Evolution of stickleback in 50 years on earthquake-uplifted islands

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How rapidly can animal populations in the wild evolve when faced with sudden environmental shifts? Uplift during the 1964 Great Alaska Earthquake abruptly created freshwater ponds on multiple islands in Prince William Sound and the Gulf of Alaska. In the short time since the earthquake, the phenotypes of resident freshwater threespine stickleback fish on at least three of these islands have changed dramatically from their oceanic ancestors. To test the hypothesis that these freshwater populations were derived from oceanic ancestors only 50 y ago, we generated over 130,000 single-nucleotide polymorphism genotypes from more than 1,000 individuals using restriction site-associated DNA sequencing (RAD-seq). Population genomic analyses of these data support the hypothesis of recent and repeated, independent colonization of freshwater habitats by oceanic ancestors. We find evidence of recurrent gene flow between oceanic and freshwater ecotypes where they co-occur. Our data implicate natural selection in phenotypic diversification and support the hypothesis that the metapopulation organization of this species helps maintain a large pool of genetic variation that can be redeployed rapidly when oceanic stickleback colonize freshwater environments. We find that the freshwater populations, despite population genetic analyses clearly supporting their young age, have diverged phenotypically from oceanic ancestors to nearly the same extent as populations that were likely founded thousands of years ago. Our results support the intriguing hypothesis that most stickleback evolution in fresh water occurs within the first few decades after invasion of a novel environment.

contemporary evolution | ecological divergence | population genomics | adaptation | metapopulation

On March 27, 1964, the largest earthquake ever recorded in North America struck the south coast of Alaska (1, 2). This catastrophic event uplifted islands in Prince William Sound and the Gulf of Alaska in just a few minutes, creating ponds from formerly marine habitat and setting the stage for the diversification of threespine stickleback fish (*Gasterosteus aculeatus*) in these new freshwater sites. This seismic disturbance provides an excellent opportunity to address long-standing evolutionary questions regarding how often dramatic phenotypic shifts can happen over contemporary timescales (3–7).

Despite examples of rapid divergence in wild populations, evolutionary rates may often be constrained by a suite of factors (8). For example, evolution in new habitats may be limited by waiting times for new beneficial mutations (9–11). Even when adaptation occurs from standing genetic variation, evolution via selection of numerous independent loci of small effect may be time consuming (12–16). We know, however, that evolution can occur rapidly, particularly under artificial selection or in human-altered landscapes (17–21). In addition, empirical studies in the wild—particularly in response to significant environmental changes—have demonstrated that strong selection and rapid evolution over decades may be more common than once thought (22–24).

A rapid evolutionary response is predicted when the intensity of directional selection is strong (11, 25), a scenario likely to occur immediately after a habitat shift or environmental disturbance (26, 27). However, because of previous technological limitations, few studies of rapid differentiation in the wild have included genetic data to fully disentangle evolution from induced phenotypic plasticity. The small numbers of markers previously available for most population genetic studies have not provided the necessary precision with which to analyze very recently diverged populations (but see refs. 28 and 29). As a consequence, the frequency of contemporary evolution in the wild is still poorly defined, and its genetic and genomic basis remains unclear (30).

Advances in sequencing technology now allow the precise inference from genomic data of colonization history and evolutionary patterns that have occurred over just a few generations (31, 32). The threespine stickleback system is ideal for testing hypotheses about contemporary evolution. Postglacial adaptive radiations over the last 12,000–20,000 y in newly available freshwater habitats have spawned divergent phenotypes that demonstrate parallel phenotypic evolution (33, 34), with underlying parallel genetic (35–39) and genomic (40–43) bases. An open question, however, is whether this parallel divergence in stickleback actually requires thousands of years, or whether it can occur in nature over decadal timescales, as is implied by studies of a small number of recently formed artificial and wild stickleback populations (44–50). Also unknown is how often the

Significance

On several Alaskan islands, phenotypically variable threespine stickleback fish now live in ponds that were formed during uplift caused by the 1964 Great Alaska Earthquake. We analyzed phenotypic and genome-wide genetic divergence of resident freshwater and oceanic threespine stickleback populations from three islands. These data support the hypothesis that the freshwater populations evolved repeatedly from their oceanic ancestors in the past half-century, and have differentiated to nearly the same extent as populations that were founded thousands of years ago. This work raises the possibility that much of the evolution that occurs when oceanic stickleback invade fresh water takes place in fewer than 50 generations after colonization, rather than gradually over thousands of years.

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Data deposition: Single-nucleotide polymorphism (SNP) data from the sequences generated for this study for the 3,000 loci used in these analyses have been deposited in Dryad (dx.doi.org/10.5061/dryad.pn85t).

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countless populations of stickleback in geographically close ponds represent invasion followed by local dispersal or independent founding from the sea.

To address these questions, we identified populations from three islands (Middleton, Montague, and Danger) in Prince William Sound and the Gulf of Alaska that could have been founded only after the 1964 earthquake (Fig. 1 and *SI Appendix*, Table S1). Middleton Island was uplifted 3.4 m, creating a new terrace with ponds from a previously submarine platform (1). Similarly, Danger and Montague Islands experienced uplift and creation of new ponds (51). Stickleback now can be found in many of the habitats produced by the earthquake (52). We first analyzed a subset of populations from Middleton Island to describe the pattern of multivariate phenotypic divergence. We then produced and analyzed restriction site-associated DNA sequencing (RAD-seq) data (53, 54) from 25,000 RAD loci in 1,057 individuals collected from a total of 20 populations from all three islands and one mainland population. Deep sequencing yielded a set of 130,000 single-nucleotide polymorphisms (SNPs) and a total of 146 million genotypes. This large genomic dataset allowed us to ask whether phenotypic and genetic divergence in stickleback, thought to require thousands of years, can occur in a fraction of that time. Unlike previous studies that have made inroads into this question (47–50), the high level of biological replication of individually genotyped samples, within and across populations, in the present study avails a battery of population genomic analyses such as analysis of molecular variance (AMOVA), principal component analysis (PCA), and STRUCTURE. These approaches are most appropriate for defining (and assigning individuals to) genetic groupings across recently formed populations potentially still experiencing gene flow, such as those that are the focus of our study. We use this robust dataset to test the parallel origin of several populations against a precisely dated geological event—the Great Alaskan Earthquake of 1964—to ask whether replicated colonization of a large number of newly formed freshwater habitats by oceanic stickleback ancestors occurred independently on different islands and even amid close geographic locales within individual islands.

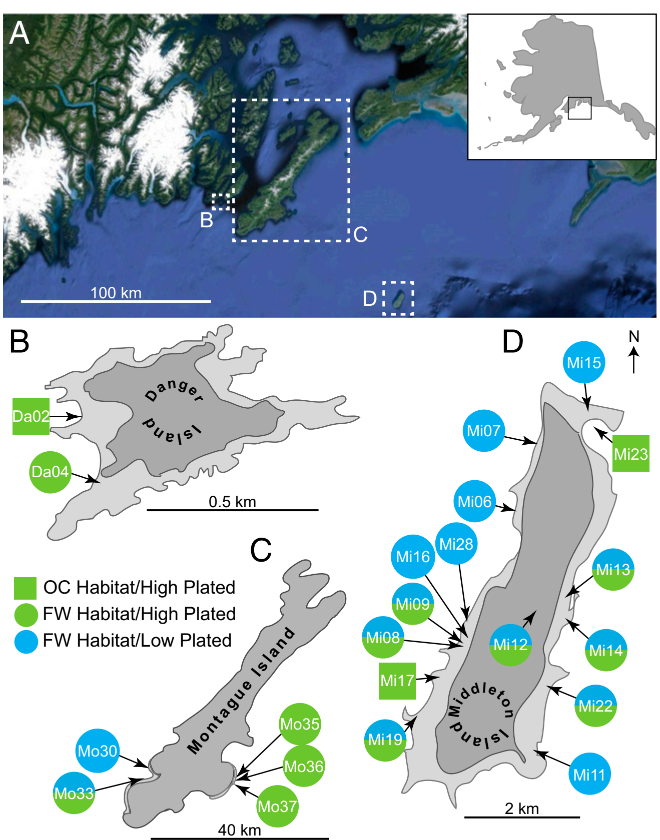

Fig. 1. Sampling locations. (*A*) Prince William Sound and the Gulf of Alaska, with Danger (*B*), Montague (*C*), and Middleton (*D*) Islands boxed. (*Inset*) Alaska with box representing sampling area. Sites are coded by whether they are freshwater or oceanic habitat and by the dominant ecotype found in the population. Dark gray shading within each island cartoon delineates the approximate pre-1964 shoreline.

