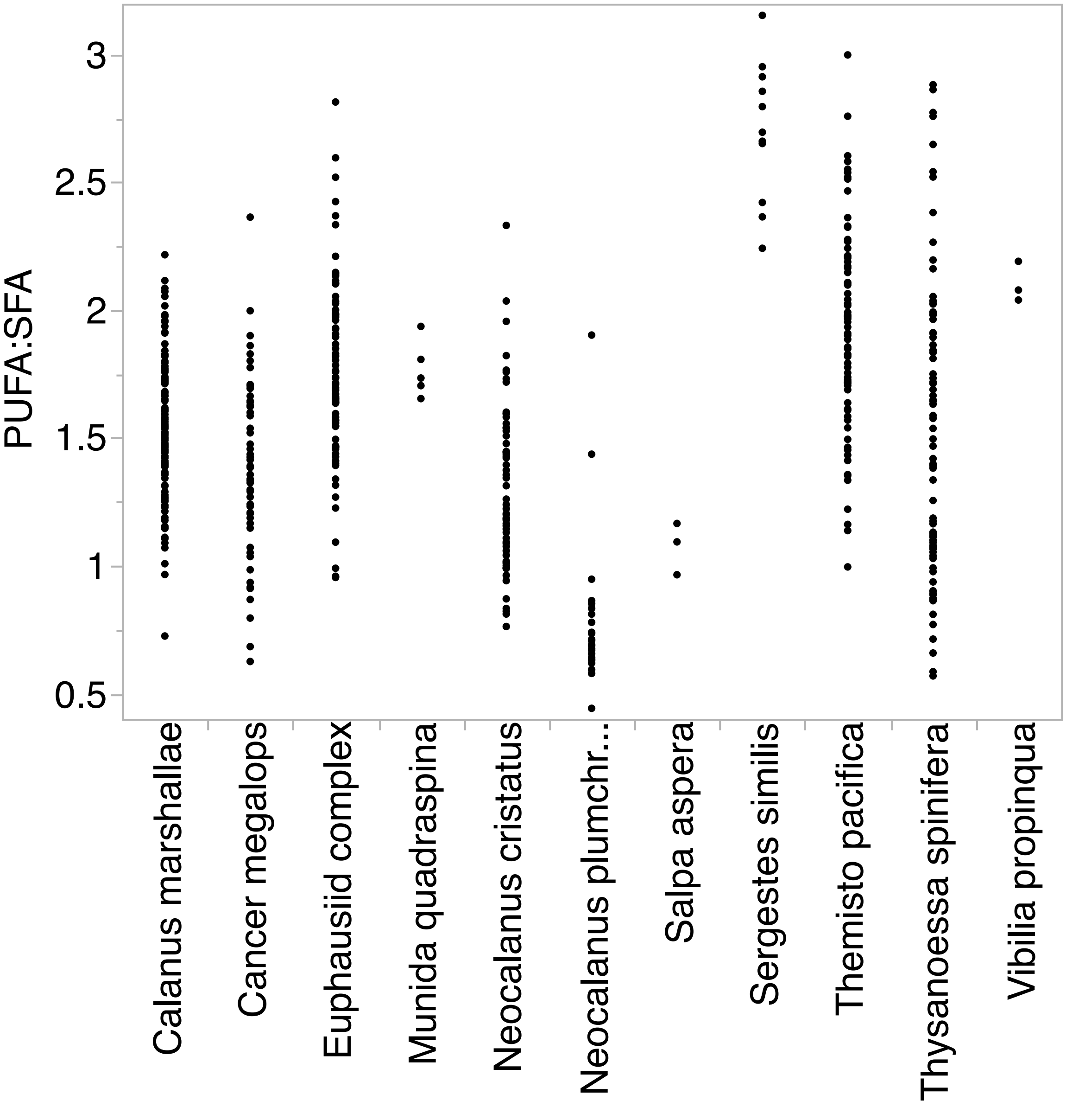

Figure A3. PUFA:SFA for eleven zooplankton taxa collected on the west coast of Vancouver Island, Strait of Georgia and north coast of British Columbia in 2010-2011.

Appendix B: Complete Fatty Acid Data

Table 3. Fatty acid data for all samples processed under this research project. Fatty acids which were included in the Nu-Chek standard but were not found in any of the samples have not been included in this table. Additional data, and a more extensive spreadsheet including station co-ordinates and oceanographic variables, is available upon request. This table is also available as a .JMP file.

NOTE: Table 3 begins on the following page. Taxa in Table 3 have been abbreviated using the following codes:

Abbr:	Taxon
Cmar	*Calanus marshallae*
Cmeg	*Cancer* megalops – includes *C. magister*, *C. oregonensis* and *C. productus*
Eelo	*Euchaeta elongata*
Ecom	*Euphausia* complex – includes *E. pacifica* and *E. longipes*
Mqua	*Munida quadraspina*
Ncri	*Neocalanus cristatus*
Nplu	*Neocalanus plumchrus*
Sasp	*Salpa aspera*
Ssim	*Sergestes similis*
Tpac	*Themisto pacifica*
Tspi	*Thysanoessa spinifera*
Vpro	*Vibilia propinqua*

Taxon	Station	Region	Month	Day	Year	PUFA:SFA	DHA:EPA	%EFAs	%DHA+EPA	14:0	15:0	16:0	16:1n-7	17:0	18:0	18:1n-9	18:2n-6	20:1	18:3n-3	20:2	22:1n-9	20:4n-6	20:5n-3	22:6n-3
Cmar	A2	WCVI	Sept	6	2010	1.52	0.71	0.26	0.26	0.14	0.01	0.12	0.06		0.02	0.05	0.04	0.09	0.01	0.08	0.09		0.15	0.11
Cmar	A2	WCVI	Sept	6	2010	1.54	0.79	0.28	0.28	0.14	0.01	0.13	0.06		0.02	0.05	0.03	0.09		0.10	0.08		0.16	0.12
Cmar	A2	WCVI	May	27	2011	1.49	1.11	0.35	0.34	0.13	0.01	0.12	0.10		0.01	0.04	0.01	0.10	0.01	0.03	0.01	0.01	0.16	0.18
Cmar	A2	WCVI	May	27	2011	1.54	1.25	0.37	0.37	0.12		0.13	0.11		0.02	0.04		0.10		0.02			0.17	0.21
Cmar	A2	WCVI	May	27	2010	1.45	1.08	0.45	0.45	0.09	0.01	0.21	0.05		0.06	0.05	0.03	0.04					0.22	0.24
Cmar	A2	WCVI	May	27	2010	1.68	1.20	0.55	0.55	0.04	0.01	0.23	0.02		0.06		0.02						0.25	0.30
Cmar	A2	WCVI	May	27	2010	1.91	1.03	0.61	0.61	0.06		0.24			0.04	0.04		0.02					0.30	0.31
Cmar	C2	WCVI	May	25	2011	1.39	0.66	0.35	0.35	0.14		0.15	0.16		0.01	0.05		0.08		0.03	0.01		0.21	0.14
Cmar	C2	WCVI	Sept	4	2010	1.61	0.89	0.34	0.34	0.11	0.01	0.17	0.06		0.04	0.05	0.04	0.06	0.01	0.04	0.07		0.18	0.16
Cmar	C2	WCVI	May	25	2011	1.65	0.72	0.41	0.41	0.11		0.16	0.14		0.02	0.05		0.05		0.03	0.01		0.24	0.17
Cmar	C2	WCVI	May	26	2010	1.07	0.72	0.46	0.46	0.10		0.32	0.06		0.04	0.02							0.27	0.19
Cmar	C2	WCVI	May	26	2010	1.78	0.83	0.55	0.55	0.07		0.25	0.07		0.02	0.05							0.30	0.25
Cmar	C2	WCVI	May	26	2010	1.94	0.90	0.61	0.61	0.06		0.25	0.03		0.03	0.03							0.32	0.29
Cmar	CS00	WCVI	Sept	9	2010	1.34	0.83	0.26	0.26	0.14	0.01	0.13	0.05		0.04	0.05	0.03	0.08	0.01	0.10	0.08		0.15	0.12
Cmar	CS00	WCVI	Sept	9	2010	1.28	1.01	0.28	0.28	0.14	0.01	0.15	0.06		0.04	0.06	0.02	0.06	0.01	0.08	0.07		0.14	0.14
Cmar	CS00	WCVI	May	31	2010	1.45	0.73	0.39	0.39	0.09	0.01	0.20	0.11		0.05	0.07	0.04	0.03					0.22	0.16
Cmar	CS01	WCVI	May	31	2010	1.61	0.63	0.31	0.31	0.09		0.15	0.18		0.02	0.07	0.04	0.11		0.03			0.19	0.12
Cmar	CS01	WCVI	Sept	9	2010	1.24	0.79	0.28	0.28	0.14	0.01	0.14	0.06		0.05	0.05	0.03	0.07		0.08	0.07		0.15	0.12
Cmar	CS01	WCVI	Sept	9	2010	1.21	0.90	0.28	0.28	0.14	0.01	0.15	0.04		0.04	0.05	0.02	0.09		0.10	0.06		0.15	0.13
Cmar	CS01	WCVI	May	31	2010	1.50	0.80	0.32	0.32	0.09		0.18	0.17		0.02	0.07	0.03	0.07		0.04			0.18	0.14
Cmar	CS01	WCVI	May	30	2011	1.39	0.91	0.40	0.39	0.16	0.01	0.15	0.09		0.02	0.04	0.02	0.06	0.01	0.04			0.21	0.19
Cmar	CS03	WCVI	Sept	10	2010	1.46	0.74	0.27	0.27	0.13	0.01	0.13	0.06		0.03	0.05	0.04	0.11		0.07	0.08		0.16	0.12
Cmar	CS03	WCVI	May	31	2010	1.76	0.74	0.36	0.36	0.08		0.16	0.13		0.03	0.07	0.04	0.08	0.01	0.05			0.20	0.15
Cmar	CS03	WCVI	Sept	10	2010	1.39	0.98	0.32	0.32	0.13	0.01	0.15	0.06		0.05	0.05	0.03	0.05		0.07	0.07		0.16	0.16
Cmar	CS03	WCVI	May	31	2010	2.12	0.88	0.37	0.37	0.04		0.21	0.05		0.03	0.19	0.02	0.05		0.05			0.20	0.17
Cmar	CS08	WCVI	Sept	10	2010	1.11	0.84	0.28	0.28	0.14	0.01	0.16	0.09		0.07	0.05	0.03	0.05		0.05	0.05		0.15	0.13
Cmar	CS08	WCVI	June	1	2010	2.22	0.54	0.40	0.40	0.07		0.15	0.12		0.03	0.07	0.07	0.05		0.03			0.26	0.14
Cmar	CS08	WCVI	May	31	2011	1.31	0.61	0.37	0.37	0.13		0.12	0.12		0.07	0.04	0.01	0.05		0.04			0.23	0.14
Cmar	CS08	WCVI	Sept	10	2010	1.43	0.73	0.32	0.32	0.11	0.01	0.14	0.06	0.01	0.06	0.06	0.03	0.04	0.02	0.08	0.05		0.19	0.14
Cmar	CS08	WCVI	June	1	2010	1.83	0.66	0.37	0.37	0.08		0.16	0.15		0.03	0.07	0.06	0.05		0.03			0.22	0.15

Cmar	CS08	WCVI	June	1	2010	1.79	0.67	0.38	0.38	0.07	0.01	0.17	0.12		0.03	0.07	0.05	0.07		0.03			0.23	0.15
Cmar	CS08	WCVI	May	31	2011	1.19	0.79	0.40	0.40	0.15		0.14	0.08		0.08	0.04	0.01	0.03		0.03			0.22	0.18
Cmar	CS09	WCVI	Sept	10	2010	1.65	0.36	0.28	0.28	0.15	0.01	0.10	0.10	0.01	0.02	0.05	0.06	0.07	0.01	0.05	0.07		0.21	0.08
Cmar	CS09	WCVI	Sept	10	2010	1.73	0.40	0.31	0.31	0.14	0.01	0.11	0.11		0.03	0.05	0.06	0.06	0.01	0.04	0.07		0.22	0.09
Cmar	CS09	WCVI	June	1	2010	1.96	0.45	0.37	0.37	0.08		0.14	0.17		0.03	0.07	0.05	0.07		0.02			0.25	0.11
Cmar	CS09	WCVI	June	1	2010	2.07	0.53	0.37	0.36	0.08	0.01	0.14	0.17		0.02	0.08	0.05	0.08			0.01	0.01	0.24	0.12
Cmar	CS09	WCVI	June	1	2010	1.87	0.55	0.36	0.36	0.08		0.14	0.18		0.02	0.07	0.04	0.08		0.02			0.23	0.13
Cmar	CS09	WCVI	May	31	2011	1.77	0.78	0.36	0.35	0.09		0.12	0.10		0.07	0.04	0.08	0.04		0.02		0.01	0.20	0.15
Cmar	CS09	WCVI	May	31	2011	1.37	0.84	0.38	0.38	0.10	0.01	0.14	0.10		0.08	0.04	0.01	0.04	0.01	0.03		0.01	0.21	0.17
Cmar	LB11	WCVI	Sept	5	2010	1.76	0.70	0.35	0.35	0.11	0.01	0.14	0.07		0.03	0.04	0.04	0.08	0.01	0.02	0.07		0.20	0.14
Cmar	LBP02	WCVI	May	28	2011	2.05	0.94	0.34	0.34	0.08		0.16	0.09		0.02	0.03	0.15	0.02	0.01	0.03			0.17	0.16
Cmar	LBP02	WCVI	May	30	2010	1.65	0.68	0.43	0.43	0.08	0.02	0.18	0.14		0.03	0.05	0.03	0.04					0.26	0.17
Cmar	LBP02	WCVI	May	28	2011	1.72	0.87	0.44	0.44	0.08		0.19	0.10		0.02	0.04	0.02	0.02	0.01	0.04			0.23	0.20
Cmar	LBP02	WCVI	May	30	2010	1.98	0.87	0.47	0.47	0.06		0.20	0.14		0.03	0.06	0.03	0.02					0.25	0.22
Cmar	LBP05	WCVI	Sept	8	2010	1.54	1.04	0.30	0.30	0.12	0.01	0.15	0.07		0.03	0.05	0.03	0.08	0.01	0.08	0.07		0.15	0.15
Cmar	LBP05	WCVI	May	29	2011	1.50	0.75	0.39	0.38	0.12	0.01	0.16	0.11		0.02	0.04	0.02	0.04	0.01	0.06			0.22	0.16
Cmar	LBP05	WCVI	May	30	2010	1.48	0.77	0.38	0.38	0.09	0.01	0.18	0.19		0.03	0.05	0.02	0.03					0.22	0.17
Cmar	LBP05	WCVI	May	29	2011	1.59	0.83	0.39	0.38	0.12		0.16	0.12		0.01	0.05	0.02	0.04	0.01	0.06			0.21	0.17
Cmar	LBP05	WCVI	Sept	8	2010	1.36	1.12	0.32	0.32	0.12	0.01	0.16	0.06		0.03	0.05		0.08		0.08	0.07		0.15	0.17
Cmar	LBP05	WCVI	May	30	2010	2.02	0.77	0.40	0.40	0.07		0.16	0.15		0.03	0.08	0.05	0.03					0.23	0.18
Cmar	LBP05	WCVI	May	30	2010	1.91	0.83	0.45	0.45	0.07		0.18	0.15		0.02	0.04	0.02	0.04	0.01				0.24	0.20
Cmar	LBP07	WCVI	Sept	8	2010	1.54	0.69	0.25	0.25	0.15	0.01	0.11	0.06		0.02	0.05	0.03	0.08	0.01	0.10	0.10		0.15	0.10
Cmar	LBP07	WCVI	Sept	8	2010	1.29	0.81	0.25	0.25	0.16	0.01	0.13	0.06		0.02	0.06	0.02	0.08		0.11	0.08		0.14	0.11
Cmar	LBP08	WCVI	Sept	9	2010	1.31	0.83	0.28	0.28	0.14	0.01	0.15	0.06		0.04	0.06	0.03	0.08		0.07	0.08		0.15	0.13
Cmar	LBP08	WCVI	Sept	9	2010	1.10	0.83	0.34	0.34	0.13	0.02	0.15	0.05	0.01	0.06			0.05		0.07	0.08		0.18	0.15
Cmar	LC04	WCVI	Sept	6	2010	1.45	0.80	0.30	0.30	0.14	0.01	0.14	0.06		0.03	0.05	0.04	0.08		0.08	0.08		0.17	0.13
Cmar	LC04	WCVI	Sept	6	2010	1.60	1.06	0.35	0.35	0.11		0.16	0.07		0.04	0.05	0.04	0.05		0.05	0.07		0.17	0.18
Cmar	LC08	WCVI	Sept	7	2010	1.68	0.85	0.31	0.31	0.12	0.01	0.14	0.06		0.03	0.05	0.03	0.08	0.01	0.08	0.09		0.17	0.14
Cmar	LG02	WCVI	Sept	8	2010	1.44	1.37	0.39	0.39	0.08	0.01	0.20	0.07		0.06	0.04	0.03	0.04		0.03	0.05		0.16	0.22
Cmar	LG02	WCVI	Sept	8	2010	1.26	1.50	0.40	0.40	0.07		0.22	0.06	0.01	0.08	0.04		0.03		0.04	0.03		0.16	0.24
Cmar	LG04	WCVI	May	28	2011	1.52	0.85	0.38	0.38	0.13	0.01	0.14	0.12		0.02	0.05	0.01	0.06		0.04			0.21	0.18
Cmar	LG04	WCVI	May	29	2010	1.46	0.80	0.44	0.44	0.09		0.22	0.14		0.02	0.04		0.04					0.24	0.19
Cmar	LG04	WCVI	May	29	2010	1.72	0.73	0.44	0.44	0.08		0.18	0.14		0.03	0.06		0.04					0.26	0.19
Cmar	LG04	WCVI	May	29	2010	1.59	0.97	0.45	0.45	0.08		0.20	0.13		0.04	0.06		0.03					0.23	0.22
Cmar	LG04	WCVI	May	28	2011	2.07	1.31	0.57	0.57	0.08		0.20	0.04		0.03	0.04	0.01		0.01	0.03			0.25	0.32
Cmar	LG07	WCVI	Sept	8	2010	1.45	0.89	0.26	0.26	0.12	0.01	0.13	0.04		0.03	0.05	0.02	0.12		0.10	0.08		0.14	0.12