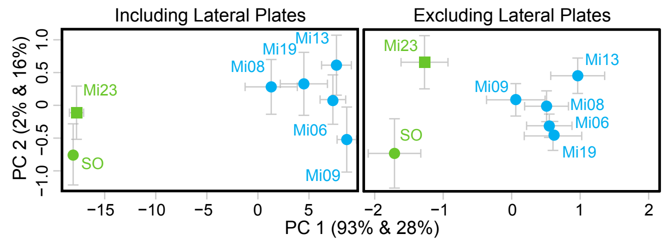

Fig. 2. PCAs describe the overall distribution of phenotypic variation in six sites from Middleton Island. Each point represents the population mean ± 2 SE. Points for Mi08, Mi09, Mi13, and Mi19 represent means for only phenotypically freshwater individuals as determined before analysis by visual inspection (*Materials and Methods*). Mi23 is a phenotypically oceanic population originating from a marine habitat, and SO are oceanic individuals pooled from all four sympatric sites included in the phenotypic analysis (Mi08, Mi09, Mi13, and Mi19). High/partially plated groups are in green, and low plated are in blue.

Results

Stickleback Are Phenotypically Divergent Between Habitats and Among Populations. We gathered morphometric data from six populations on Middleton Island (*SI Appendix*, Fig. S1 and Table S1). We analyzed individuals from one marine habitat [Middleton Population 23 (Mi23)] containing fish only with oceanic phenotypes, and one freshwater site (Mi06) containing fish only with freshwater phenotypes. The four remaining freshwater sites (Mi08, Mi09, Mi13, and Mi19) contained both phenotypically freshwater and oceanic individuals (*SI Appendix*, Table S2). Freshwater and oceanic ecotypes differed in standard length [$F_{(1,569)} = 943.80$; $P < 0.001$] and the number of lateral plates that form part of the dermal armor [$F_{(1,569)} = 1{,}734.00$; $P < 0.001$; *SI Appendix*, Fig. S2]. In a PCA using a set of morphological metrics known to diverge between ecotypes (55) (*SI Appendix*, Fig. S1 and Table S2), the first principal component (PC1) clearly separated freshwater and oceanic individuals and explained 93% of the total variation (Fig. 2 and *SI Appendix*, Table S3). Oceanic and freshwater ecotypes differed significantly in scores from the first three PCs [$F_{(1,553)} = 786.52$, $P < 0.001$; $F_{(1,553)} = 16.11$, $P < 0.001$; $F_{(1,553)} = 14.33$, $P < 0.001$; *SI Appendix*, Fig. S3]. When considering populations separately, freshwater individuals from Mi09 were also differentiated from Mi08 and Mi19 along PC1 (*SI Appendix*, Fig. S3 and Table S4).

Lateral plates had the largest loadings among all of the traits on PC1 (*SI Appendix*, Table S5), which was anticipated due to the extensive documentation of differences in lateral plate number between oceanic and freshwater individuals (35–40). To confirm that other traits also contributed to phenotypic divergence, we reran the PCA with all variables except lateral plates. The first two PCs still accounted for a significant amount of the variation (28% and 16%, respectively; Fig. 2 and *SI Appendix*, Fig. S3 and Table S3), and the ecotypes again differed significantly in scores for the first three PCs [$F_{(1,546)} = 95.30$, $P < 0.001$; $F_{(1,546)} = 12.09$, $P < 0.001$; $F_{(1,546)} = 4.23$, $P = 0.040$; *SI Appendix*, Figs. S3 and S4 and Table S4]. Lengths of the left pelvic spine, second dorsal spine, pectoral muscle, and pectoral fin insertion had the largest loadings on PC1, whereas snout, eye, and operculum lengths, as well as the distance between dorsal spines, had the largest loadings on PC2 (*SI Appendix*, Table S5). Similar to the analysis that included lateral plates, scores from the first three PCs differed significantly among populations [$F_{(6,550)} = 27.88$, $P < 0.001$; $F_{(6,550)} = 9.93$, $P \leq 0.001$; $F_{(6,550)} = 7.38$, $P < 0.001$; *SI Appendix*, Figs. S3 and S4 and Table S4]. The degree of phenotypic divergence among these very young populations mirrors what has been documented for much older stickleback populations in Alaska and other regions of the world (33).

Genetic Variation Is Partitioned Primarily Between Oceanic and Freshwater Ecotypes. To infer the genetic relatedness of individuals and evolutionary histories of populations on all three islands, we generated RAD libraries for 1,057 individuals from 21 total populations (*SI Appendix*, Table S1), ranging from 18 to 96 fish per population (mean of 50), and including one locale on mainland Alaska. These libraries were single-end sequenced in 12 lanes of an Illumina HiSeq 2500 (*SI Appendix*, Tables S6 and S7), resulting in a total of more than 1.4 billion 101-bp sequences that passed several stringent quality filters. Each individual was represented by an average of 1.25 million sequences of which ∼1 million (84%) were aligned to the reference genome, and nearly all (99%) were used by the population genomics analysis pipeline Stacks for downstream analyses. Approximately 130,000 SNPs were identified, most of which were called in every individual, thus providing a powerful dataset for studies of recent and rapid evolution (*SI Appendix*, Tables S8 and S9).

We performed PCA using the SNP data from all 21 populations. Similar to our phenotypic results, we found that the major axis of genetic variation (PC1) represents a continuum of oceanic to freshwater genotypes, and also separates freshwater populations from the three islands (Fig. 3 and *SI Appendix*, Fig. S5). The optimum number of clusters (*K*) in the STRUCTURE analysis was 2, representing oceanic (dark gray) and freshwater (light gray) genotypes. Posterior probability of assignment to the oceanic genotype decreases, and probability of assignment to the freshwater genotype correspondingly increases, as populations increase in PC1 score.

Post-1964 Populations Were Not Derived from Preexisting Freshwater Populations. Historical maps and aerial photos show that no freshwater habitat existed before the 1964 earthquake on Danger Island. However, Middleton Island and the study area of Montague Island had preexisting freshwater sites. On Montague, extensive sampling of the only nearby site (Stump Lake), which is in a separate watershed and approximately 1 overland kilometer from the post-1964 sites on the eastern side of the island, yielded no fish of any species. Additional pre-1964 freshwater sites in more distant watersheds on Montague were at least 2 km from the uplift ponds. On Middleton, stickleback were found in only one of the two preexisting ponds, Mi12 (Fig. 1), which rests on an upper terrace that formed ∼2,400 y ago (2). Stickleback from this site were well separated from the remaining sites in the study system along PC2 (*SI Appendix*, Figs. S5 and S6), formed a clearly unique genotypic cluster in STRUCTURE (Fig. 4), and were the most differentiated freshwater population on all three islands (Fig. 5 and *SI Appendix*, Fig. S7 and Table S10). Site 12 is therefore unlikely to have founded the other freshwater populations on Middleton.