Cmar	LG07	WCVI	Sept	8	2010	1.45	0.79	0.27	0.27	0.14	0.01	0.13	0.05		0.03	0.05	0.03	0.09	0.02	0.10	0.08		0.15	0.12
Cmar	LG07	WCVI	May	29	2010	1.40	0.97	0.43	0.43	0.07		0.24	0.06		0.06	0.09		0.05					0.22	0.21
Cmar	LG09	WCVI	Sept	7	2010	1.52	0.58	0.26	0.26	0.14	0.01	0.11	0.06		0.02	0.05	0.04	0.11		0.08	0.09		0.16	0.09
Cmar	LG09	WCVI	Sept	7	2010	1.59	0.68	0.24	0.24	0.13	0.01	0.11	0.06		0.02	0.05	0.03	0.14	0.02	0.08	0.09		0.14	0.10
Cmar	VI05	WCVI	June	18	2010	1.49	0.87	0.45	0.44	0.08		0.20	0.07		0.07	0.04	0.02	0.02		0.02	0.02	0.01	0.23	0.20
Cmar	VI05	WCVI	June	18	2010	1.31	0.96	0.50	0.50	0.05		0.26	0.05		0.10	0.04							0.26	0.25
Cmar	VI07	WCVI	June	18	2010	1.41	0.91	0.40	0.40	0.09		0.20	0.06		0.06	0.04	0.02	0.05		0.04	0.02		0.21	0.19
Cmar	VI07	WCVI	June	18	2010	1.71	0.82	0.44	0.44	0.10		0.17	0.06		0.05	0.03	0.02	0.02	0.02	0.05	0.04		0.24	0.20
Cmar	VI07	WCVI	June	18	2010	1.47	0.87	0.46	0.46	0.11		0.18	0.08		0.05	0.03	0.02	0.03		0.04			0.24	0.21
Cmar	VI13	WCVI	June	19	2010	1.95	0.77	0.40	0.40	0.08		0.17	0.06		0.04	0.04	0.02	0.08	0.06	0.02	0.03		0.23	0.17
Cmar	VI13	WCVI	June	19	2010	1.54	0.83	0.38	0.37	0.09	0.01	0.18	0.07		0.05	0.05	0.02	0.04	0.01	0.03	0.05		0.20	0.17
Cmar	VI13	WCVI	June	19	2010	1.96	0.90	0.38	0.38	0.08	0.01	0.16	0.07		0.04	0.03	0.02	0.06	0.09	0.02	0.04		0.20	0.18
Cmar	VI18	WCVI	June	21	2010	1.56	0.78	0.43	0.43	0.09		0.19	0.07		0.05	0.03	0.02	0.05		0.02	0.04		0.24	0.19
Cmar	VI18	WCVI	June	21	2010	1.55	0.83	0.52	0.52	0.05		0.24	0.06		0.07	0.03	0.02						0.28	0.23
Cmar	VI18	WCVI	June	21	2010	1.61	0.83	0.50	0.50	0.07		0.22	0.07		0.06	0.02	0.02	0.02		0.01	0.01		0.27	0.23
Cmar	VI20	WCVI	June	21	2010	1.61	0.73	0.35	0.35	0.12	0.01	0.15	0.08		0.03	0.06	0.03	0.06	0.01	0.04	0.06		0.20	0.15
Cmar	VI20	WCVI	June	21	2010	1.57	0.84	0.46	0.46	0.09		0.20	0.06		0.05	0.04	0.02	0.03		0.02			0.25	0.21
Cmar	VI20	WCVI	June	21	2010	1.59	0.90	0.47	0.47	0.09		0.20	0.05		0.05	0.04	0.02	0.04		0.04			0.25	0.22
Cmar	VI24	WCVI	June	22	2010	1.47	0.81	0.37	0.36	0.11	0.01	0.18	0.06		0.04	0.04	0.03	0.07		0.02	0.06	0.01	0.20	0.16
Cmar	VI24	WCVI	June	22	2010	1.37	0.83	0.35	0.34	0.11		0.18	0.11		0.06	0.02	0.03	0.03		0.03	0.06	0.01	0.19	0.16
Cmar	VI24	WCVI	June	22	2010	1.21	1.02	0.37	0.37	0.08		0.22	0.08	0.01	0.08	0.03	0.03	0.02		0.03	0.02		0.19	0.19
Cmar	VI26	WCVI	June	22	2010	1.62	0.76	0.42	0.42	0.10	0.01	0.18	0.06		0.06	0.05	0.03	0.03		0.02	0.03		0.24	0.18
Cmar	VI26	WCVI	June	22	2010	1.77	0.81	0.49	0.47	0.06		0.19	0.06		0.06	0.03	0.02	0.02		0.01	0.01	0.01	0.26	0.21
Cmar	VI26	WCVI	June	22	2010	1.66	0.83	0.50	0.49	0.07		0.21	0.06		0.06	0.04	0.02	0.02		0.01		0.01	0.27	0.22
Cmar	GS06	SoG	July	3	2010	0.97	0.79	0.31	0.31	0.14		0.18	0.07		0.10	0.04	0.01	0.05			0.06		0.17	0.14
Cmar	GS12	SoG	July	4	2010	0.72	1.17	0.32	0.29	0.09		0.22	0.04		0.18	0.02	0.02			0.04		0.03	0.13	0.16
Cmar	GS12	SoG	July	4	2010	1.17	1.30	0.49	0.49	0.07		0.27	0.06		0.08			0.03					0.21	0.28
Cmar	GS14	SoG	July	4	2010	1.45	1.10	0.39	0.37	0.10		0.19	0.04		0.05	0.03	0.01	0.03		0.06	0.07	0.01	0.18	0.19
Cmar	GS14	SoG	July	4	2010	1.60	1.26	0.48	0.48	0.08		0.24	0.06		0.04	0.04	0.02	0.02			0.03		0.21	0.27
Cmar	GS14	SoG	July	4	2010	1.47	1.17	0.54	0.54	0.06		0.26	0.05		0.07	0.03							0.25	0.29
Cmar	GS16	SoG	July	4	2010	1.11	1.17	0.38	0.38	0.08		0.25	0.06		0.10	0.04	0.02	0.03			0.03		0.18	0.21
Cmar	GS16	SoG	July	4	2010	1.15	1.21	0.43	0.42	0.10		0.24	0.06		0.08	0.03		0.04			0.03	0.01	0.19	0.23
Cmar	GS16	SoG	July	4	2010	1.44	1.29	0.49	0.49	0.07		0.25	0.05		0.05	0.05		0.02					0.21	0.28
Cmar	GS24	SoG	July	5	2010	1.23	0.88	0.37	0.36	0.14		0.19	0.08		0.06	0.02	0.02	0.04		0.02	0.06	0.01	0.19	0.17
Cmar	GS30	SoG	July	6	2010	1.15	1.25	0.34	0.34	0.11	0.01	0.21	0.05		0.07	0.04	0.02	0.04	0.01	0.05	0.05		0.15	0.19
Cmar	GS30	SoG	July	6	2010	1.58	1.18	0.42	0.42	0.08		0.22	0.05		0.04	0.04	0.06	0.03		0.04	0.02		0.19	0.23

Cmar	GS30	SoG	July	6	2010	1.21	1.39	0.46	0.46	0.09		0.24	0.07		0.08	0.03		0.03					0.19	0.27
Cmar	GS32	SoG	July	6	2010	1.51	0.73	0.40	0.40	0.15		0.16	0.10		0.02	0.05	0.04	0.07		0.01			0.23	0.17
Cmar	GS32	SoG	July	6	2010	1.07	1.37	0.42	0.42	0.07		0.26	0.05		0.11	0.04							0.18	0.24
Cmar	GS34	SoG	July	6	2010	1.26	1.17	0.44	0.44	0.09		0.25	0.05		0.07	0.04	0.02	0.01			0.02		0.20	0.24
Cmar	GS36	SoG	July	7	2010	1.27	1.22	0.28	0.28	0.09		0.15	0.06		0.04	0.04		0.27		0.04	0.04		0.13	0.16
Cmar	GS36	SoG	July	7	2010	1.01	1.43	0.45	0.45	0.07		0.28	0.05		0.12	0.03							0.19	0.27
Cmar	GS38	SoG	July	7	2010	1.09	1.17	0.35	0.35	0.12		0.21	0.08		0.07	0.07	0.03	0.06					0.16	0.19
Cmar	GS42	SoG	July	7	2010	1.15	1.26	0.41	0.41	0.08		0.24	0.04		0.11	0.05	0.02			0.04	0.01		0.18	0.23
Cmar	GS42	SoG	July	7	2010	1.28	1.43	0.45	0.45	0.08		0.23	0.05		0.09	0.07				0.02			0.19	0.27
Cmar	DT02	North	June	27	2010	1.73	0.41	0.27	0.26	0.14	0.01	0.10	0.07		0.02	0.05	0.05	0.08	0.01	0.11	0.07	0.01	0.19	0.08
Cmar	DT02	North	June	27	2010	1.52	0.49	0.32	0.31	0.14	0.01	0.12	0.07		0.02	0.05	0.05	0.07	0.01	0.11		0.01	0.21	0.10
Cmar	DT02	North	June	27	2010	1.74	0.53	0.31	0.30	0.13	0.01	0.12	0.06		0.03	0.06	0.05	0.07	0.01	0.11	0.05		0.20	0.11
Cmar	DT04	North	June	27	2010	1.82	0.43	0.25	0.25	0.14		0.09	0.07		0.01	0.05	0.05	0.11	0.02	0.11	0.07	0.01	0.17	0.07
Cmar	DT04	North	June	27	2010	1.84	0.47	0.25	0.25	0.14	0.01	0.09	0.07		0.02	0.06	0.05	0.08	0.02	0.12	0.08	0.01	0.17	0.08
Cmar	DT04	North	June	27	2010	1.80	0.50	0.29	0.29	0.14	0.01	0.10	0.07		0.01	0.05	0.05	0.07	0.01	0.10	0.07	0.01	0.19	0.10
Cmar	DT06	North	June	27	2010	1.73	0.47	0.26	0.26	0.14	0.01	0.09	0.07		0.02	0.05	0.05	0.09	0.01	0.10	0.07		0.18	0.08
Cmar	DT06	North	June	27	2010	1.68	0.52	0.27	0.26	0.13	0.01	0.10	0.07		0.02	0.05	0.04	0.08	0.01	0.11	0.07	0.01	0.17	0.09
Cmar	DT06	North	June	27	2010	1.44	0.71	0.32	0.32	0.14	0.01	0.13	0.07		0.03	0.06	0.04	0.06	0.01	0.10			0.19	0.13
Cmar	DT08	North	June	27	2010	1.98	0.51	0.35	0.35	0.12	0.01	0.11	0.07		0.03	0.05	0.05	0.07	0.01	0.07	0.06	0.01	0.23	0.12
Cmar	DT08	North	June	27	2010	1.45	0.61	0.37	0.36	0.15		0.15	0.08		0.02	0.05	0.04	0.06		0.07			0.22	0.14
Cmar	DT08	North	June	27	2010	1.71	0.68	0.36	0.35	0.11	0.01	0.14	0.05	0.01	0.03	0.04	0.04	0.07	0.01	0.07	0.05		0.21	0.14
Cmar	H04	North	June	25	2010	1.45	0.89	0.40	0.39	0.09	0.01	0.18	0.05	0.01	0.06	0.04	0.03	0.04		0.04	0.02	0.01	0.21	0.18
Cmar	H04	North	June	25	2010	1.42	0.92	0.45	0.45	0.08		0.21	0.06		0.07	0.04	0.03	0.02		0.03			0.23	0.21
Cmar	HS02	North	June	26	2010	1.54	0.55	0.34	0.33	0.10		0.16	0.07		0.05	0.03	0.05	0.04	0.01	0.06	0.04	0.01	0.21	0.12
Cmar	Q05	North	July	1	2010	1.55	1.16	0.40	0.40	0.08	0.01	0.19	0.06		0.05	0.05	0.02	0.05		0.01	0.05		0.18	0.21
Cmar	Q05	North	July	1	2010	1.54	1.18	0.47	0.47	0.08		0.21	0.06		0.06	0.04	0.02	0.03			0.02		0.21	0.25
Cmar	Q05	North	July	1	2010	2.09	1.19	0.57	0.57	0.07		0.23	0.06			0.03					0.02		0.26	0.31
Cmar	Q09	North	July	1	2010	1.46	0.90	0.36	0.36	0.13		0.16	0.09		0.04	0.04	0.03	0.06		0.03	0.06		0.19	0.17
Cmar	Q09	North	July	1	2010	1.39	0.77	0.40	0.40	0.14	0.01	0.17	0.10		0.04	0.05	0.04	0.05					0.23	0.18
Cmar	Q09	North	July	1	2010	1.46	0.96	0.42	0.42	0.12		0.18	0.07		0.03	0.04	0.02	0.05	0.01	0.05			0.21	0.21
Cmar	QCI02	North	June	29	2010	1.55	0.77	0.35	0.35	0.14	0.01	0.14	0.06		0.04	0.04	0.03	0.06	0.03	0.06	0.05		0.20	0.15
Cmar	QCI02	North	June	29	2010	1.36	0.84	0.37	0.37	0.15	0.01	0.16	0.05		0.04	0.04	0.03	0.04		0.05	0.04		0.20	0.17
Cmar	QCI02	North	June	29	2010	1.18	0.98	0.39	0.39	0.14		0.19	0.05	0.01	0.05	0.05	0.02	0.06		0.03			0.20	0.19
Cmar	QCI04	North	June	29	2010	1.45	0.97	0.39	0.39	0.10		0.17	0.04		0.05	0.03	0.02			0.05	0.02		0.20	0.19
Cmar	QCI04	North	June	29	2010	1.40	0.98	0.42	0.42	0.10	0.01	0.19	0.03		0.07	0.04	0.03	0.03		0.06	0.02		0.21	0.21
Cmar	QCI04	North	June	29	2010	1.41	1.09	0.41	0.41	0.10	0.01	0.20	0.04		0.06	0.04	0.03	0.04	0.02	0.04			0.20	0.22

Cmar	QCI06	North	June	29	2010	1.25	0.93	0.41	0.41	0.09		0.21	0.04		0.09	0.03	0.03	0.04		0.01	0.02		0.21	0.20
Cmar	QCI06	North	June	29	2010	1.47	0.94	0.46	0.46	0.07		0.22	0.04		0.08	0.04	0.03	0.02		0.02			0.24	0.22
Cmar	QCI06	North	June	29	2010	1.40	0.97	0.48	0.48	0.08		0.23	0.04		0.08	0.04	0.02	0.02					0.24	0.23
Cmar	QCI08	North	June	30	2010	1.15	1.03	0.37	0.37	0.14	0.01	0.19	0.02	0.01	0.06	0.04	0.03	0.02		0.06	0.04		0.18	0.19
Cmar	QCI08	North	June	30	2010	1.45	1.12	0.38	0.38	0.09		0.20	0.03		0.06	0.06	0.03	0.05	0.01	0.03	0.04		0.18	0.20
Cmar	QCI08	North	June	30	2010	1.82	0.97	0.44	0.44	0.05		0.19	0.02	0.01	0.06	0.03	0.02	0.09	0.05	0.02	0.02		0.22	0.22
Cmar	QCI10	North	June	30	2010	1.50	1.15	0.36	0.36	0.10	0.01	0.18	0.03	0.01	0.04	0.06	0.03	0.06	0.01	0.03	0.05		0.17	0.19
Cmar	QCI10	North	June	30	2010	1.40	1.05	0.40	0.39	0.08	0.01	0.20	0.02	0.01	0.06	0.04	0.02	0.04	0.02	0.04	0.02	0.01	0.19	0.20
Cmar	QCI10	North	June	30	2010	1.67	1.15	0.40	0.40	0.06		0.19	0.02	0.01	0.06	0.04	0.03	0.07	0.06	0.04	0.01		0.18	0.21
Cmar	QCI12	North	June	30	2010	1.36	0.62	0.33	0.32	0.14	0.01	0.14	0.04		0.03	0.04	0.03	0.04	0.01	0.08	0.04	0.01	0.20	0.12
Cmeg	C1	WCVI	Sept	4	2010	2.00	0.71	0.43	0.41	0.04	0.01	0.19	0.06		0.05	0.11	0.02	0.06		0.02	0.02	0.02	0.24	0.17
Cmeg	LG09	WCVI	Sept	7	2010	1.42	0.77	0.50	0.50	0.05		0.27			0.10	0.09							0.28	0.22
Cmeg	LQ03	WCVI	Sept	9	2010	1.41	0.84	0.38	0.37	0.06	0.02	0.23	0.07		0.06	0.10	0.02	0.02		0.03	0.01	0.01	0.20	0.17
Cmeg	VI07	WCVI	June	18	2010	1.70	0.69	0.44	0.43	0.04	0.01	0.22	0.04		0.06	0.07	0.02	0.03		0.03	0.01	0.01	0.25	0.18
Cmeg	GS06	SoG	July	3	2010	0.92	0.54	0.37	0.37			0.35			0.14	0.08							0.24	0.13
Cmeg	GS10	SoG	July	3	2010	1.52	0.56	0.42	0.42	0.05		0.23	0.09		0.07	0.09	0.02	0.01		0.03			0.27	0.15
Cmeg	GS10	SoG	July	3	2010	1.21	0.67	0.41	0.41	0.04		0.28	0.04		0.11	0.09	0.02						0.25	0.17
Cmeg	GS10	SoG	July	3	2010	1.41	0.68	0.45	0.45	0.04		0.26	0.06		0.09	0.10							0.27	0.18
Cmeg	GS12	SoG	July	4	2010	1.39	0.82	0.44	0.44	0.04		0.26	0.07		0.07	0.08				0.03			0.24	0.20
Cmeg	GS14	SoG	July	4	2010	1.30	0.98	0.42	0.42	0.05	0.01	0.26	0.07		0.08	0.09	0.01						0.21	0.21
Cmeg	GS16	SoG	July	4	2010	1.54	0.60	0.53	0.53			0.27			0.13	0.08							0.33	0.20
Cmeg	GS26	SoG	July	5	2010	1.46	0.73	0.51	0.51			0.29			0.12	0.09							0.29	0.21
Cmeg	GS28	SoG	July	6	2010	1.17	0.60	0.27	0.27	0.07		0.29	0.07		0.05	0.21				0.04			0.17	0.10
Cmeg	GS28	SoG	July	6	2010	1.07	0.46	0.37	0.37			0.30			0.19	0.15							0.25	0.12
Cmeg	GS28	SoG	July	6	2010	1.59	0.77	0.41	0.41	0.03		0.23	0.06		0.06	0.10				0.04			0.23	0.18
Cmeg	GS30	SoG	July	6	2010	0.62	0.74	0.25	0.25	0.05		0.34			0.22	0.13							0.15	0.11
Cmeg	GS34	SoG	July	6	2010	0.91	0.43	0.38	0.38			0.34			0.18	0.10							0.26	0.11
Cmeg	GS34	SoG	July	6	2010	1.78	0.72	0.49	0.49			0.26	0.06		0.08	0.11							0.29	0.21
Cmeg	GS34	SoG	July	6	2010	1.69	0.83	0.51	0.51	0.02		0.23	0.03		0.10	0.10							0.28	0.23
Cmeg	GS36	SoG	July	7	2010	1.15	0.83	0.39	0.39	0.05		0.28	0.05		0.12	0.10	0.03						0.21	0.17
Cmeg	GS36	SoG	July	7	2010	2.36	0.85	0.43	0.43			0.16	0.02		0.07	0.10							0.23	0.20
Cmeg	GS36	SoG	July	7	2010	1.36	0.80	0.46	0.46	0.03		0.26	0.03		0.12	0.09							0.26	0.21
Cmeg	GS38	SoG	July	7	2010	1.83	0.65	0.47	0.46	0.03	0.01	0.19	0.06	0.01	0.08	0.06	0.02	0.01	0.02	0.03		0.01	0.28	0.18
Cmeg	GS38	SoG	July	7	2010	1.90	0.64	0.47	0.45	0.03	0.01	0.20	0.07	0.01	0.06	0.09	0.01	0.02	0.01	0.02		0.02	0.27	0.18
Cmeg	GS38	SoG	July	7	2010	1.86	0.68	0.47	0.46	0.03	0.01	0.20	0.06	0.01	0.07	0.06	0.01	0.01	0.02	0.04		0.01	0.27	0.19
Cmeg	GS40	SoG	July	7	2010	1.60	0.71	0.39	0.38	0.04	0.01	0.20	0.09	0.01	0.06	0.07	0.02	0.01	0.02	0.04		0.01	0.22	0.16

Cmeg	GS40	SoG	July	7	2010	1.80	0.73	0.45	0.43	0.04	0.01	0.20	0.05	0.01	0.07	0.10	0.02	0.02	0.01	0.03	0.01	0.01	0.25	0.18
Cmeg	GS40	SoG	July	7	2010	1.66	0.64	0.52	0.52	0.02		0.24	0.03		0.10	0.08							0.32	0.20
Cmeg	GS42	SoG	July	7	2010	1.71	0.57	0.43	0.42	0.04	0.01	0.21	0.09		0.06	0.09	0.01	0.01	0.01	0.02	0.01	0.01	0.27	0.15
Cmeg	GS42	SoG	July	7	2010	1.62	0.57	0.48	0.47	0.02		0.24	0.04		0.10	0.09	0.01	0.01				0.02	0.30	0.17
Cmeg	GS42	SoG	July	7	2010	1.34	0.76	0.44	0.44	0.04		0.27	0.06		0.09	0.10							0.25	0.19
Cmeg	DT02	North	June	27	2010	1.19	0.37	0.38	0.38	0.04		0.30	0.07		0.08	0.12							0.28	0.10
Cmeg	DT02	North	June	27	2010	1.38	0.41	0.39	0.39	0.06		0.27	0.04		0.07	0.13	0.03	0.02					0.27	0.11
Cmeg	DT02	North	June	27	2010	1.05	0.45	0.38	0.38	0.06		0.30	0.08		0.10	0.09							0.26	0.12
Cmeg	DT04	North	June	27	2010	1.33	0.50	0.37	0.37	0.08		0.25	0.12		0.05	0.14							0.24	0.12
Cmeg	DT04	North	June	27	2010	1.32	0.73	0.47	0.47			0.31			0.12	0.10							0.27	0.20
Cmeg	DT06	North	June	27	2010	1.04	0.38	0.33	0.33	0.06		0.27	0.07		0.11	0.12		0.04					0.24	0.09
Cmeg	DT06	North	June	27	2010	1.48	0.46	0.38	0.38	0.07		0.22	0.09		0.05	0.11	0.03	0.02		0.04			0.26	0.12
Cmeg	DT06	North	June	27	2010	1.63	0.46	0.40	0.40	0.07		0.22	0.05		0.07	0.12	0.03	0.03			0.01		0.28	0.13
Cmeg	DT08	North	June	27	2010	0.87	0.23	0.33	0.33			0.36			0.17	0.14							0.27	0.06
Cmeg	DT08	North	June	27	2010	0.68	0.39	0.29	0.29	0.12		0.32			0.10	0.08		0.08					0.21	0.08
Cmeg	HS02	North	June	26	2010	0.98	0.38	0.35	0.35			0.36			0.15	0.14							0.26	0.10
Cmeg	HS02	North	June	26	2010	1.24	0.52	0.35	0.35	0.05		0.28	0.07		0.08	0.14	0.02	0.01					0.23	0.12
Cmeg	HS02	North	June	26	2010	1.27	0.59	0.37	0.37	0.05		0.28	0.08		0.07	0.15							0.23	0.14
Cmeg	Q09	North	July	1	2010	0.79	0.56	0.33	0.33			0.39			0.17	0.11							0.21	0.12
Cmeg	Q09	North	July	1	2010	1.64	0.52	0.47	0.47	0.03		0.25	0.06		0.07	0.11		0.01					0.31	0.16
Cmeg	Q09	North	July	1	2010	1.29	0.55	0.48	0.48			0.29			0.14	0.08							0.31	0.17
Cmeg	QCI06	North	June	29	2010	1.44	0.36	0.42	0.42			0.33			0.08	0.17							0.31	0.11
Cmeg	QCI06	North	June	29	2010	0.93	0.50	0.37	0.37			0.37			0.15	0.12							0.25	0.12
Cmeg	QCI08	North	June	30	2010	1.23	0.49	0.43	0.43	0.05		0.30	0.06		0.07	0.09							0.29	0.14
Cmeg	QCI08	North	June	30	2010	1.39	0.52	0.45	0.45	0.05		0.29	0.05		0.05	0.10							0.29	0.15
Cmeg	QCI08	North	June	30	2010	1.64	0.64	0.44	0.44	0.05		0.24	0.06		0.04	0.08	0.02	0.02		0.04			0.27	0.17
Cmeg	QCI10	North	June	30	2010	1.20	0.56	0.38	0.37	0.06	0.02	0.27	0.09		0.04	0.07	0.02			0.04		0.01	0.23	0.13
Eelo	LBP07	WCVI	Sept	8	2010	9.16	1.34	0.32	0.31	0.02		0.05	0.14		0.01	0.38	0.02	0.01	0.01	0.03			0.13	0.18
Eelo	LBP07	WCVI	Sept	8	2010	9.34	1.39	0.32	0.32	0.01		0.05	0.12		0.01	0.38	0.02	0.01	0.01	0.04			0.13	0.18
Eelo	LBP07	WCVI	Sept	8	2010	11.2	1.32	0.32	0.32	0.02		0.04	0.13		0.01	0.37	0.03	0.01	0.01	0.05			0.14	0.18
Eelo	LG07	WCVI	Sept	8	2010	8.08	1.54	0.35	0.35	0.01		0.05	0.12		0.03	0.34	0.01	0.01	0.01	0.05			0.14	0.21
Eelo	LG07	WCVI	Sept	8	2010	10.3	1.50	0.35	0.35	0.01		0.04	0.12		0.01	0.35	0.01	0.01	0.01	0.05			0.14	0.21
Eelo	LG09	WCVI	Sept	7	2010	9.97	1.33	0.34	0.34	0.02		0.04	0.13		0.01	0.39	0.03	0.01	0.01				0.15	0.19
Eelo	LG09	WCVI	Sept	7	2010	8.47	1.22	0.35	0.35	0.02		0.05	0.12		0.02	0.35	0.02	0.01	0.01	0.04			0.16	0.19
Ecom	A2	WCVI	May	27	2010	1.87	0.53	0.44	0.43	0.02	0.04	0.26	0.05		0.02	0.10	0.04		0.03			0.01	0.28	0.15
Ecom	A2	WCVI	May	27	2010	2.60	0.72	0.53	0.51	0.02		0.22	0.04	0.01	0.02	0.10	0.04		0.03			0.02	0.30	0.21