One hypothesis for the origin of freshwater stickleback in Mi12 is that they were unintentionally introduced during stocking of trout into this lake in the mid-20th century. The stocked trout originated from a hatchery on mainland Upper Fire Lake north of Anchorage, Alaska. STRUCTURE analyses show that Mi12 and Upper Fire Lake (UFL) represent distinct genotypic clusters with different allele frequencies (*SI Appendix*, Fig. S8), and the two sites are also highly divergent ($F_{ST} = 0.164$; *SI Appendix*, Tables S10 and S11). Taken together, these results offer no support for the hypothesis of introductions from UFL and instead argue for an older colonization event for Mi12 with a

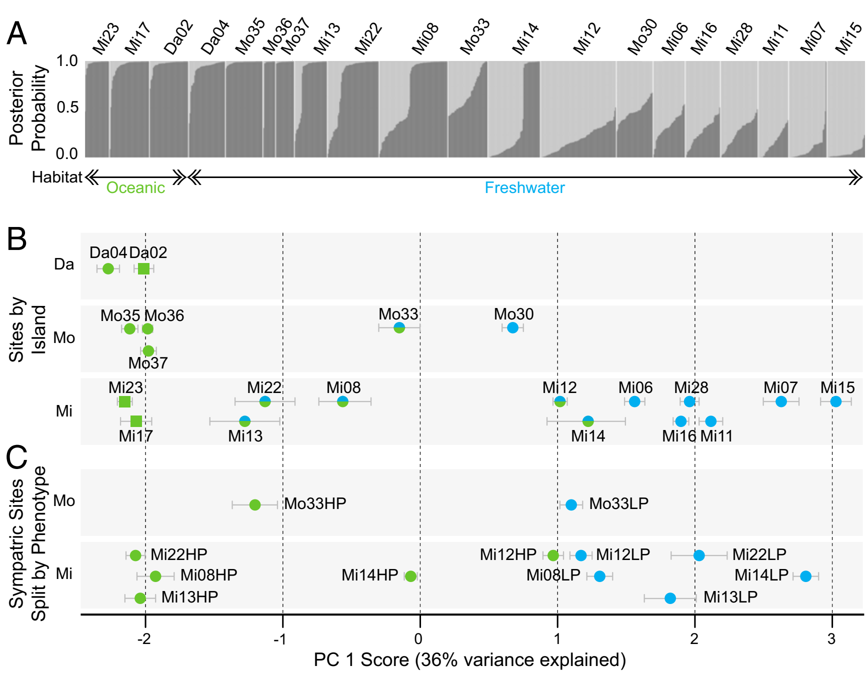

Fig. 3. The major axis of genetic variation is a continuum of oceanic to freshwater genotypes. (*A*) STRUCTURE analysis of the entire dataset reveals an optimum *K* of 2, representing oceanic (dark gray) and freshwater (light gray) genotypes. (*B*) Distribution of mean principal component (PC) 1 scores for each of 20 populations ± 1 SE. PC1 accounts for 36% of the overall genetic variation. As populations increase in PC1 score, their posterior probabilities of assignment to the freshwater genotypic cluster in the STRUCTURE analysis also increase. (*C*) Populations plotted by PC1 scores as in *B*, but with those populations that house different plate morphs split by that criterion; high/partially plated groups are in green and low plated in blue.

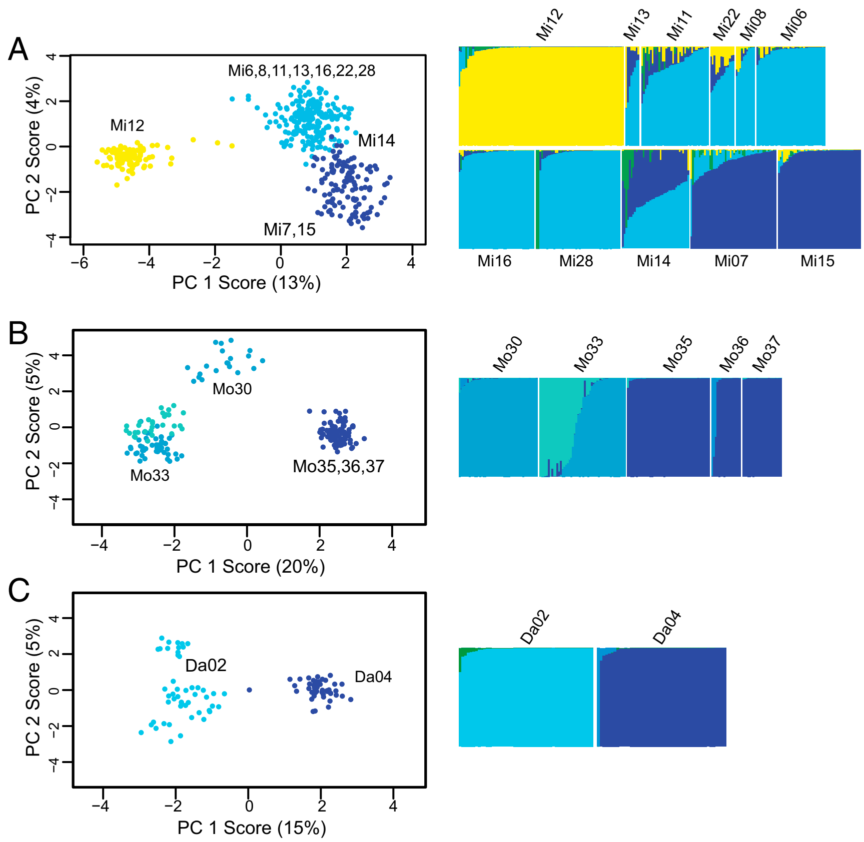

Fig. 4. Uplift island populations form multiple distinct genotypic groupings. Plots of posterior probabilities of assignment of each individual into clusters based upon the results of a STRUCTURE analysis and corresponding PCAs color-coded by *K*-means clustering assignment; reuse of colors in these three separate STRUCTURE analyses does not signify the same genotypic groupings. Percentages represent the amount of genetic variation explained by each PC. (*A*) Post-1964 freshwater populations from Middleton Island separate into clusters representing sites 7, 14, and 15, and sites 6, 8, 11, 13, 14, 16, 22, and 28. From sites 8, 13, 14, and 22, only individuals with freshwater phenotypes (low lateral plate counts) were included. Site 12, the pre-1964 population, forms a unique genotypic cluster. (*B*) Montague sites separate into two major clusters that distinguish sites from watersheds in the southeast (35–37) and southwest (30, 33). Site 33 contains two genotypic clusters. (*C*) The freshwater (Da04) and oceanic (Da02) sites from Danger also form separate clusters.

subsequent evolutionary history independent of other sites on Middleton.

Independent Evolution Occurred Quickly Among Islands and Among Regions Within Middleton and Montague Islands. Using an AMOVA (56) framework, we found that, across all populations, most of the genetic variation (~74%) was partitioned among individuals, whereas 15% of the genetic variation was attributed to differences among sites within islands (*SI Appendix*, Table S9). Despite their having distinct phenotypic differences, we found that only 5% of the genetic variation was partitioned between oceanic and freshwater habitats, but 18% of the variation was partitioned among populations within habitat types (freshwater or oceanic). Because the PCA and STRUCTURE results (Fig. 3 and *SI Appendix*, Tables S10–S12) support low levels of genetic divergence among oceanic populations, this partitioning of genetic variation must be due to differences among freshwater sites and is consistent with independent draws of genetic variation from a common oceanic ancestor during separate originations of these freshwater populations. Furthermore, STRUCTURE, *K*-means clustering, PCA, pairwise F_{ST}, and phylogenetic analysis of populations (Figs. 3–5 and *SI Appendix*, Figs. S5 and S7 and Table S13) all consistently support the presence of three distinct clusters of freshwater populations on Middleton Island. One group (designated FW1) contains sites Mi07 and Mi15. A second (FW2) consists of sites Mi06, Mi11, Mi16, and Mi28, as well as freshwater phenotype individuals from sites Mi08, Mi13, and Mi22. Mi14 harbors a mix of freshwater individuals from FW1 and FW2. A third freshwater grouping is the pre-1964 population, Mi12 (*SI Appendix*, Table S14). Within Middleton Island, 9% of the variation among sites is attributed to these different regions, whereas individuals within sites, and sites within regions, each account for 5–6% of the variation (*SI Appendix*, Table S9). F_{ST} comparisons among populations within FW1 and FW2 range from 0.002 to 0.047, whereas those between pairs of populations among FW1, FW2, and Mi12 range from 0.015 to 0.198 (*SI Appendix*, Table S10).