Ecom	C2	WCVI	May	26	2010	2.37	0.54	0.52	0.51	0.03	0.01	0.23	0.05		0.02	0.09	0.03		0.02			0.01	0.33	0.18
Ecom	C2	WCVI	May	26	2010	2.43	0.58	0.53	0.51	0.02		0.24	0.05		0.02	0.09	0.03		0.02			0.01	0.33	0.19
Ecom	C2	WCVI	May	26	2010	2.52	0.57	0.54	0.53	0.03		0.21	0.05	0.01	0.02	0.07	0.04		0.03			0.01	0.34	0.19
Ecom	C2	WCVI	Sept	4	2010	2.05	1.08	0.50	0.49	0.04	0.01	0.24	0.04		0.01	0.08	0.03		0.03	0.01		0.01	0.24	0.25
Ecom	CS00	WCVI	Sept	9	2010	0.95	0.74	0.29	0.28	0.08	0.01	0.34	0.05	0.01	0.03	0.12	0.02	0.01	0.02			0.01	0.16	0.12
Ecom	CS00	WCVI	Sept	9	2010	1.91	0.95	0.45	0.43	0.06	0.01	0.22	0.04	0.01	0.01	0.08	0.03		0.02	0.05		0.02	0.22	0.21
Ecom	CS01	WCVI	Sept	9	2010	1.09	0.62	0.34	0.32	0.08	0.01	0.33	0.05	0.01	0.02	0.09	0.04		0.03			0.02	0.20	0.12
Ecom	CS01	WCVI	Sept	9	2010	1.99	0.88	0.45	0.43	0.05	0.01	0.21	0.04	0.01	0.02	0.09	0.03		0.02	0.06		0.02	0.23	0.20
Ecom	CS03	WCVI	May	31	2010	1.76	0.64	0.46	0.44	0.03		0.28	0.03	0.01	0.03	0.10	0.04		0.02			0.02	0.27	0.17
Ecom	CS03	WCVI	May	31	2010	2.11	0.85	0.48	0.47	0.04		0.23	0.05		0.02	0.10	0.02		0.02	0.04		0.02	0.25	0.21
Ecom	CS03	WCVI	May	31	2010	2.00	0.96	0.49	0.47	0.04	0.01	0.24	0.03		0.03	0.09	0.03		0.02	0.03		0.02	0.24	0.23
Ecom	CS03	WCVI	Sept	10	2010	2.15	0.98	0.48	0.46	0.05	0.01	0.21	0.04		0.01	0.09	0.03		0.02	0.05		0.02	0.23	0.23
Ecom	CS03	WCVI	Sept	10	2010	1.72	1.11	0.46	0.45	0.04	0.01	0.24	0.04		0.05	0.08	0.03		0.02	0.03		0.01	0.21	0.24
Ecom	CS08	WCVI	June	1	2010	1.83	0.59	0.52	0.50	0.04		0.27	0.07		0.02	0.08						0.02	0.31	0.19
Ecom	CS09	WCVI	Sept	10	2010	0.96	0.32	0.31	0.29	0.10	0.01	0.33	0.09		0.03	0.08	0.04		0.01			0.01	0.22	0.07
Ecom	CS09	WCVI	Sept	10	2010	1.39	0.48	0.41	0.40	0.08		0.27	0.08		0.03	0.09	0.01		0.01	0.03		0.01	0.27	0.13
Ecom	CS09	WCVI	June	1	2010	1.64	0.40	0.46	0.44	0.04		0.26	0.09		0.04	0.08	0.02					0.02	0.31	0.13
Ecom	CS09	WCVI	June	1	2010	1.55	0.54	0.42	0.41	0.05		0.27	0.09		0.02	0.11	0.01			0.01		0.01	0.26	0.14
Ecom	LBP05	WCVI	May	30	2010	2.10	0.77	0.48	0.47	0.04		0.23	0.07		0.02	0.09	0.02		0.01	0.03		0.01	0.27	0.21
Ecom	LBP07	WCVI	Sept	8	2010	2.14	0.92	0.49	0.46	0.05	0.01	0.21	0.04		0.02	0.09	0.03	0.01	0.02	0.03		0.03	0.24	0.22
Ecom	LBP08	WCVI	Sept	9	2010	1.96	0.92	0.47	0.44	0.05	0.01	0.23	0.04	0.01	0.02	0.09	0.03		0.02	0.05		0.02	0.23	0.21
Ecom	LBP08	WCVI	Sept	9	2010	2.03	1.07	0.49	0.49	0.07		0.23	0.03		0.01	0.10	0.04			0.04			0.24	0.25
Ecom	LC04	WCVI	Sept	6	2010	1.65	0.74	0.45	0.43	0.04	0.01	0.30	0.03	0.01	0.02	0.10	0.03		0.02			0.02	0.25	0.18
Ecom	LC08	WCVI	May	28	2010	1.32	0.62	0.45	0.44	0.07	0.01	0.30	0.05	0.01	0.02		0.05		0.04			0.01	0.27	0.17
Ecom	LC08	WCVI	Sept	7	2010	2.13	0.95	0.49	0.47	0.04		0.24	0.04		0.01	0.09	0.03		0.02	0.05		0.02	0.24	0.23
Ecom	LD09	WCVI	May	28	2010	2.33	0.78	0.53	0.51	0.04		0.23	0.02	0.01	0.02	0.09	0.04		0.02			0.02	0.29	0.22
Ecom	LD09	WCVI	May	28	2010	1.96	1.16	0.46	0.45	0.05	0.01	0.22	0.03		0.02	0.08	0.03		0.02	0.04		0.01	0.21	0.24
Ecom	LG09	WCVI	May	29	2010	1.93	0.74	0.49	0.47	0.04	0.01	0.25	0.02	0.01	0.02	0.09	0.04		0.02			0.02	0.27	0.20
Ecom	VI13	WCVI	July	19	2010	1.56	0.71	0.44	0.44	0.05	0.01	0.25	0.06		0.05	0.08	0.02	0.01	0.01	0.01		0.01	0.25	0.18
Ecom	VI13	WCVI	July	19	2010	1.71	0.69	0.48	0.47	0.05		0.26	0.07		0.03	0.08	0.02		0.01			0.01	0.28	0.19
Ecom	VI20	WCVI	July	21	2010	1.71	0.60	0.46	0.45	0.05		0.26	0.06		0.04	0.08	0.02		0.01	0.02		0.01	0.28	0.17
Ecom	VI24	WCVI	July	22	2010	1.23	0.61	0.39	0.38	0.04	0.01	0.27	0.05		0.11	0.09	0.03		0.01			0.01	0.23	0.14
Ecom	VI24	WCVI	July	22	2010	1.87	0.55	0.50	0.47	0.05		0.25	0.04		0.03	0.08	0.03	0.01	0.01			0.03	0.30	0.17
Ecom	VI26	WCVI	July	22	2010	1.46	0.59	0.45	0.43	0.05	0.01	0.26	0.05		0.06	0.08	0.02	0.01	0.01			0.02	0.27	0.16
Ecom	VI26	WCVI	July	22	2010	1.57	0.60	0.46	0.44	0.06		0.25	0.05		0.06	0.07	0.03	0.01	0.01			0.02	0.28	0.17
Ecom	GS06	SoG	July	3	2010	1.57	0.79	0.44	0.42	0.05	0.01	0.28	0.04	0.01	0.02	0.08	0.03		0.03			0.01	0.24	0.19

Ecom	GS06	SoG	July	3	2010	1.82	0.97	0.45	0.44	0.05	0.01	0.23	0.06		0.02	0.07	0.02		0.02	0.06		0.01	0.22	0.21
Ecom	GS10	SoG	July	3	2010	0.99	0.48	0.32	0.30	0.07	0.01	0.36	0.06		0.03	0.10	0.03		0.01			0.01	0.20	0.10
Ecom	GS10	SoG	July	3	2010	1.66	0.70	0.45	0.43	0.04	0.01	0.28	0.04	0.01	0.02	0.09	0.03		0.02			0.03	0.25	0.18
Ecom	GS12	SoG	July	4	2010	1.40	0.63	0.40	0.37	0.06	0.01	0.29	0.10	0.01	0.02	0.09	0.03		0.01			0.02	0.23	0.14
Ecom	GS12	SoG	July	4	2010	1.69	0.77	0.49	0.47	0.04		0.27	0.04	0.01	0.03	0.07	0.03		0.01			0.02	0.27	0.20
Ecom	GS14	SoG	July	4	2010	1.97	0.72	0.51	0.47	0.04	0.01	0.25	0.04	0.01	0.02	0.09	0.03		0.01			0.03	0.27	0.20
Ecom	GS14	SoG	July	4	2010	2.00	0.94	0.46	0.43	0.04	0.01	0.23	0.07		0.02	0.09	0.02		0.01	0.02		0.03	0.22	0.21
Ecom	GS14	SoG	July	4	2010	2.12	0.95	0.50	0.48	0.04		0.23	0.06		0.02	0.08	0.02		0.02	0.03		0.02	0.25	0.24
Ecom	GS16	SoG	July	4	2010	1.80	0.60	0.48	0.45	0.04		0.28	0.05		0.02	0.10	0.02		0.01			0.03	0.28	0.17
Ecom	GS16	SoG	July	4	2010	1.64	0.77	0.47	0.45	0.04		0.28	0.06		0.03	0.08	0.02		0.01			0.02	0.25	0.20
Ecom	GS16	SoG	July	4	2010	2.12	0.83	0.48	0.45	0.03	0.01	0.23	0.08		0.02	0.10	0.02		0.01	0.02		0.03	0.25	0.21
Ecom	GS24	SoG	July	5	2010	1.49	0.65	0.44	0.42	0.04	0.01	0.30	0.05		0.03	0.10	0.02		0.01			0.02	0.25	0.16
Ecom	GS24	SoG	July	5	2010	1.41	1.10	0.40	0.39	0.05		0.28	0.05		0.04	0.10	0.02	0.01	0.01	0.05		0.01	0.19	0.20
Ecom	GS26	SoG	July	5	2010	1.27	0.62	0.38	0.37	0.07	0.01	0.31	0.06	0.01	0.02	0.08	0.03		0.03			0.02	0.23	0.14
Ecom	GS26	SoG	July	5	2010	1.85	0.82	0.44	0.42	0.06		0.24	0.07		0.01	0.07	0.03		0.02	0.06		0.02	0.23	0.19
Ecom	GS28	SoG	July	6	2010	1.47	0.80	0.43	0.41	0.06	0.01	0.30	0.05	0.01	0.02	0.08	0.03		0.03			0.02	0.23	0.18
Ecom	GS30	SoG	July	6	2010	1.34	0.54	0.40	0.37	0.05	0.01	0.31	0.06	0.01	0.02	0.10	0.03		0.02			0.02	0.24	0.13
Ecom	GS30	SoG	July	6	2010	1.64	0.56	0.45	0.43	0.04		0.30	0.05		0.02	0.10	0.02		0.01			0.03	0.27	0.15
Ecom	GS30	SoG	July	6	2010	1.55	0.66	0.45	0.43	0.05	0.01	0.27	0.05	0.01	0.03	0.08	0.03		0.02			0.02	0.26	0.17
Ecom	GS32	SoG	July	6	2010	1.60	0.95	0.42	0.41	0.06	0.01	0.24	0.07		0.04	0.07	0.02		0.02	0.05		0.01	0.21	0.20
Ecom	GS32	SoG	July	6	2010	2.82	1.34	0.58	0.50	0.02		0.20	0.03		0.03	0.12	0.02					0.08	0.21	0.29
Ecom	GS34	SoG	July	6	2010	1.70	1.05	0.34	0.33	0.04		0.19	0.04		0.03	0.07	0.02		0.02	0.04		0.01	0.16	0.17
Ecom	GS36	SoG	July	7	2010	1.69	0.79	0.42	0.41	0.04	0.01	0.26	0.09		0.02	0.09	0.01		0.02	0.04		0.02	0.23	0.18
Ecom	GS36	SoG	July	7	2010	1.64	0.93	0.41	0.40	0.05		0.25	0.07		0.03	0.09	0.02		0.03	0.05		0.01	0.21	0.19
Ecom	GS36	SoG	July	7	2010	1.93	0.83	0.44	0.41	0.04		0.25	0.07		0.02	0.10	0.03		0.02	0.04		0.02	0.23	0.19
Ecom	GS38	SoG	July	7	2010	1.90	0.78	0.44	0.42	0.04	0.01	0.25	0.07		0.02	0.10	0.02		0.02	0.03		0.02	0.24	0.18
Ecom	GS38	SoG	July	7	2010	1.98	0.77	0.46	0.43	0.04	0.01	0.24	0.07		0.01	0.09	0.02		0.02	0.04		0.02	0.24	0.19
Ecom	GS38	SoG	July	7	2010	2.03	0.89	0.49	0.48	0.04	0.01	0.22	0.06		0.03	0.07	0.02		0.02	0.04		0.01	0.25	0.23
Ecom	GS40	SoG	July	7	2010	1.65	0.80	0.41	0.40	0.05	0.01	0.26	0.08		0.02	0.09	0.02		0.02	0.04		0.01	0.22	0.18
Ecom	GS40	SoG	July	7	2010	1.58	0.73	0.45	0.43	0.05	0.01	0.27	0.05	0.01	0.03	0.09	0.03		0.02			0.02	0.25	0.18
Ecom	GS42	SoG	July	7	2010	1.67	0.90	0.43	0.42	0.05	0.01	0.23	0.07		0.03	0.07	0.02		0.02	0.05		0.01	0.22	0.20
Ecom	GS42	SoG	July	7	2010	1.74	0.93	0.43	0.42	0.05		0.23	0.07		0.02	0.08	0.02		0.02	0.05		0.01	0.22	0.20
Ecom	DT02	North	July	27	2010	1.85	0.78	0.43	0.42	0.05		0.23	0.05		0.03	0.12	0.02	0.02	0.01	0.03		0.01	0.24	0.18
Ecom	DT02	North	July	27	2010	1.93	0.77	0.47	0.47	0.06		0.23	0.04		0.01	0.08	0.02		0.02	0.06			0.27	0.21
Ecom	DT04	North	July	27	2010	1.80	0.67	0.45	0.44	0.08		0.20	0.06		0.03	0.08	0.02	0.02	0.01	0.05		0.01	0.26	0.18
Ecom	DT04	North	July	27	2010	1.65	0.71	0.45	0.45	0.07		0.25	0.05		0.02	0.10	0.01			0.04			0.27	0.19

Ecom	DT06	North	July	27	2010	1.47	0.77	0.42	0.41	0.07		0.24	0.05		0.05	0.09	0.01	0.03	0.01	0.03		0.01	0.23	0.18
Ecom	DT06	North	July	27	2010	1.76	0.76	0.44	0.44	0.07	0.01	0.21	0.05		0.02	0.08	0.02	0.02	0.01	0.05		0.01	0.25	0.19
Ecom	DT08	North	July	27	2010	1.43	0.62	0.38	0.37	0.10	0.01	0.20	0.07		0.03	0.08	0.02	0.04	0.01	0.05		0.01	0.23	0.14
Ecom	DT08	North	July	27	2010	1.46	0.63	0.40	0.39	0.10	0.01	0.20	0.07		0.03	0.08	0.02	0.04	0.01	0.04		0.01	0.24	0.15
Ecom	Q09	North	July	1	2010	1.65	0.65	0.46	0.45	0.05	0.01	0.28	0.04		0.02	0.09	0.03		0.01			0.02	0.27	0.18
Ecom	Q09	North	July	1	2010	2.21	0.81	0.49	0.47	0.04		0.24	0.04		0.01	0.09	0.03		0.02	0.04		0.02	0.26	0.21
Ecom	QCI02	North	July	29	2010	1.57	0.88	0.45	0.44	0.10	0.01	0.21	0.04		0.03	0.07	0.02	0.02	0.01	0.04		0.01	0.23	0.21
Ecom	QCI02	North	July	29	2010	1.66	0.92	0.46	0.45	0.10	0.01	0.21	0.03		0.02	0.07	0.03	0.01	0.02	0.04		0.01	0.24	0.22
Ecom	QCI06	North	July	29	2010	1.78	0.79	0.48	0.48	0.05		0.26	0.03		0.03	0.08	0.02	0.01	0.01	0.02		0.01	0.27	0.21
Ecom	QCI08	North	July	30	2010	1.73	0.88	0.45	0.44	0.07	0.01	0.23	0.03		0.03	0.09	0.03	0.02	0.02	0.03		0.01	0.23	0.21
Ecom	QCI10	North	July	30	2010	1.44	0.97	0.41	0.41	0.09	0.01	0.23	0.03		0.04	0.08	0.03	0.02	0.01	0.04		0.01	0.21	0.20
Mqua	LBP07	WCVI	Sept	8	2010	1.70	1.04	0.31	0.29	0.06	0.01	0.19	0.13	0.01	0.03	0.12	0.03	0.04	0.01	0.03	0.02	0.02	0.14	0.15
Mqua	LBP07	WCVI	Sept	8	2010	1.81	1.17	0.38	0.36	0.05	0.01	0.20	0.08	0.01	0.03	0.12	0.03	0.01	0.01	0.03	0.01	0.02	0.17	0.19
Mqua	LG07	WCVI	Sept	8	2010	1.65	0.69	0.31	0.29	0.06	0.01	0.19	0.17		0.02	0.13	0.03	0.01	0.01	0.04		0.02	0.17	0.12
Mqua	LG09	WCVI	Sept	7	2010	1.94	0.67	0.33	0.31	0.05	0.01	0.19	0.15		0.02	0.13	0.03	0.02	0.02	0.04	0.01	0.02	0.19	0.12
Mqua	LG09	WCVI	Sept	7	2010	1.73	0.63	0.33	0.33	0.06	0.01	0.19	0.16		0.03	0.13	0.03	0.01	0.01				0.20	0.13
Ncri	A2	WCVI	May	27	2011	2.04	1.36	0.37	0.36	0.11	0.01	0.13	0.01		0.03	0.02	0.19	0.02		0.04			0.15	0.21
Ncri	C2	WCVI	May	25	2011	1.15	0.49	0.32	0.32	0.16	0.02	0.14	0.03		0.01	0.02	0.01	0.05	0.01	0.15	0.02		0.21	0.11
Ncri	C2	WCVI	Sept	4	2010	1.20	0.56	0.39	0.39	0.19	0.01	0.19	0.04		0.02	0.04	0.03	0.07			0.02		0.25	0.14
Ncri	CS00	WCVI	May	30	2011	1.22	0.39	0.35	0.34	0.18	0.02	0.12	0.03		0.01	0.02	0.01	0.06	0.01	0.13	0.02		0.25	0.10
Ncri	CS00	WCVI	May	30	2011	1.16	0.47	0.35	0.35	0.19	0.02	0.13	0.03		0.01	0.02	0.01	0.03	0.01	0.13	0.01		0.24	0.11
Ncri	CS00	WCVI	May	31	2010	1.53	0.57	0.43	0.42	0.17	0.01	0.15	0.03		0.01	0.03	0.03	0.09	0.02		0.02	0.01	0.27	0.15
Ncri	CS00	WCVI	May	31	2010	1.31	0.64	0.42	0.42	0.18	0.02	0.16	0.02		0.02	0.03	0.03	0.06	0.01		0.02		0.26	0.16
Ncri	CS00	WCVI	Sept	9	2010	0.94	1.06	0.48	0.48	0.10		0.30			0.12								0.24	0.25
Ncri	CS00	WCVI	May	31	2010	1.76	0.92	0.57	0.57	0.12	0.01	0.19	0.03	0.01	0.02	0.03	0.02						0.30	0.27
Ncri	CS01	WCVI	May	30	2011	1.07	0.34	0.35	0.34	0.21	0.02	0.13	0.04		0.01	0.03	0.01	0.05	0.01	0.11	0.01	0.01	0.25	0.09
Ncri	CS01	WCVI	May	31	2010	1.44	0.58	0.32	0.32	0.17	0.01	0.12	0.02		0.01	0.02	0.02	0.04		0.13	0.10		0.20	0.12
Ncri	CS01	WCVI	May	30	2011	1.44	0.49	0.39	0.39	0.15	0.02	0.13	0.03		0.01	0.02	0.01	0.04	0.01	0.13	0.02	0.01	0.26	0.13
Ncri	CS01	WCVI	May	31	2010	1.42	0.61	0.43	0.42	0.16	0.02	0.17	0.03		0.02	0.03	0.03	0.05	0.01		0.02	0.01	0.26	0.16
Ncri	CS01	WCVI	Sept	9	2010	1.96	1.00	0.35	0.35	0.06	0.01	0.12	0.02	0.01	0.04	0.04	0.02	0.01		0.03	0.05		0.18	0.18
Ncri	CS01	WCVI	May	31	2010	1.77	1.09	0.56	0.56	0.11		0.22	0.01		0.02	0.03	0.02	0.03					0.27	0.29
Ncri	CS03	WCVI	May	30	2011	1.26	0.44	0.36	0.36	0.17	0.02	0.12	0.03		0.01	0.02	0.01	0.05	0.01	0.13	0.01	0.01	0.25	0.11
Ncri	CS03	WCVI	May	30	2011	1.43	0.46	0.36	0.36	0.15	0.02	0.12	0.03		0.01	0.02	0.01	0.05	0.01	0.15	0.02	0.01	0.25	0.11
Ncri	CS03	WCVI	May	31	2010	1.54	0.68	0.31	0.31	0.12	0.01	0.15	0.02		0.02	0.03	0.02	0.03		0.15	0.12		0.18	0.12
Ncri	CS03	WCVI	May	30	2011	1.44	0.60	0.36	0.35	0.14	0.02	0.11	0.02		0.02	0.02	0.01	0.06	0.01	0.13	0.03		0.22	0.13
Ncri	CS03	WCVI	May	31	2010	1.60	0.56	0.45	0.45	0.16	0.02	0.12	0.03		0.02	0.02	0.03	0.08	0.01				0.29	0.16

Ncri	CS03	WCVI	May	31	2010	1.58	0.60	0.44	0.44	0.14		0.17	0.03		0.03	0.03	0.03	0.08			0.03		0.27	0.17
Ncri	CS08	WCVI	May	31	2010	1.51	0.74	0.48	0.48	0.12		0.23	0.09		0.02	0.06	0.01						0.28	0.20
Ncri	CS09	WCVI	Sept	10	2010	0.83	0.88	0.26	0.26	0.20	0.01	0.20	0.05		0.03	0.05	0.03	0.12			0.03		0.14	0.12
Ncri	CS09	WCVI	Sept	10	2010	0.82	1.12	0.33	0.33	0.16	0.01	0.26	0.04		0.06	0.05	0.02	0.06					0.16	0.18
Ncri	CS09	WCVI	Sept	10	2010	1.02	1.25	0.39	0.39	0.17	0.02	0.24	0.02	0.01	0.02	0.04	0.02	0.06					0.17	0.22
Ncri	LBP05	WCVI	May	29	2011	0.99	0.63	0.25	0.24	0.15	0.02	0.13	0.03		0.01	0.03	0.01	0.05	0.01	0.11	0.01		0.15	0.09
Ncri	LBP05	WCVI	May	29	2011	1.01	0.65	0.23	0.22	0.13	0.02	0.13	0.04		0.01	0.03	0.02	0.05	0.01	0.09	0.02		0.13	0.09
Ncri	LBP08	WCVI	Sept	9	2010	1.13	0.79	0.42	0.42	0.15	0.02	0.21	0.03		0.07	0.04	0.03	0.03					0.24	0.19
Ncri	LC12	WCVI	Sept	6	2010	0.83	0.61	0.33	0.32	0.25	0.02	0.18	0.04	0.01	0.03	0.03	0.03	0.05	0.01		0.01	0.01	0.20	0.12
Ncri	LC12	WCVI	Sept	6	2010	1.37	0.58	0.45	0.44	0.20	0.01	0.16	0.03		0.02	0.03	0.03	0.06			0.01	0.01	0.28	0.16
Ncri	LC12	WCVI	May	28	2010	1.09	0.75	0.41	0.41	0.22	0.02	0.18	0.02	0.01	0.02	0.03	0.02	0.05	0.01		0.01		0.23	0.17
Ncri	LC12	WCVI	May	28	2010	1.45	0.79	0.47	0.47	0.17	0.02	0.18	0.02		0.01	0.02	0.02	0.04	0.02		0.02		0.26	0.21
Ncri	LC12	WCVI	May	28	2010	1.48	1.08	0.52	0.52	0.14	0.02	0.20	0.01	0.01	0.02	0.03	0.02	0.03					0.25	0.27
Ncri	LC12	WCVI	May	27	2011	2.33	1.62	0.54	0.53	0.07		0.15	0.03		0.05	0.07	0.01			0.03			0.20	0.33
Ncri	LD09	WCVI	May	27	2011	1.00	0.42	0.32	0.32	0.21	0.02	0.13	0.03		0.01	0.02	0.01	0.05	0.01	0.13	0.01	0.01	0.22	0.10
Ncri	LD09	WCVI	May	27	2011	1.19	0.45	0.33	0.33	0.17	0.02	0.12	0.03		0.01	0.02	0.01	0.05	0.01	0.16	0.01	0.01	0.23	0.10
Ncri	LD09	WCVI	May	28	2010	1.34	0.79	0.49	0.49	0.15	0.01	0.22	0.03		0.02	0.03	0.02	0.03					0.27	0.22
Ncri	LD09	WCVI	May	28	2010	1.56	0.76	0.52	0.52	0.13		0.21	0.04		0.02	0.04		0.04					0.29	0.22
Ncri	LG07	WCVI	May	28	2011	0.96	0.67	0.28	0.27	0.18	0.02	0.12	0.02		0.01	0.02	0.01	0.05	0.01	0.15	0.01		0.16	0.11
Ncri	LG07	WCVI	May	28	2011	1.04	0.67	0.32	0.31	0.19	0.02	0.13	0.02		0.01	0.02	0.01	0.04	0.01	0.16	0.01		0.19	0.13
Ncri	LG07	WCVI	May	29	2010	1.60	0.67	0.34	0.34	0.16	0.01	0.13	0.02		0.01	0.02	0.02			0.16	0.11		0.20	0.14
Ncri	LG07	WCVI	Sept	8	2010	1.01	0.72	0.33	0.33	0.21	0.02	0.17	0.03	0.01	0.03	0.04	0.03	0.08	0.01		0.03	0.01	0.19	0.14
Ncri	LG07	WCVI	May	29	2010	1.24	0.98	0.50	0.50	0.15	0.02	0.24	0.02		0.03	0.04							0.25	0.25
Ncri	LG07	WCVI	Sept	8	2010	1.82	1.28	0.59	0.59	0.09		0.26				0.06							0.26	0.33
Ncri	LG09	WCVI	May	28	2011	0.99	0.60	0.33	0.32	0.22	0.02	0.12	0.02		0.01	0.02	0.01	0.05	0.01	0.14	0.01		0.20	0.12
Ncri	LG09	WCVI	May	28	2011	0.99	0.66	0.32	0.31	0.20	0.02	0.13	0.02		0.01	0.02	0.01	0.05	0.01	0.15	0.01		0.19	0.12
Ncri	LG09	WCVI	May	29	2010	1.20	0.66	0.40	0.40	0.20	0.01	0.17	0.03		0.01	0.04	0.03	0.06	0.01				0.24	0.16
Ncri	LG09	WCVI	May	29	2010	1.36	0.86	0.35	0.35	0.13	0.02	0.18	0.03		0.02	0.02	0.02	0.02		0.15	0.07		0.19	0.16
Ncri	LG09	WCVI	May	29	2010	1.54	0.71	0.43	0.43	0.15	0.02	0.16	0.03	0.01	0.01	0.03	0.02	0.06	0.02		0.03		0.25	0.18
Ncri	VI20	WCVI	June	21	2010	1.60	0.61	0.48	0.48	0.12	0.01	0.19	0.04		0.04	0.04	0.05	0.02					0.30	0.18
Ncri	VI24	WCVI	June	22	2010	1.72	0.73	0.56	0.56	0.09		0.21	0.03		0.05	0.03	0.02	0.02					0.32	0.23
Ncri	VI26	WCVI	June	22	2010	1.39	0.64	0.30	0.29	0.16	0.01	0.16	0.04		0.02	0.04	0.03	0.04	0.01	0.08	0.12		0.18	0.11
Ncri	VI26	WCVI	June	22	2010	1.06	0.76	0.36	0.36	0.17	0.02	0.21	0.04		0.02	0.04	0.03	0.06	0.01		0.01		0.20	0.15
Ncri	VI26	WCVI	June	22	2010	1.18	0.91	0.46	0.46	0.15	0.02	0.23	0.03		0.02	0.04		0.05					0.24	0.22
Ncri	DT06	North	June	27	2010	1.16	0.68	0.28	0.28	0.18	0.01	0.16	0.03		0.02	0.03	0.03	0.03		0.12	0.09		0.16	0.11
Ncri	DT06	North	June	27	2010	1.08	0.75	0.27	0.27	0.17	0.01	0.18	0.03		0.02	0.03	0.03	0.04		0.13	0.08		0.15	0.12