Similar to the results on Middleton, STRUCTURE, *K*-means clustering, phylogenetic clustering, F_{ST} comparisons, and PCA on Montague Island (Mo) support differentiation between the southeast (Mo35, Mo36, and Mo37) and the southwest (Mo30 and Mo33) (Figs. 3–5 and *SI Appendix*, Fig. S4 and Table S15). These two derived groupings are designated MoSE and MoSW, respectively. The two populations that comprise MoSW are further separated from each other in STRUCTURE and *K*-means analyses (Fig. 4). Within MoSW, Mo33 consists of two genotypic clusters that roughly correspond with lateral plate morphs, but there are also individuals with intermediate numbers of lateral plates. STRUCTURE and comparisons of mean genetic PC scores suggest that this is a more admixed population than in sympatric sites on Middleton Island (Mi08, Mi13, Mi14, and Mi22; Fig. 3). That Mo33 is a population in which oceanic and freshwater fish have hybridized is also supported by the distinction of its members from the oceanic genotype (*SI Appendix*, Fig. S8) and by

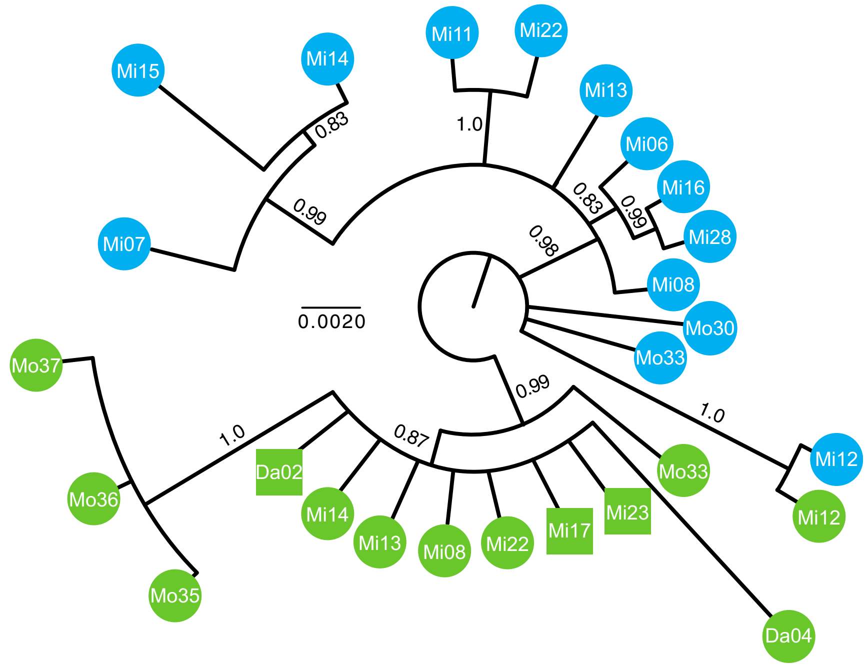

Fig. 5. A neighbor-joining tree illustrates the relationships of the populations. The tree was assembled in POPTREE (95) using 1,000 random loci. Bootstrap values were calculated based on 500 replicates. Circles and squares distinguish freshwater and saltwater environments, with polymorphic (Mi12) and sympatric populations divided according to phenotype: high/partially plated (green) and low plated (blue). Shown are nodes with support greater than 0.75.

the comparison of lateral plate number and genetic PC 1 score (*SI Appendix*, Fig. S10); we see more individuals with intermediate phenotypes and genotypes here than among Middleton sympatric populations. Assignment to either MoSE or MoSW accounts for 17% of the variation among populations on Montague Island, whereas individuals within sites, and sites within MoSE and MoSW, account for ~3% and 5% of the variation, respectively. The remaining 75% of the variation is at the individual level (*SI Appendix*, Table S9). Pairwise F_{ST} between populations within MoSE and MoSW ranges from 0.003 to 0.030, whereas F_{ST} between pairs of populations chosen from MoSE and MoSW ranges from 0.037 to 0.125 (*SI Appendix*, Table S10).

The fine-scale population structure within Montague and Middleton Islands suggests that there were at least five independent colonizations (Mi12, MiFW1, MiFW2, MoSE, and MoSW) by oceanic ancestors on these two islands. The presence in a freshwater habitat [Danger Island population 4 (Da04)] of oceanic-looking fish that form a genotypic cluster distinct from nearby oceanic stickleback at Danger Island (Fig. 4 and *SI Appendix*, Table S16) argues that independent colonization of newly opened habitats continues to occur.

Methods that assign individuals by probability to genetic groupings (e.g., STRUCTURE) are most appropriate for studies of very recently derived populations, or populations that are continuing to experience gene flow. Although phylogenetic approaches that assume a bifurcating relationship among lineages are not strictly appropriate for analyses of populations with these characteristics (32, 57), using allele frequency variation to reconstruct well-supported nodes of a population-level phylogenetic tree can be informative (Fig. 5 and *SI Appendix*, Fig. S7). Broad topology of the inferred population phylogeny clearly supports the conclusions (presented above) of repeated evolution among and within islands. As expected under recent, independent derivation of freshwater populations from oceanic ancestors, the base of the tree is an unresolved polytomy of clades that includes oceanic and freshwater lineages (Fig. 5). Importantly, the tree provides no more evidence for the pre-1964 population (Mi12) as the sister group to the other Middleton freshwater populations than it does for any of the other clades at the tree's base, including those found on distant Montague Island. The observed well-supported clade of low-plated fish on Middleton (excluding Mi12) might arise in a scenario of independent colonization; reuse of standing genetic variation from local marine populations could create a signal of cohesion among the young freshwater adapted lineages even when some populations arose independently from the sea.

Incongruent Phenotypic and Genetic Variation Indicates Recurring Introgressive Hybridization. Five of the populations genotyped on Middleton Island contained fish with oceanic characteristics as well as fish with typical freshwater phenotypes (Fig. 1). Such ponds could house populations segregating phenotypes as polymorphisms or could be regions of secondary contact between two genetically differentiated populations. In one of these ponds (pre-1964 Mi12), fish segregate a polymorphism in lateral plate number but form a united genetic group. In the four other sites, however, STRUCTURE analyses reveal both oceanic and freshwater genotypes (Mi08, Mi13, Mi14, and Mi22; Figs. 3 and 4), supporting the hypothesis of secondary contact of distinct populations. As expected, in these populations, the genetic divergence between oceanic and freshwater ecotypes is highly correlated with plate variation (*SI Appendix*, Figs. S9 and S10), and a significant relationship exists between the genetic PC1 scores and plate number ($r^2 = 0.54$, $t = -33.61$, $P < 0.001$). Two main clusters of points comprise individuals with concordant freshwater or oceanic phenotypes and genotypes (*SI Appendix*, Figs. S9 and S10). Individuals in freshwater habitats with discordant phenotypes and genotypes may be products of introgressive hybridization. Further advocating for introgression is that, out of the 132 individuals surveyed from oceanic habitats on Danger (Da02) and Middleton Islands (Mi17 and Mi23), one individual had a freshwater genotype and another had a freshwater phenotype (*SI Appendix*, Fig. S11). These data lend further credence to gene flow from derived freshwater populations back into oceanic populations.