Ncri	DT06	North	June	27	2010	1.09	0.65	0.35	0.35	0.18	0.02	0.19	0.05	0.01	0.03	0.05	0.04	0.05	0.01		0.02		0.21	0.14
Ncri	DT08	North	June	27	2010	1.37	0.83	0.45	0.45	0.12	0.02	0.23	0.03		0.02	0.05	0.03	0.04	0.02				0.24	0.20
Ncri	DT08	North	June	27	2010	1.73	1.01	0.41	0.41	0.10	0.01	0.19	0.02		0.02	0.04	0.03	0.02		0.07	0.08		0.20	0.21
Ncri	QCI02	North	June	29	2010	1.18	0.52	0.40	0.40	0.18	0.03	0.19	0.03		0.02	0.02	0.03	0.05	0.02		0.02		0.26	0.13
Ncri	QCI04	North	June	29	2010	0.87	0.59	0.35	0.34	0.24	0.03	0.19	0.03	0.01	0.02	0.03	0.02	0.05	0.01		0.01		0.22	0.13
Ncri	QCI06	North	June	29	2010	1.11	0.90	0.42	0.42	0.15	0.01	0.22			0.07	0.05	0.03	0.04					0.22	0.20
Ncri	QCI08	North	June	30	2010	1.14	1.05	0.34	0.34	0.14	0.02	0.21	0.03		0.03	0.04	0.02	0.03		0.07	0.07		0.16	0.17
Ncri	QCI10	North	June	30	2010	0.76	0.91	0.30	0.30	0.21	0.02	0.25	0.03		0.03	0.04	0.03	0.05	0.02				0.16	0.15
Ncri	QCI12	North	June	30	2010	0.81	0.64	0.33	0.33	0.16	0.03	0.25	0.03		0.08	0.05	0.04	0.04					0.20	0.13
Nplu	CS00	WCVI	May	31	2010	0.65	0.79	0.24	0.24	0.28	0.01	0.16	0.02		0.01	0.02	0.02	0.03		0.18	0.02		0.14	0.11
Nplu	CS00	WCVI	May	30	2011	0.64	0.81	0.27	0.27	0.33	0.01	0.13	0.02		0.01	0.01	0.01	0.01	0.01	0.16			0.15	0.12
Nplu	CS00	WCVI	May	30	2011	0.71	0.85	0.28	0.27	0.29	0.01	0.14	0.02		0.01	0.02	0.01	0.01	0.01	0.17			0.15	0.13
Nplu	CS00	WCVI	May	31	2010	0.85	0.93	0.26	0.26	0.22	0.01	0.16	0.02		0.01	0.02	0.02	0.03		0.19	0.04		0.14	0.13
Nplu	CS00	WCVI	May	31	2010	0.95	0.89	0.41	0.41	0.27	0.01	0.20	0.02		0.01	0.02	0.02	0.01	0.02				0.21	0.19
Nplu	CS01	WCVI	May	31	2010	0.68	0.72	0.23	0.23	0.29	0.01	0.14	0.02		0.01	0.02	0.02	0.04		0.18	0.04		0.13	0.10
Nplu	CS01	WCVI	May	31	2010	0.63	0.74	0.31	0.30	0.37	0.02	0.17	0.02	0.01	0.01	0.02	0.02	0.02	0.02				0.17	0.13
Nplu	CS01	WCVI	May	31	2010	0.74	0.77	0.33	0.33	0.33	0.01	0.18	0.02		0.01	0.02	0.02	0.02	0.02				0.19	0.14
Nplu	CS03	WCVI	May	31	2010	0.69	0.89	0.22	0.22	0.24	0.02	0.19	0.03		0.02	0.02	0.04	0.02		0.17	0.04		0.12	0.11
Nplu	CS03	WCVI	May	31	2010	0.63	0.77	0.31	0.31	0.36	0.02	0.19	0.02	0.01	0.02	0.02	0.02	0.01	0.02				0.17	0.13
Nplu	CS03	WCVI	May	31	2010	0.58	0.89	0.27	0.27	0.35	0.02	0.21	0.03		0.02	0.02	0.02	0.01	0.03				0.14	0.13
Nplu	LB11	WCVI	Sept	5	2010	1.90	0.60	0.53	0.53	0.11		0.16	0.03		0.05	0.03	0.04	0.04					0.33	0.20
Nplu	LBP05	WCVI	May	30	2010	0.81	0.94	0.35	0.35	0.29	0.02	0.21	0.03		0.01	0.03	0.03	0.02	0.02				0.18	0.17
Nplu	LC12	WCVI	May	27	2011	1.44	1.60	0.42	0.42	0.17	0.01	0.14	0.03		0.03	0.05	0.01	0.01	0.01	0.10			0.16	0.26
Nplu	H04	North	June	25	2010	0.66	0.79	0.31	0.31	0.36	0.01	0.18	0.02		0.02	0.02	0.03	0.02	0.01				0.18	0.14
Nplu	QCI02	North	June	29	2010	0.71	0.66	0.23	0.23	0.27	0.01	0.14	0.03		0.01	0.02	0.02	0.03		0.17	0.04		0.14	0.09
Nplu	QCI02	North	June	29	2010	0.58	0.56	0.27	0.26	0.37	0.02	0.19	0.03		0.02	0.02	0.04	0.02	0.01			0.01	0.17	0.09
Nplu	QCI02	North	June	29	2010	0.59	0.65	0.28	0.28	0.34	0.02	0.20	0.04	0.01	0.02	0.02	0.03	0.02	0.02				0.17	0.11
Nplu	QCI04	North	June	29	2010	0.78	0.66	0.33	0.33	0.29	0.02	0.18	0.03		0.03	0.03	0.03	0.02	0.02			0.01	0.20	0.13
Nplu	QCI04	North	June	29	2010	0.73	0.72	0.34	0.34	0.31	0.02	0.18	0.03		0.03	0.02	0.03	0.02	0.01				0.20	0.14
Nplu	QCI04	North	June	29	2010	0.71	0.72	0.33	0.32	0.34	0.02	0.16	0.03		0.02	0.02	0.02	0.02	0.02				0.19	0.14
Nplu	QCI06	North	June	29	2010	0.44	0.60	0.24	0.24	0.47	0.02	0.16	0.03		0.01	0.02	0.03	0.01	0.01				0.15	0.09
Nplu	QCI06	North	June	29	2010	0.67	0.65	0.32	0.32	0.34	0.02	0.18	0.02		0.02	0.02	0.02	0.02	0.01				0.20	0.13
Nplu	QCI06	North	June	29	2010	0.83	0.63	0.36	0.36	0.30	0.02	0.18	0.03		0.02	0.02	0.03	0.02	0.02				0.22	0.14
Nplu	QCI10	North	June	30	2010	0.63	0.70	0.30	0.30	0.36	0.02	0.18	0.02		0.02	0.02	0.03	0.02	0.02				0.18	0.12
Nplu	QCI10	North	June	30	2010	0.62	0.80	0.31	0.31	0.40	0.02	0.16	0.02		0.02	0.02	0.02	0.02	0.01				0.17	0.14
Nplu	QCI12	North	June	30	2010	0.69	0.64	0.32	0.32	0.32	0.02	0.19	0.03		0.03	0.02	0.03	0.02	0.02				0.19	0.12

Nplu	QCI12	North	June	30	2010	0.70	0.74	0.33	0.33	0.34	0.02	0.18	0.03	0.01	0.02	0.02	0.03	0.01	0.02				0.19	0.14
Nplu	QCI12	North	June	30	2010	0.86	0.76	0.37	0.37	0.29	0.01	0.18	0.02		0.02	0.02	0.03	0.02	0.02				0.21	0.16
Sasp	LG07	WCVI	Sept	8	2010	0.96	1.27	0.28	0.28	0.08	0.01	0.19	0.06		0.12	0.07	0.03	0.01		0.05	0.01		0.12	0.16
Sasp	LG07	WCVI	Sept	8	2010	1.09	1.43	0.29	0.29	0.09		0.18	0.06		0.09	0.07	0.03			0.06			0.12	0.17
Sasp	LG07	WCVI	Sept	8	2010	1.17	1.39	0.29	0.29	0.09	0.02	0.18	0.05		0.08	0.07	0.03	0.02	0.01	0.07	0.02		0.12	0.17
Ssim	LBP07	WCVI	Sept	8	2010	3.15	0.98	0.41	0.39	0.02		0.15	0.08		0.02	0.18	0.02	0.02	0.01	0.03	0.01	0.02	0.20	0.20
Ssim	LBP07	WCVI	Sept	8	2010	2.66	1.20	0.40	0.39	0.03	0.01	0.17	0.08		0.02	0.17	0.02	0.02	0.01	0.02		0.01	0.18	0.21
Ssim	LBP07	WCVI	Sept	8	2010	2.91	1.08	0.40	0.39	0.03		0.16	0.08		0.02	0.19	0.02	0.02	0.01	0.02		0.01	0.19	0.21
Ssim	LBP07	WCVI	Sept	8	2010	2.95	1.14	0.41	0.39	0.02		0.16	0.08	0.01	0.02	0.17	0.02	0.02	0.01	0.03	0.01	0.02	0.18	0.21
Ssim	LBP07	WCVI	Sept	8	2010	2.86	1.11	0.41	0.40	0.03		0.16	0.07		0.02	0.15	0.02	0.03	0.01	0.04	0.02	0.02	0.19	0.21
Ssim	LG07	WCVI	Sept	8	2010	2.42	1.29	0.42	0.40	0.02	0.01	0.20	0.06	0.01	0.03	0.17	0.02	0.02	0.01	0.01	0.01	0.02	0.17	0.22
Ssim	LG07	WCVI	Sept	8	2010	2.37	1.23	0.41	0.39	0.03	0.01	0.19	0.06	0.01	0.03	0.15	0.02	0.01	0.01	0.01	0.02	0.02	0.18	0.22
Ssim	LG07	WCVI	Sept	8	2010	2.24	1.39	0.41	0.39	0.03	0.01	0.20	0.06	0.01	0.03	0.17	0.02	0.01	0.01	0.02		0.01	0.16	0.23
Ssim	LG09	WCVI	Sept	7	2010	2.65	1.04	0.40	0.40	0.02		0.17	0.07	0.01	0.03	0.17	0.02	0.04	0.01	0.01	0.01		0.20	0.20
Ssim	LG09	WCVI	Sept	7	2010	2.80	1.04	0.40	0.40	0.02		0.16	0.07	0.01	0.02	0.15	0.02	0.05	0.01	0.02	0.01		0.20	0.20
Ssim	LG09	WCVI	Sept	7	2010	2.70	1.14	0.40	0.40	0.03		0.16	0.07	0.01	0.02	0.16	0.02	0.06	0.01		0.01		0.19	0.22
Tpac	A2	WCVI	Sept	6	2010	1.86	1.16	0.43	0.43	0.05	0.01	0.18	0.03	0.02	0.05	0.11	0.03	0.02		0.03	0.01		0.20	0.23
Tpac	A2	WCVI	Sept	6	2010	2.21	1.15	0.43	0.43	0.03	0.01	0.19	0.03	0.01	0.03	0.15	0.02	0.03		0.02	0.02		0.20	0.23
Tpac	C2	WCVI	Sept	4	2010	1.41	1.02	0.45	0.45	0.02		0.28			0.10	0.12							0.22	0.23
Tpac	CS00	WCVI	May	31	2010	2.17	0.72	0.41	0.39	0.05	0.01	0.19	0.06	0.01	0.03	0.18	0.02	0.03	0.01			0.02	0.23	0.16
Tpac	CS00	WCVI	Sept	9	2010	1.83	1.33	0.36	0.32	0.05		0.21	0.05		0.07	0.20	0.02	0.03	0.01		0.01	0.04	0.14	0.18
Tpac	CS00	WCVI	Sept	9	2010	2.02	1.34	0.43	0.41	0.04	0.01	0.20	0.03	0.01	0.05	0.15	0.02	0.03	0.01	0.02	0.01	0.02	0.17	0.23
Tpac	CS01	WCVI	May	31	2010	1.90	0.89	0.43	0.40	0.07	0.01	0.19	0.03	0.01	0.04	0.14	0.02	0.03	0.01		0.01	0.03	0.21	0.19
Tpac	CS01	WCVI	Sept	9	2010	2.55	1.08	0.50	0.46	0.03		0.21	0.02		0.03	0.16	0.01	0.03			0.01	0.04	0.22	0.24
Tpac	CS03	WCVI	Sept	10	2010	2.20	0.91	0.46	0.33	0.03		0.22	0.03	0.01	0.04	0.16	0.02	0.03				0.14	0.17	0.16
Tpac	CS03	WCVI	May	31	2010	1.16	0.83	0.37	0.37			0.23			0.20	0.13							0.20	0.17
Tpac	CS03	WCVI	Sept	10	2010	1.83	0.88	0.45	0.37	0.06		0.24	0.03		0.03	0.13	0.02	0.03	0.02			0.08	0.20	0.17
Tpac	CS03	WCVI	Sept	10	2010	3.00	1.29	0.37	0.33	0.07		0.13	0.02		0.02	0.09	0.19	0.02	0.01	0.02	0.01	0.04	0.15	0.19
Tpac	CS03	WCVI	Sept	10	2010	2.52	1.28	0.46	0.37	0.05	0.01	0.17	0.02	0.01	0.03	0.15	0.02	0.03		0.02	0.02	0.09	0.16	0.21
Tpac	CS08	WCVI	Sept	10	2010	1.82	0.71	0.41	0.33	0.03		0.25	0.03		0.06	0.18	0.02	0.03				0.07	0.20	0.14
Tpac	CS08	WCVI	Sept	10	2010	1.72	0.85	0.41	0.36	0.05	0.01	0.24	0.03		0.05	0.18		0.02	0.01			0.06	0.19	0.16
Tpac	CS08	WCVI	May	31	2010	1.54	0.70	0.47	0.39		0.04	0.27			0.08	0.14						0.09	0.23	0.16
Tpac	CS09	WCVI	Sept	10	2010	2.33	0.80	0.47	0.42	0.03		0.20	0.04	0.01	0.03	0.15	0.02	0.03				0.05	0.23	0.19
Tpac	CS09	WCVI	Sept	10	2010	2.54	1.03	0.46	0.45	0.02		0.19	0.02		0.05	0.19	0.02	0.03			0.01	0.02	0.22	0.23
Tpac	CS09	WCVI	Sept	10	2010	2.58	1.04	0.48	0.45	0.05	0.01	0.17	0.05		0.02	0.14	0.01	0.03	0.01	0.01	0.01	0.04	0.22	0.23
Tpac	LB11	WCVI	Sept	5	2010	1.93	1.03	0.46	0.46	0.03		0.22	0.02		0.06	0.14	0.02						0.23	0.23