Discussion

Patterns of Genetic Differentiation Support Independent Evolution After the Earthquake. Stickleback on three seismically uplifted islands harbor extensive genetic variation that is partitioned primarily among individuals. A significant amount of the remaining genetic variation, however, is also partitioned among fish with divergent lateral plate phenotypes in oceanic and freshwater habitats, as well as among those with freshwater phenotypes from freshwater sites (*SI Appendix*, Table S9). Genetic divergence between oceanic and freshwater ecotypes has previously been documented across the stickleback holarctic distribution (41) and among populations in close proximity within Alaska (40). The overall divergence (as measured by F_{ST}) that we find here, however, is lower for several freshwater–oceanic pairs than has been documented previously and is consistent with much more recent freshwater colonization from an oceanic ancestor (Fig. 6). In addition, genetic diversity is not much lower in freshwater habitats than in marine, indicating that either the initial colonizing populations were large or (more likely) that recurrent gene flow has transpired between oceanic and freshwater stickleback since the time the populations were founded (*SI Appendix*, Table S8). Overall, the pattern of partitioning of genetic variation among populations supports independent draws of genetic variation from a common oceanic ancestor during the origin of freshwater populations, with subsequent gene flow from nearby oceanic stickleback.

Our deep population genomic data clearly support a recent oceanic origin and subsequent adaptive differentiation of resident freshwater stickleback in post-1964 ponds on all three islands. Intraisland genetic variation also partitions freshwater sites from Middleton and Montague into three and two groups, respectively (Mi12, MiFW1, MiFW2, and MoSE, MoSW) that are geographically distinct but, in the case of Middleton Island, closely neighboring. A possibility existed that the pre-1964 population on Middleton Island (Mi12) was the progenitor of the younger freshwater populations on the island. Our data do not support this hypothesis. Rather, the high genetic divergence between oceanic populations and Mi12 ($F_{ST} \sim 0.16$; *SI Appendix*, Table S10) is consistent with its founding at the time the terrace was formed by an older uplift event, ~2,400 y ago (2). Similarly, the two genetic groupings on Montague are found on opposite sides of the island (Fig. 1) and are separated by a mountain range, which likely prevents gene flow between them. However, gene flow may occur within watersheds, particularly the southeast watershed (Fig. 4 and *SI Appendix*, Table S15). STRUCTURE analysis also revealed two genotypes in Mo33 (Fig. 4 and *SI Appendix*, Table S15); the continuous range of posterior probabilities of genetic assignment among individuals there argues for secondary contact occurring soon after colonization, subsequent generations of hybridization, and no recent influx of oceanic fish.

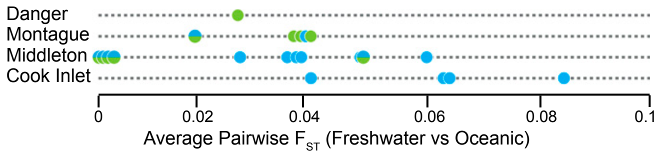

Fig. 6. Post-1964 populations have diverged phenotypically from marine ancestors nearly as much as have older, postglacial freshwater populations. Comparison of pairwise F_{ST} between freshwater and oceanic populations from Cook Inlet (mainland) and uplifted islands demonstrates that within just a few decades freshwater populations can show freshwater–marine divergence comparable to mainland populations that were likely founded thousands of years ago. Cook Inlet data from Hohenlohe et al. (40). Each of the 24 sites is color-coded by the dominant lateral plate phenotype (high/partially plated in green; low plated in blue).

Overall, our findings support the hypothesis of at least six independent colonization events by oceanic ancestors across the three islands. Because we examined a subset of freshwater habitats on only three of the many islands and coastal regions throughout Prince William Sound and the Gulf of Alaska impacted by uplift, this is likely to be a significant underestimate of the number of times that freshwater stickleback have evolved independently in the last 50 y throughout this region. Furthermore, our results demonstrate a range of populations along the oceanic to freshwater phenotypic and genomic continuum, from Da04, which closely resembles oceanic populations, to Mi07 and Mi15, which appear to have the most extreme freshwater phenotypes and genotypes (Fig. 3 and *SI Appendix*, Figs. S5, S9, and S10). This spectrum likely reflects colonization and hybridization history. Da04 could be a more recently founded population that experiences regular gene flow with oceanic stickleback, whereas Mi07 and Mi15 could have been founded earlier and remained isolated.

Phenotypic Differentiation Supports a Role for Strong Divergent Selection. Despite being founded less than 50 y ago, freshwater stickleback populations on Middleton Island are differentiated from oceanic fish across multiple morphological features. As expected, variation in lateral plate count is a major driver of the phenotypic divergence we measured. However, even when lateral plate number is removed from the PCA, traits involved in foraging, defense, and swimming also distinguish the two ecotypes (*SI Appendix*, Table S5). Many of these traits have a known genetic basis (35–37, 58, 59), with quantitative trait loci mapping to many different linkage groups (35, 36, 39, 58–62), strongly supporting that the phenotypic divergence we observe on Middleton Island is due primarily to evolution rather than phenotypic plasticity.

Even in freshwater habitats where oceanic and freshwater ecotypes are sympatric, they are phenotypically divergent to nearly the same extent as allopatric ecotypes (Fig. 2 and *SI Appendix*, Figs. S3 and S4). Given the topography of Middleton Island and the locations of the newly formed freshwater habitats, secondary contact between oceanic and freshwater fish is the most probable cause of this sympatric co-occurrence. This scenario has likely been repeated over many years and creates the potential for gene flow that would inhibit phenotypic divergence simply by drift (30, 63–66). The clearly discontinuous trait distributions between ecotypes are therefore most likely due to strong divergent selection on the phenotypes in the alternative oceanic and freshwater habitats, in agreement with other studies of selection in artificially seeded stickleback populations (38, 50, 67–69). The strength of selection (s) on the region containing *Eda*—the locus associated with lateral plate loss (35, 36, 70)—in oceanic stickleback transplanted to artificial freshwater ponds was found to be 0.52 (47, 69, 71). Even selection coefficients an order of magnitude smaller on other traits would maintain adaptive phenotypic differentiation in the face of all but the highest levels of gene flow.

Most Stickleback Evolution May Occur in the First Decades After Colonization. The postglacial adaptive radiation of threespine stickleback in Cook Inlet is a well-described model of rapid evolution for which there is ample evidence of phenotypic and genetic divergence between ecotypes likely occurring over thousands of years (35, 40, 60, 72). However, the independent colonization of newly available freshwater habitat by oceanic ancestors on Middleton, Montague, and Danger Islands has occurred on a timescale that is orders of magnitude shorter. Although life history traits vary among stickleback populations, 50 y likely represents only 25 to a maximum of 50 generations (73). Remarkably, phenotypic divergence of freshwater fish on Middleton Island is nearly the same amount as freshwater stickleback from mainland Alaska populations that were probably founded about 13,000 y ago (35) (Fig. 5), despite the overall genetic divergence being lower in the much younger Middleton populations. Our results demonstrate that evolution can occur in this species on contemporary timescales, and present the tantalizing hypothesis that much of the previously documented postglacial divergence of freshwater stickleback populations that has been inferred to have occurred over thousands of years (40, 74) actually occurred during the first few generations following colonization.

Although phenotypic differentiation in decades is a very rapid rate that is not often observed in nature (reviewed by refs. 6 and 75), it has previously been documented in threespine stickleback (e.g., refs. 49, 50, 52, 76, and 77) as well as other fish species. In addition, ancestral and derived populations of mosquitofish (*Gambusia affinis*) diverged in several life history traits in less than 60 y (78). Similarly, Pacific salmon (*Oncorhynchus* spp.) adapted to different breeding environments and developed partial reproductive isolation over a period of 13–26 generations (79). Parallel life history evolution has also been observed in the guppy (*Poecilia reticulata*) in only about a decade as a result of changes in predation pressure (3). Here, for the first time (to our knowledge), we document the fine-scale population genetic patterns associated with similarly rapid phenotypic evolution of stickleback after colonization of new habitats of known age in the wild.