Tpac	LBP05	WCVI	May	30	2010	1.22	0.76	0.38	0.38	0.06		0.25			0.14	0.17							0.22	0.17
Tpac	LBP05	WCVI	Sept	8	2010	2.20	1.03	0.48	0.46	0.02		0.22	0.03		0.05	0.14	0.02	0.02			0.01	0.02	0.23	0.23
Tpac	LBP07	WCVI	Sept	8	2010	2.10	1.04	0.41	0.39	0.05		0.20	0.03		0.05	0.19	0.03	0.03				0.02	0.19	0.20
Tpac	LBP07	WCVI	Sept	8	2010	2.60	1.12	0.51	0.47	0.05		0.19	0.02		0.03	0.15	0.02	0.04				0.04	0.22	0.25
Tpac	LBP08	WCVI	Sept	9	2010	1.69	0.96	0.41	0.35	0.03		0.24	0.03	0.02	0.07	0.15	0.03	0.02				0.06	0.18	0.17
Tpac	LBP08	WCVI	Sept	9	2010	2.04	1.37	0.44	0.39	0.05	0.01	0.18	0.03	0.01	0.05	0.13	0.02	0.03	0.01	0.02	0.01	0.04	0.17	0.23
Tpac	LC04	WCVI	Sept	6	2010	1.89	0.77	0.46	0.46	0.04		0.22	0.04	0.01	0.06	0.11	0.03	0.01		0.03			0.26	0.20
Tpac	LC08	WCVI	Sept	7	2010	1.99	1.14	0.49	0.46	0.05		0.21	0.04	0.01	0.05	0.12	0.02	0.01				0.03	0.22	0.25
Tpac	LC08	WCVI	Sept	7	2010	1.93	1.15	0.49	0.49	0.03		0.22			0.05	0.11		0.03					0.23	0.26
Tpac	LC12	WCVI	May	28	2010	1.43	0.99	0.47	0.47			0.27			0.14	0.12							0.24	0.23
Tpac	LC12	WCVI	Sept	6	2010	1.82	1.21	0.46	0.44	0.03		0.23	0.02		0.08	0.13	0.03	0.01				0.02	0.20	0.24
Tpac	LC12	WCVI	May	28	2010	1.75	0.96	0.51	0.51	0.04		0.24			0.08	0.13							0.26	0.25
Tpac	LC12	WCVI	May	28	2010	2.19	0.93	0.55	0.53	0.05		0.21			0.05	0.10	0.02	0.01				0.02	0.27	0.26
Tpac	LD09	WCVI	Sept	7	2010	1.99	1.10	0.43	0.43	0.04	0.01	0.19	0.05	0.01	0.04	0.12	0.02	0.03		0.02	0.01		0.20	0.22
Tpac	LD09	WCVI	Sept	7	2010	1.73	1.10	0.43	0.43	0.04	0.01	0.20	0.04	0.02	0.06	0.11	0.02	0.02		0.02	0.01		0.20	0.23
Tpac	LD09	WCVI	May	28	2010	2.21	1.10	0.52	0.52	0.03		0.22	0.02		0.05	0.14		0.01					0.25	0.27
Tpac	LG07	WCVI	May	29	2010	1.35	0.67	0.42	0.42	0.04		0.26			0.11	0.13							0.25	0.17
Tpac	LG07	WCVI	Sept	8	2010	2.06	1.07	0.44	0.43	0.05		0.20	0.04		0.04	0.12	0.02	0.03	0.02	0.04		0.01	0.21	0.22
Tpac	LG07	WCVI	May	29	2010	2.17	0.91	0.48	0.48	0.04	0.01	0.20	0.03		0.05	0.14	0.02	0.02					0.25	0.23
Tpac	LG07	WCVI	Sept	8	2010	2.36	1.18	0.49	0.48	0.03		0.22	0.02	0.01	0.03	0.15	0.02	0.03			0.01	0.02	0.22	0.26
Tpac	LG09	WCVI	Sept	7	2010	1.71	0.93	0.41	0.39	0.03		0.23	0.04	0.01	0.07	0.13	0.02	0.02	0.02			0.03	0.20	0.19
Tpac	LG09	WCVI	May	29	2010	1.95	0.98	0.47	0.47	0.03		0.24	0.02		0.06	0.14	0.03	0.01					0.24	0.23
Tpac	LG09	WCVI	Sept	7	2010	1.97	1.25	0.45	0.43	0.05	0.01	0.19	0.03		0.06	0.12	0.02	0.03	0.01	0.03		0.02	0.19	0.24
Tpac	LG09	WCVI	Sept	7	2010	2.32	1.05	0.50	0.49	0.03		0.22	0.02	0.01	0.03	0.15	0.02	0.02				0.01	0.24	0.25
Tpac	LG09	WCVI	May	29	2010	2.47	1.04	0.51	0.51	0.03		0.21	0.02		0.04	0.13	0.02	0.01	0.01		0.01		0.25	0.26
Tpac	VI05	WCVI	June	18	2010	1.00	0.96	0.40	0.40			0.36			0.14	0.09							0.21	0.20
Tpac	VI07	WCVI	June	18	2010	1.33	0.64	0.36	0.36	0.07		0.24	0.07		0.07	0.10	0.03	0.02		0.04	0.01		0.22	0.14
Tpac	VI13	WCVI	June	19	2010	1.61	0.60	0.37	0.37	0.07		0.21	0.07		0.04	0.10	0.02	0.05		0.03	0.01		0.23	0.14
Tpac	VI13	WCVI	June	19	2010	1.74	0.68	0.40	0.40	0.05		0.23	0.06		0.04	0.12	0.02	0.03		0.03	0.03		0.24	0.16
Tpac	VI18	WCVI	June	21	2010	1.49	0.73	0.45	0.45	0.04		0.27	0.05		0.07	0.12							0.26	0.19
Tpac	VI24	WCVI	June	22	2010	1.57	0.63	0.47	0.47	0.04		0.24	0.03		0.08	0.09		0.06					0.29	0.18
Tpac	VI26	WCVI	June	22	2010	1.98	0.70	0.42	0.42	0.04		0.20	0.04		0.04	0.14	0.01	0.01		0.09			0.25	0.17
Tpac	GS06	SoG	July	3	2010	1.14	1.28	0.38	0.38			0.30			0.12	0.10							0.17	0.22
Tpac	GS10	SoG	July	3	2010	1.58	1.19	0.40	0.40	0.04	0.01	0.23	0.03	0.01	0.07	0.14	0.02	0.02					0.18	0.22
Tpac	GS10	SoG	July	3	2010	2.46	0.98	0.46	0.46	0.03		0.19	0.03		0.03	0.16	0.02	0.02		0.02			0.23	0.23
Tpac	GS12	SoG	July	4	2010	1.78	1.18	0.49	0.49	0.04		0.25			0.06	0.14		0.02					0.22	0.26

Tpac	GS12	SoG	July	4	2010	2.02	1.39	0.53	0.53	0.03		0.24			0.06	0.14							0.22	0.31
Tpac	GS14	SoG	July	4	2010	2.27	0.95	0.44	0.44	0.04	0.01	0.17	0.03		0.04	0.14	0.01	0.02		0.02	0.01		0.23	0.21
Tpac	GS14	SoG	July	4	2010	1.64	1.25	0.44	0.43	0.02		0.23	0.01	0.02	0.09	0.13	0.03	0.01				0.01	0.19	0.24
Tpac	GS16	SoG	July	4	2010	1.71	1.24	0.40	0.40	0.04		0.21	0.04		0.10	0.19		0.02					0.18	0.22
Tpac	GS16	SoG	July	4	2010	1.72	1.18	0.43	0.43	0.04	0.01	0.21	0.03	0.01	0.08	0.13	0.02	0.02					0.20	0.23
Tpac	GS24	SoG	July	5	2010	1.91	1.02	0.42	0.42	0.04		0.22	0.04		0.05	0.15	0.02	0.02					0.21	0.21
Tpac	GS24	SoG	July	5	2010	2.10	1.10	0.53	0.52	0.02		0.25	0.02		0.05	0.11	0.03					0.02	0.25	0.27
Tpac	GS26	SoG	July	5	2010	1.79	0.93	0.43	0.43	0.04	0.01	0.22	0.04		0.04	0.12	0.02	0.01		0.04			0.22	0.21
Tpac	GS26	SoG	July	5	2010	1.89	0.99	0.46	0.46	0.03	0.01	0.22	0.02		0.05	0.10	0.02	0.01		0.03			0.23	0.23
Tpac	GS28	SoG	July	6	2010	1.36	1.27	0.39	0.39	0.05	0.01	0.23	0.03	0.01	0.10	0.12	0.02	0.01					0.17	0.22
Tpac	GS28	SoG	July	6	2010	1.85	1.09	0.47	0.45	0.02		0.23	0.02	0.01	0.08	0.12	0.02	0.02			0.01	0.02	0.22	0.24
Tpac	GS30	SoG	July	6	2010	2.15	1.08	0.48	0.47	0.03		0.21	0.02		0.07	0.14	0.02	0.02			0.01	0.02	0.22	0.24
Tpac	GS32	SoG	July	6	2010	2.06	1.08	0.42	0.42	0.04	0.01	0.19	0.03		0.05	0.16	0.01	0.02		0.02	0.01		0.20	0.22
Tpac	GS32	SoG	July	6	2010	2.28	1.02	0.46	0.43	0.05		0.19	0.03	0.01	0.05	0.16	0.01	0.04			0.01	0.03	0.21	0.22
Tpac	GS34	SoG	July	6	2010	2.47	0.87	0.45	0.44	0.03		0.21	0.02		0.03	0.19	0.02	0.04			0.01	0.01	0.23	0.20
Tpac	GS34	SoG	July	6	2010	2.51	1.10	0.50	0.48	0.02		0.21	0.02	0.01	0.04	0.16	0.02	0.02			0.01	0.02	0.23	0.25
Tpac	GS36	SoG	July	7	2010	1.97	0.92	0.42	0.42	0.04	0.01	0.20	0.04	0.01	0.04	0.14	0.02	0.02		0.01			0.22	0.20
Tpac	GS36	SoG	July	7	2010	1.98	1.02	0.43	0.43	0.03		0.21	0.03		0.06	0.14	0.01	0.02			0.01		0.21	0.22
Tpac	GS38	SoG	July	7	2010	2.24	1.03	0.47	0.47	0.03		0.21	0.05		0.05	0.14	0.02	0.01		0.03			0.23	0.24
Tpac	GS38	SoG	July	7	2010	2.76	0.98	0.51	0.49	0.02		0.20	0.02		0.04	0.17	0.02	0.02			0.01	0.02	0.25	0.24
Tpac	GS40	SoG	July	7	2010	2.11	1.06	0.46	0.46	0.04	0.01	0.19	0.04		0.05	0.14	0.01	0.02		0.02			0.22	0.24
Tpac	GS40	SoG	July	7	2010	2.03	1.07	0.48	0.46	0.02		0.21	0.02	0.01	0.07	0.14	0.02	0.01			0.01	0.01	0.22	0.24
Tpac	GS42	SoG	July	7	2010	2.27	1.02	0.45	0.45	0.03	0.01	0.19	0.03		0.04	0.15	0.02	0.02		0.02			0.22	0.23
Tpac	GS42	SoG	July	7	2010	2.32	0.96	0.48	0.48	0.03	0.01	0.19	0.03		0.05	0.13	0.02	0.01		0.01	0.01		0.24	0.23
Tpac	H04	North	June	25	2010	1.61	0.88	0.38	0.36	0.06	0.01	0.21	0.03	0.01	0.06	0.14	0.02	0.04		0.03	0.01	0.03	0.19	0.17
Tpac	QCI04	North	June	29	2010	1.46	0.82	0.34	0.34	0.12	0.01	0.18	0.04		0.04	0.09	0.03	0.04		0.07	0.05		0.19	0.15
Tpac	QCI08	North	June	30	2010	1.71	1.00	0.40	0.40	0.07		0.21	0.03		0.05	0.12	0.02	0.04		0.05	0.02		0.20	0.20
Tpac	QCI12	North	June	30	2010	1.45	0.62	0.39	0.39	0.07		0.24	0.05		0.05	0.11	0.03	0.02		0.04	0.01		0.24	0.15
Tspi	B7	WCVI	Sept	5	2010	1.71	0.39	0.48	0.47	0.05		0.27	0.05		0.04	0.09	0.03		0.01			0.01	0.33	0.13
Tspi	C2	WCVI	Sept	4	2010	0.87	0.45	0.28	0.27	0.08	0.01	0.38	0.08	0.01	0.02	0.11	0.03		0.01			0.01	0.19	0.09
Tspi	C2	WCVI	Sept	4	2010	1.99	0.80	0.51	0.50	0.03		0.26	0.04	0.01	0.03	0.08	0.03		0.02			0.01	0.28	0.22
Tspi	CS00	WCVI	Sept	9	2010	0.90	0.33	0.28	0.27	0.08	0.01	0.37	0.07		0.03	0.11	0.04		0.01			0.01	0.20	0.07
Tspi	CS00	WCVI	Sept	9	2010	1.17	0.46	0.37	0.36	0.07		0.31	0.06		0.03	0.11	0.01			0.02		0.01	0.24	0.11
Tspi	CS00	WCVI	Sept	9	2010	1.34	0.58	0.38	0.36	0.05	0.01	0.31	0.05		0.03	0.13	0.03		0.01			0.01	0.23	0.13
Tspi	CS01	WCVI	Sept	9	2010	0.66	0.26	0.21	0.21	0.11	0.01	0.38	0.11		0.03	0.09	0.04		0.01			0.01	0.16	0.04
Tspi	CS01	WCVI	May	31	2010	1.91	0.60	0.44	0.42	0.02	0.01	0.25	0.08		0.02	0.10	0.03		0.01			0.01	0.26	0.16

Tspi	CS01	WCVI	May	31	2010	2.16	0.60	0.46	0.45	0.03	0.01	0.23	0.08		0.02	0.11	0.03		0.02			0.02	0.28	0.17
Tspi	CS01	WCVI	May	31	2010	2.04	0.63	0.45	0.43	0.02	0.01	0.25	0.08		0.02	0.11	0.03		0.02			0.02	0.27	0.17
Tspi	CS03	WCVI	Sept	10	2010	1.16	0.30	0.30	0.28	0.07		0.31	0.09		0.02	0.14	0.04		0.01			0.02	0.22	0.07
Tspi	CS03	WCVI	Sept	10	2010	0.81	0.42	0.27	0.26	0.08	0.01	0.38	0.06	0.01	0.03	0.10	0.03	0.01	0.02			0.01	0.18	0.08
Tspi	CS03	WCVI	Sept	10	2010	1.64	0.43	0.41	0.39	0.06		0.26	0.07		0.03	0.15	0.01			0.02		0.02	0.27	0.12
Tspi	CS03	WCVI	Sept	10	2010	1.26	0.56	0.37	0.36	0.07	0.01	0.29	0.05	0.01	0.02	0.10	0.01	0.01	0.01	0.03		0.01	0.23	0.13
Tspi	CS03B	WCVI	May	31	2010	1.63	0.60	0.41	0.39	0.04	0.01	0.27	0.09		0.02	0.11	0.03		0.01			0.01	0.25	0.15
Tspi	CS03B	WCVI	May	31	2010	1.83	0.72	0.46	0.45	0.04	0.01	0.26	0.05	0.01	0.02	0.10	0.03		0.02			0.01	0.26	0.19
Tspi	CS03B	WCVI	May	31	2010	2.05	0.69	0.48	0.47	0.03	0.01	0.24	0.05		0.03	0.10	0.03		0.02			0.02	0.28	0.19
Tspi	CS08	WCVI	Sept	10	2010	0.77	0.20	0.25	0.24	0.09		0.38	0.09		0.03	0.09	0.04		0.01			0.01	0.20	0.04
Tspi	CS08	WCVI	Sept	10	2010	0.86	0.30	0.29	0.28	0.08		0.38	0.09		0.03	0.09	0.03		0.01			0.01	0.21	0.06
Tspi	CS08	WCVI	Sept	10	2010	1.07	0.25	0.35	0.34	0.07		0.32	0.08		0.04	0.10	0.01			0.02		0.01	0.27	0.07
Tspi	CS08	WCVI	May	31	2010	1.89	0.32	0.36	0.35	0.04		0.24	0.10		0.03	0.19	0.02					0.01	0.27	0.09
Tspi	CS08	WCVI	May	31	2010	1.64	0.56	0.47	0.46	0.05		0.26	0.09		0.02	0.07	0.01			0.01		0.02	0.29	0.16
Tspi	CS09	WCVI	Sept	10	2010	0.57	0.19	0.19	0.19	0.10	0.01	0.42	0.12		0.03	0.08	0.03		0.01			0.01	0.16	0.03
Tspi	CS09	WCVI	Sept	10	2010	0.58	0.19	0.19	0.18	0.11	0.01	0.41	0.10		0.03	0.09	0.03		0.01			0.01	0.15	0.03
Tspi	CS09	WCVI	Sept	10	2010	1.10	0.27	0.35	0.34	0.07		0.32	0.09		0.03	0.10	0.01			0.02		0.01	0.27	0.07
Tspi	CS09	WCVI	Sept	10	2010	1.11	0.31	0.35	0.33	0.07		0.31	0.08		0.03	0.11	0.01		0.01	0.02		0.01	0.25	0.08
Tspi	CS09	WCVI	May	31	2010	9.17	0.45	0.63	0.60	0.04			0.09		0.03	0.13	0.03		0.01			0.03	0.42	0.18
Tspi	CS09	WCVI	May	31	2010	7.34	0.48	0.60	0.57	0.06	0.01		0.10		0.03	0.11	0.04	0.01	0.01			0.03	0.39	0.18
Tspi	JI22	WCVI	May	31	2010	2.52	0.62	0.54	0.54	0.02		0.24	0.03		0.02	0.12	0.04						0.33	0.21
Tspi	JI22	WCVI	May	31	2010	2.54	0.67	0.53	0.52	0.02	0.01	0.22	0.04	0.01	0.02	0.10	0.03		0.02			0.02	0.31	0.21
Tspi	JI22	WCVI	May	31	2010	2.76	0.73	0.56	0.54	0.01	0.01	0.21	0.03		0.02	0.10	0.03		0.02			0.02	0.31	0.23
Tspi	LB11	WCVI	Sept	5	2010	0.99	0.40	0.32	0.31	0.07	0.01	0.36	0.06		0.03	0.09	0.04		0.01			0.01	0.22	0.09
Tspi	LB11	WCVI	Sept	5	2010	1.40	0.58	0.41	0.40	0.06		0.29	0.05		0.03	0.09	0.02		0.01	0.04		0.01	0.25	0.15
Tspi	LBP02	WCVI	May	30	2010	2.20	0.58	0.50	0.48	0.02		0.24	0.07	0.01	0.03	0.10	0.03		0.01			0.01	0.31	0.18
Tspi	LBP02	WCVI	May	30	2010	2.88	0.62	0.56	0.53	0.01		0.21	0.02		0.02	0.11	0.02		0.02			0.03	0.33	0.20
Tspi	LBP05	WCVI	Sept	8	2010	0.89	0.48	0.29	0.28	0.09	0.01	0.37	0.04		0.03	0.10	0.03	0.01	0.02			0.01	0.19	0.09
Tspi	LBP05	WCVI	Sept	8	2010	1.09	0.53	0.32	0.31	0.08	0.01	0.31	0.04		0.02	0.10	0.02	0.01	0.01	0.05		0.01	0.20	0.11
Tspi	LBP05	WCVI	Sept	8	2010	1.08	0.65	0.33	0.32	0.07		0.33	0.05		0.03	0.11	0.01		0.01	0.04			0.20	0.13
Tspi	LBP05	WCVI	May	30	2010	1.96	0.60	0.45	0.43	0.03	0.01	0.24	0.07	0.01	0.02	0.09	0.04		0.03			0.01	0.27	0.16
Tspi	LBP05	WCVI	May	30	2010	1.84	0.72	0.42	0.41	0.03	0.01	0.26	0.03	0.01	0.02	0.11	0.05	0.01	0.04			0.01	0.24	0.17
Tspi	LBP05	WCVI	May	30	2010	2.52	0.67	0.53	0.51	0.02	0.01	0.22	0.04	0.01	0.02	0.10	0.03		0.02			0.02	0.31	0.21
Tspi	LBP07	WCVI	Sept	8	2010	1.12	0.58	0.35	0.33	0.06	0.01	0.34	0.05		0.03	0.10	0.03		0.01			0.02	0.21	0.12
Tspi	LBP07	WCVI	Sept	8	2010	1.54	0.92	0.43	0.41	0.09	0.01	0.25	0.05	0.01	0.01	0.08	0.04		0.03			0.02	0.21	0.20
Tspi	LC04	WCVI	Sept	6	2010	0.87	0.27	0.26	0.26	0.07		0.39	0.09		0.02	0.11	0.05		0.01				0.20	0.05

Tspi	LC04	WCVI	Sept	6	2010	1.42	0.43	0.41	0.40	0.05		0.29	0.06		0.03	0.11	0.01		0.01	0.03		0.01	0.28	0.12
Tspi	LC04	WCVI	Sept	6	2010	1.39	0.69	0.41	0.40	0.03	0.01	0.33	0.06	0.01	0.02	0.10	0.02		0.01			0.02	0.24	0.16
Tspi	LC08	WCVI	Sept	7	2010	1.19	0.60	0.36	0.34	0.07	0.01	0.33	0.04	0.01	0.02	0.09	0.04		0.03			0.02	0.21	0.13
Tspi	LC08	WCVI	May	28	2010	2.65	0.80	0.56	0.54	0.01		0.23	0.02	0.01	0.02	0.11	0.02		0.01			0.02	0.30	0.24
Tspi	LC08	WCVI	May	28	2010	2.86	0.93	0.55	0.52	0.01		0.21	0.02	0.01	0.02	0.12	0.03	0.01	0.02			0.03	0.27	0.25
Tspi	LD09	WCVI	May	28	2010	1.75	0.86	0.41	0.40	0.02	0.02	0.29	0.02		0.02	0.16	0.02	0.01	0.02			0.01	0.21	0.18
Tspi	LD09	WCVI	May	28	2010	2.04	0.92	0.46	0.45	0.02	0.01	0.26	0.02	0.01	0.03	0.12	0.04	0.01	0.03			0.02	0.23	0.21
Tspi	LG07	WCVI	Sept	8	2010	0.71	0.44	0.24	0.23	0.11	0.01	0.40	0.06	0.01	0.02	0.10	0.02	0.01	0.02			0.01	0.16	0.07
Tspi	LG07	WCVI	Sept	8	2010	1.13	0.51	0.31	0.30	0.07	0.01	0.30	0.04		0.02	0.11	0.02	0.01	0.02	0.04		0.01	0.20	0.10
Tspi	LG07	WCVI	May	29	2010	2.27	0.68	0.50	0.48	0.02	0.01	0.24	0.06		0.02	0.10	0.03		0.02			0.01	0.29	0.19
Tspi	LG07	WCVI	May	29	2010	2.02	0.78	0.47	0.45	0.02	0.01	0.26	0.04	0.01	0.02	0.12	0.03		0.02			0.02	0.25	0.20
Tspi	LG07	WCVI	May	29	2010	2.77	0.79	0.55	0.53	0.01		0.21	0.02		0.02	0.09	0.03		0.02			0.02	0.29	0.23
Tspi	LG09	WCVI	Sept	29	2010	1.05	0.39	0.32	0.32	0.07		0.33	0.06		0.03	0.12	0.01			0.02		0.01	0.23	0.09
Tspi	VI07	WCVI	June	18	2010	1.86	0.60	0.48	0.46	0.04		0.25	0.06	0.01	0.03	0.09	0.03		0.02			0.02	0.29	0.17
Tspi	VI07	WCVI	July	18	2010	1.98	0.75	0.49	0.47	0.05		0.24	0.06		0.02	0.09	0.02		0.01	0.03		0.02	0.27	0.20
Tspi	VI24	WCVI	June	22	2010	1.98	0.34	0.53	0.48	0.05		0.25	0.05		0.02	0.07	0.02		0.01			0.05	0.36	0.12
Tspi	VI26	WCVI	June	22	2010	1.13	0.42	0.34	0.32	0.08	0.01	0.32	0.08	0.01	0.02	0.09	0.04		0.02			0.02	0.23	0.10
Tspi	VI26	WCVI	June	22	2010	2.03	0.59	0.50	0.48	0.06	0.01	0.23	0.04	0.01	0.01	0.08	0.04		0.02			0.03	0.30	0.18
Tspi	GS24	SoG	July	5	2010	1.40	0.54	0.40	0.37	0.03		0.34	0.04	0.01	0.01	0.09	0.03		0.03			0.03	0.24	0.13
Tspi	GS24	SoG	July	5	2010	2.38	0.86	0.51	0.48	0.03	0.01	0.21	0.06		0.01	0.08	0.02		0.02	0.05		0.03	0.26	0.22
Tspi	GS40	SoG	July	7	2010	1.59	0.90	0.40	0.39	0.05	0.01	0.24	0.07	0.01	0.03	0.08	0.02		0.02	0.06		0.01	0.21	0.19
Tspi	GS40	SoG	July	7	2010	1.91	0.73	0.49	0.46	0.03		0.25	0.06	0.01	0.04	0.09	0.03		0.02			0.03	0.26	0.19
Tspi	DT08	North	June	27	2010	1.67	0.52	0.45	0.44	0.06	0.01	0.26	0.03		0.02	0.08	0.04		0.02			0.02	0.29	0.15
Tspi	DT08	North	June	27	2010	1.81	0.60	0.46	0.44	0.05	0.01	0.26	0.03	0.01	0.02	0.10	0.04		0.03			0.02	0.28	0.17
Tspi	H04	North	June	25	2010	1.72	0.64	0.46	0.44	0.06		0.26	0.05		0.02	0.09	0.04		0.02			0.01	0.27	0.17
Tspi	H04	North	June	25	2010	1.73	0.64	0.47	0.46	0.06	0.01	0.26	0.03	0.01	0.02	0.08	0.04		0.02			0.01	0.28	0.18
Tspi	Q09	North	July	1	2010	1.07	0.51	0.34	0.33	0.09	0.02	0.33	0.06	0.01	0.01	0.08	0.04		0.03			0.01	0.22	0.11
Tspi	Q09	North	July	1	2010	1.69	0.57	0.45	0.43	0.05	0.01	0.27	0.04	0.01	0.02	0.09	0.04		0.03			0.02	0.27	0.16
Tspi	QCI02	North	June	29	2010	0.89	0.41	0.28	0.27	0.11	0.01	0.34	0.05	0.01	0.02	0.10	0.03	0.03	0.03			0.01	0.19	0.08
Tspi	QCI02	North	June	29	2010	1.03	0.46	0.31	0.30	0.11	0.01	0.33	0.05		0.01	0.11	0.03		0.03			0.01	0.21	0.10
Tspi	QCI02	North	July	29	2010	1.38	0.53	0.34	0.33	0.09	0.01	0.24	0.04		0.02	0.10	0.03	0.02	0.02	0.03		0.01	0.22	0.12
Tspi	QCI02	North	July	29	2010	1.47	0.64	0.36	0.35	0.08	0.01	0.24	0.04		0.01	0.09	0.02	0.02	0.02	0.03		0.01	0.21	0.14
Tspi	QCI04	North	June	29	2010	1.39	0.56	0.43	0.41	0.10	0.01	0.27	0.05	0.01	0.02	0.08	0.03		0.01			0.01	0.27	0.15
Tspi	QCI04	North	July	29	2010	1.65	0.78	0.45	0.44	0.07	0.01	0.24	0.03	0.01	0.02	0.08	0.02	0.01	0.01	0.03		0.01	0.25	0.19
Tspi	QCI08	North	June	30	2010	0.98	0.43	0.32	0.31	0.11	0.01	0.33	0.06	0.01	0.01	0.10	0.03		0.02			0.01	0.22	0.09
Tspi	QCI08	North	June	30	2010	0.94	0.61	0.28	0.27	0.11	0.01	0.34	0.06	0.01	0.02	0.11	0.03		0.02			0.01	0.17	0.10

Tspi	QCI08	North	June	30	2010	1.58	0.70	0.43	0.42	0.05	0.01	0.29	0.03	0.01	0.02	0.12	0.03		0.02			0.01	0.25	0.17
Tspi	QCI12	North	June	30	2010	1.04	0.54	0.30	0.29	0.10	0.01	0.33	0.05		0.01	0.12	0.03	0.02	0.02			0.01	0.19	0.10
Tspi	QCI12	North	June	30	2010	1.11	0.43	0.35	0.33	0.07	0.01	0.34	0.06	0.01	0.02	0.10	0.03		0.02			0.02	0.23	0.10
Tspi	QCI12	North	July	30	2010	1.50	0.75	0.39	0.38	0.08	0.01	0.26	0.04		0.01	0.11	0.02	0.02	0.02	0.02		0.01	0.21	0.16
Vpro	LG07	WCVI	Sept	8	2010	2.08	1.15	0.41	0.41	0.05	0.01	0.16	0.05	0.01	0.03	0.06	0.03		0.02	0.12		0.01	0.19	0.22
Vpro	LG07	WCVI	Sept	8	2010	2.04	1.19	0.43	0.42	0.06	0.01	0.16	0.05	0.01	0.03	0.05	0.03		0.03	0.13		0.01	0.19	0.23
Vpro	LG09	WCVI	Sept	7	2010	2.19	1.09	0.44	0.44	0.07	0.01	0.14	0.05	0.01	0.02	0.05	0.03	0.01	0.02	0.12			0.21	0.23