Introgressive Hybridization Maintains the Pool of Standing Genetic Variation. The possibility for recurrent gene flow between fish in different habitats persists. Our data document that oceanic fish are still entering freshwater ponds to breed or are becoming trapped after high tides or storm surges, as has been observed in other regions of southcentral Alaska (e.g., ref. 76). Although most fish selected for genotyping from freshwater sites containing both ecotypes were morphologically freshwater or oceanic, a few were intermediate in phenotype, and STRUCTURE results indicated a degree of hybridization in these ponds (Figs. 3 and 4). These results suggest that at least some individuals are likely early-generation hybrids between the differentiated oceanic and freshwater ecotypes. Thus, despite the phenotypic diversification in the two habitats, gene flow in sympatry may decrease divergence in neutral genomic regions. Our data also clearly support the "transporter hypothesis" (80) that standing genetic variation in stickleback is maintained by low levels of recurrent hybridization between freshwater and oceanic stickleback.

The constituent genetic loci of traits under differential selection between oceanic and freshwater habitats map to different linkage groups (62), suggesting that numerous regions need to be reassembled. However, linkage disequilibrium created and maintained by strong selection in each habitat (81), perhaps abetted by structural variation in the stickleback genome (43, 81, 82), may significantly reduce the number of independent regions that need to be "transported" and rapidly reintegrated. Supporting this hypothesis is our finding that parallel evolution in this species happens not only on the scale of different continents or dispersed geographic regions as has been amply documented (41, 55, 81, 83), but also on smaller spatial scales as nearby islands or even geographically proximate ponds on the same island. These data argue that rapid parallel evolution over decades in stickleback may occur frequently because it is underlain by a pliant genomic architecture that is itself the product of millions of years of evolution [sensu (84)]. If the findings from stickleback are generalizable to other systems, then rapid evolution in the wild may be more common than previously documented.

Materials and Methods

Site Selection. By comparing pre- and post-1964 maps and aerial imagery (Aerometrics, US Geological Survey, Bureau of Land Management) of islands in Prince William Sound and the Gulf of Alaska, we identified ponds that now lie on terrain that had been submarine before the 1964 Great Alaska Earthquake. Multiple water bodies fitting this criterion were found on Montague and Danger Islands, in Prince William Sound, and on Middleton Island, in the Gulf of Alaska (Fig. 1 and *SI Appendix*, Table S1). Middleton Island has only a single pre-1964 pond (Mi12) that rests on an upper terrace formed ∼2,400 y ago (2). Mi12 was stocked with rainbow trout from the Upper Fire Lake (UFL) hatchery (Eagle River, AK) in the 1960s. Therefore, stickleback samples from UFL are also included in our analysis.

Field Collections. Collections were made in the summers of 2005 (Montague and Middleton), 2010 (Danger and Middleton), and 2011 (Middleton, Montague, and UFL). Threespine stickleback were collected using 0.32- and 0.64-cm mesh minnow traps set near shore and left overnight, killed with an overdose of MS-222 anesthetic, and preserved in 95% ethanol. Salinity was measured at each site by YSI-80 meter and ranged from 0.1 to 1.4 ppt for freshwater sites and 21.4–26.4 ppt for oceanic sites. We used samples from 1 oceanic and 1 post-1964 freshwater site on Danger Island, 5 post-1964 freshwater sites on Montague Island, and 2 oceanic sites, 12 post-1964 freshwater sites, and 1 pre-1964 freshwater site on Middleton Island (Fig. 1 and *SI Appendix*, Table S1).

Sample Preparation. Caudal and pectoral fins were clipped for DNA extraction using the Qiagen DNeasy kit. DNA and soma were assigned a unique identification number for association of genotype with phenotype. Bodies were fixed in 10 mg paraformaldehyde in 100 mL 1× PBS for at least 48 h, bleached in a 0.05% hydrogen peroxide solution, stained in a 0.1% Alizarin red S solution, destained in 1% KOH, and preserved in 700 mL/L (70%) undenatured ethanol.

Phenotypic Analysis. Left sides of stained fish were photographed using a tripod-mounted Canon digital SLR camera and Canon EOS ViewerUtility software. For consistency, one observer counted lateral plates from photographs, and individuals were grouped into one of the following categories: high plated (complete row of anterior, supporting, and posterior plates), partially plated (gap in posterior plates), or low plated (only anterior and/or supporting plates present).

For individuals from six sites on Middleton Island (*SI Appendix*, Table S2), fish longer than 32-mm standard length (SL) (anterior tip of upper jaw to posterior end of hypural plate) were analyzed for morphology such that only adult phenotypes were included (70). The lengths of the left pelvic spine and second dorsal spine were measured using digital calipers and the number of gill rakers on the first right arch were counted under a dissecting microscope from ≤30 fish per site. The following traits were measured digitally to the nearest 0.01 mm from photographs using tpsDig2, version 2.04, software: SL, snout length (anterior tip of upper jaw to closest margin of orbit), vertical orbit diameter, horizontal opercle width, length of pectoral fin insertion, length of the first lateral plate behind the second dorsal spine, distance between the insertion of the second and third dorsal spines, and length of the base of the dorsal fin (*SI Appendix*, Fig. S1 and Table S2). The numbers of principal anal, dorsal, and caudal fin rays were counted. Also recorded was the diagonal length of the smooth area anterior to the left pectoral fin, as a proxy for the size of the fin abductor muscle.

Phenotypic Statistical Analyses. Four of the sites we focused on for phenotypic analysis contained sympatric freshwater and oceanic individuals. Each individual was visually classified as being either oceanic or freshwater based on size, defensive armor, and swimming traits (52, 76). To verify the visual classification, *K*-means clustering was performed using five ecotype specific traits: SL, number of left lateral plates, and size-adjusted lengths of the left pelvic spine, second dorsal spine, and diagonal of the smooth surface anterior to the pectoral fin. Statistical analyses were concordant with prior visual classifications: only 1.2% of the individuals were categorized differently by the cluster analysis than by visual classification. For all subsequent statistical tests, the results of the visual classification were used to assign each fish to its category.

PCAs were used to uncover the major axes of phenotypic variation among 557 individuals from the six sites (*SI Appendix*, Tables S2–S5). Not all traits were reliably visible on all photos, and gill rakers were not counted on all individuals; to accommodate these missing morphological data, the ppca function in the pcamethods package (85) was used to perform probabilistic PCAs using the R statistical software platform (86). Because morphometric traits exhibit allometric growth patterns, we performed PCAs with size-standardized data. To size-standardize the data, we used a model I regression to test for a significant relationship between each morphometric trait and SL separately for each population. For those traits with significant regressions, the residuals were calculated and included in PCAs along with unstandardized data for meristic traits and morphometric traits that did not have significant size relationships.

Because PCs are by definition orthogonal, we analyzed each separately. Individual ANOVAs were performed on scores from each of the first three PCs, followed by Tukey post hoc tests, to determine whether populations and ecotypes significantly differed in morphology. For population-level analyses, oceanic-looking individuals from sympatric sites (SO; Mi08, Mi09, Mi13, and Mi19) were pooled due to small sample sizes and compared with each of five freshwater populations as well as oceanic individuals from the marine habitat.

RAD Library Preparation and Sequence Analysis. Genomic DNA from each of the 1,057 individuals from all three islands and UFL was digested with the restriction enzyme SbfI-HF (NEB), and RAD-seq libraries were created as previously reported (40, 53, 54). Uniquely barcoded samples representing 76–96 individuals were run per lane in 12 total lanes of sequencing on an Illumina HiSeq 2500 platform, and on average, each lane resulted in ∼157 million SE sequences, of which about 113 million were retained (72%). The 101-nt-long reads included 6-nt in-line barcodes to identify individual fish. Raw sequence data were demultiplexed by barcode and filtered for quality using the process_radtags program in the Stacks software suite (87, 88). Reads were aligned against the stickleback reference genome (version BROADs1, Ensembl release 64) using GSnap (89), allowing for up to five mismatches and gaps of length 2, disabling terminal alignments, and requiring unique alignments. The alignments were processed and genotypes were called for each locus across all samples using the pstacks, cstacks, and sstacks programs from *Stacks*. For a locus to be included in further analyses, we required that it be present in all populations and successfully genotyped in at least 75% of individuals from each population. See *SI Appendix*, Tables S6 and S7, for tallies of raw and retained reads.

Statistical Approach. Population genetic statistics (major allele frequency, percent polymorphic loci, and Wright's F statistics F_{IS} and F_{ST}) were calculated for every SNP using the populations program in *Stacks* (87, 88). For biallelic SNP markers, π is a measure of expected heterozygosity, which is an overall indication of a population's genetic diversity. F_{IS} measures the reduction in observed heterozygosity compared with that which is expected for a locus in a population and can indicate nonrandom mating or cryptic population structure (90, 91).

To analyze population structure, we used the populations program in *Stacks* to output filtered SNP data from all RAD loci across all populations into a file formatted for STRUCTURE (92). Because of computational limitations, we randomly chose three subsets of 1,000 SNPs each to complete the analysis. These three subsets yielded comparable results, so data from only one subset are included. STRUCTURE analyses were performed on all sites together, as well as subsets of the data for fine-scale detection of population structure (Figs. 2 and 3 and *SI Appendix*, Fig. S2). For all analyses, 10,000 burn-in steps and 10,000 replicates were used, with 10 runs for each potential *K* (number of genotypic groups). The optimal *K* for each analysis was chosen using the deltaK method (93).

This same set of SNPs was used in GenoDive (94) to conduct *K*-means cluster analyses using the same ranges of *K* tested in STRUCTURE. We also tested a higher level of population structure using AMOVAs (56) that nested sites within islands, within habitat type (defined by oceanic versus freshwater), or within mean lateral plate morph (complete, partial, or low). We used PCA to identify the major axes of genetic variation. We analyzed phylogenetic relationships among our study populations by constructing neighbor-joining trees with 500 bootstrap iterations for three sets of 1,000 loci using POPTREE (95). These three datasets produced concordant trees, so we present results from only one. A phylogenetic tree was also created using Treemix (96).

Materials and Data Availability. Sampling locations are in Fig. 1 and *SI Appendix*, Table S1. Single-nucleotide polymorphism (SNP) data from the sequences generated for this study for the 3,000 loci used in these analyses have been deposited in Dryad (dx.doi.org/10.5061/dryad.pn85t).

Fish were collected under Alaska Department of Fish and Game Permits SF-2005-020, SF-2010-029, and SF-2011-153, and all research protocols with vertebrates were approved by the University of Alaska Anchorage and University of Oregon Institutional Animal Care and Use Committees.

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Supplemental Figures

Supplemental Figure 1. A suite of morphological and meristic traits associated with armor, feeding, and locomotion was analyzed in individuals from six sites on Middleton Island. (1) Standard length, (2) snout length, (3) orbit diameter, (4) opercle width, (5) diagonal length of pectoral fin abductor, (6) length of the pectoral fin insertion, (7) distance between second and third dorsal spines, (8) length of the dorsal fin insertion, (9) second dorsal spine length, (10) left pelvic spine length.

Supplemental Figure 2. Frequency distributions of left lateral plate number (A) and standard length (B) across 557 oceanic (light gray) and freshwater (black) individuals from six sites on Middleton Island.

Supplemental Figure 3. Ecotypes and populations significantly differ in mean principal component (PC) scores. A) and B) are boxplots of PC scores for ecotypes in the analyses including and excluding lateral plates. C) and D) are mean PC scores +/- 2 SE for populations in the analyses including and excluding lateral plates. Letters represent populations that significantly differ from each other based on Tukey's post hoc tests.

Supplemental Figure 4. Principal Components Analyses were used to describe the overall distribution of phenotypic variation in 557 individuals from seven populations on Middleton Island. Individuals are color-coded by site of origin. In the upper panels of A and B, each point represents an individual. In the lower panels, each point represents one of seven population means +/- 2 SE. Sites Mi06, Mi08, Mi09, Mi13, and Mi19 represent freshwater individuals. Site Mi23 comprises oceanic individuals from a marine site. SO=oceanic individuals from sympatric sites (Mi06, Mi08, Mi13, and Mi19). A) Principal components 1 and 2. B) Principal components 2 and 3.

Supplemental Figure 5. Principal Components Analyses showing mean principle component scores (+/- 2 SE) for each of twenty populations in the analysis of 1000 nuclear markers. Panel A represents all of the populations. Panels B, C, and D represent data from Middleton, Montague and Danger, respectively.

Supplemental Figure 6. Mean genetic PC2 scores for each of twenty populations +/- 1SE. PC2, which accounts for 16% of the overall variation, separates the pre-1964 site from Middleton (Mi12) from the remaining sites.

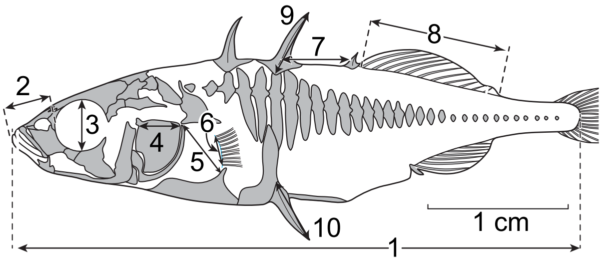
Supplemental Figure 7. A TreeMix (1) tree defines clades of predominantly low plated (blue) or completely plated (green) stickleback. The major clades of the tree agree with clusters identified by *STRUCTURE* and with the general topology of the NJ Tree (Fig. 5). The TreeMix analysis is based on 13,559 variant sites (SNPs) in the island populations, with polymorphic (Mi12) and sympatric populations divided according to phenotype (high/partial versus low plated). Data were exported with the populations program from Stacks using a minor allele frequency filter of 15%.

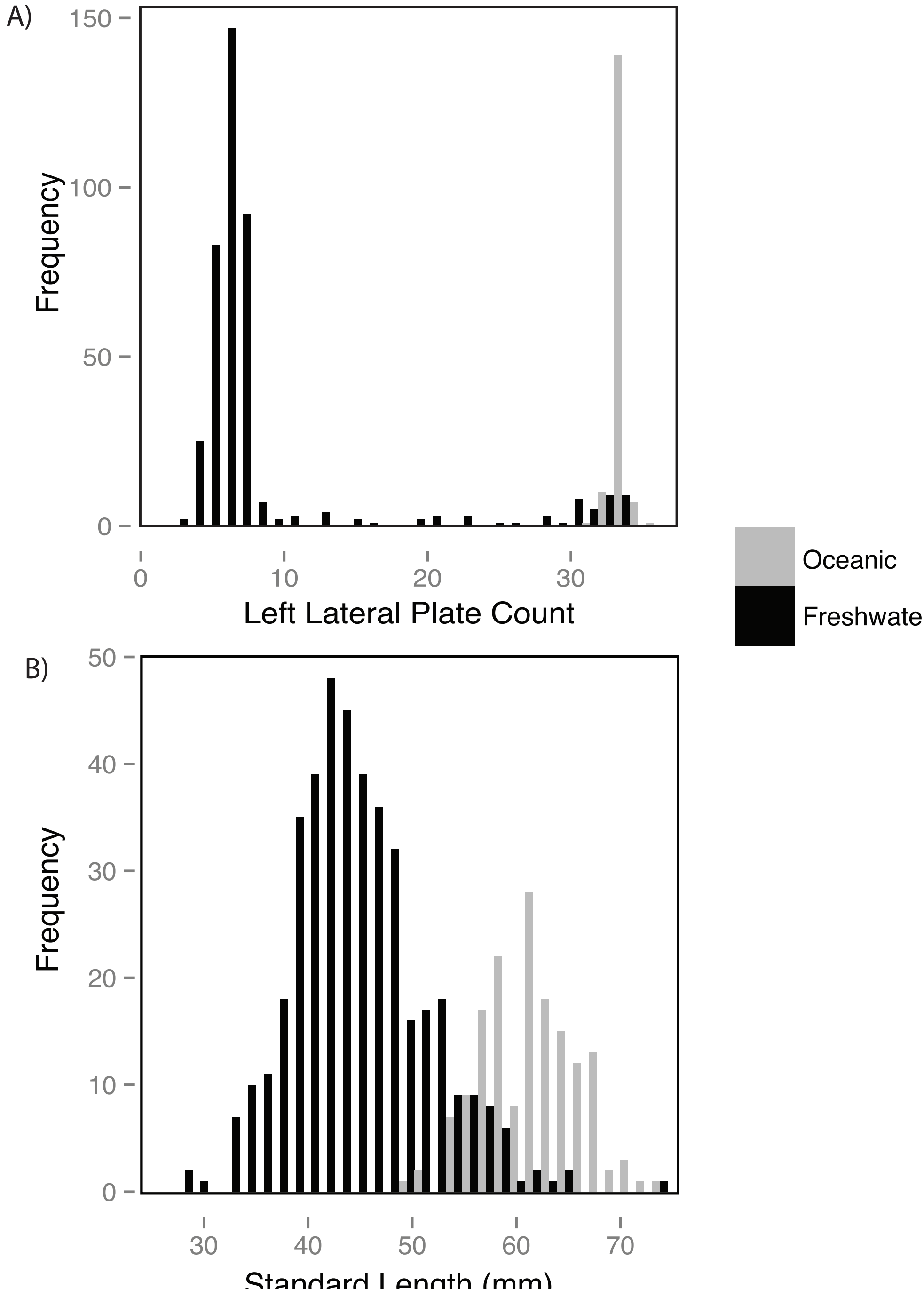
Supplemental Figure 8. Plots of posterior probabilities of group assignment of each individual into clusters based upon the results of a *STRUCTURE* analysis. A) The pre-1964 site on Middleton (Mi12) is genetically distinct from the potential founding population from the mainland (UFL). B) Adding an oceanic population (Mi23) to the Montague analysis results in a clear separation between oceanic and Montague individuals, supporting a hypothesis that, though Mo33 experienced secondary contact of ecotypes, it is now highly admixed and no longer contains any purely marine individuals.

Supplemental Figure 9. Bivariate distribution of lateral plate number and genetic PC1 score to demonstrate the significant correlation between these two variables. A) Mean lateral plate count for each of 20 sites +/- 1 SE. B) There is a significant relationship between PC1 score and lateral plate number. Each point represents one of 1,057 individuals. C) Illustrations of representatives of each quadrant in panel B. Upper left is an individual with oceanic phenotype and genotype. Upper right is an individual with a freshwater genotype and oceanic phenotype. Lower right is an individual with a freshwater genotype and phenotype. Lower left is an individual with an oceanic genotype and freshwater phenotype. D) Boxplot of residuals and illustrations of individuals representing the largest outliers.

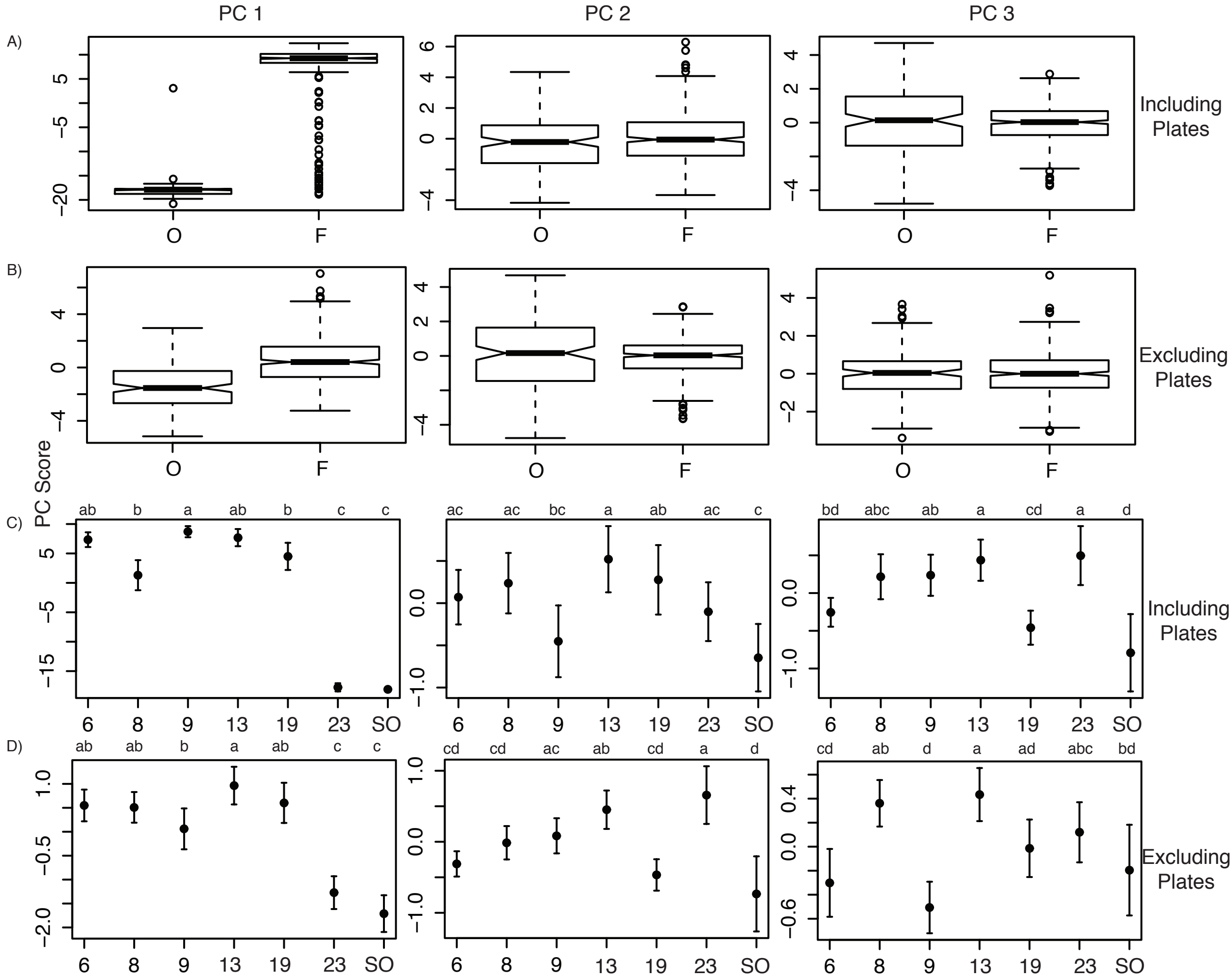
Supplemental Figure 10. Bivariate plot of genetic PC1 score versus lateral plate number as in Supplemental figure 9, but split by island of origin. Individuals from A) all sites B) Middleton, C) Montague, and D) Danger. Individuals are color-coded by population.

Supplemental Figure 11. Plot of lateral plate scores against genetic PC1 scores for individuals caught in oceanic sites on Danger (Da02) and Middleton (Mi13, Mi23) Islands. Panel A shows that most individuals have a concordant high lateral plate number and low (oceanic) genetic PC1 score. However, two individuals (denoted by arrows) are significant outliers. Panel B shows the frequency distribution of PC scores for further emphasis.


9
7
8
2
3
6
4
5
10
1 cm
1



A)
150
100
50
0
Frequency
0
10
20
30
Left Lateral Plate Count
Oceanic
Freshwater
B)
50
40
30
20
10
0
Frequency
30
40
50
60
70
Standard Length (mm)



PC 1
PC 2
PC 3
A)
B)
C)
D)
PC Score
Including Plates
Excluding Plates
O
F
6
8
9
13
19
23
SO
ab
b
a
ab
b
c
c
ac
ac
bc
a
ab
ac
c
bd
abc
ab
a
cd
a
d
ab
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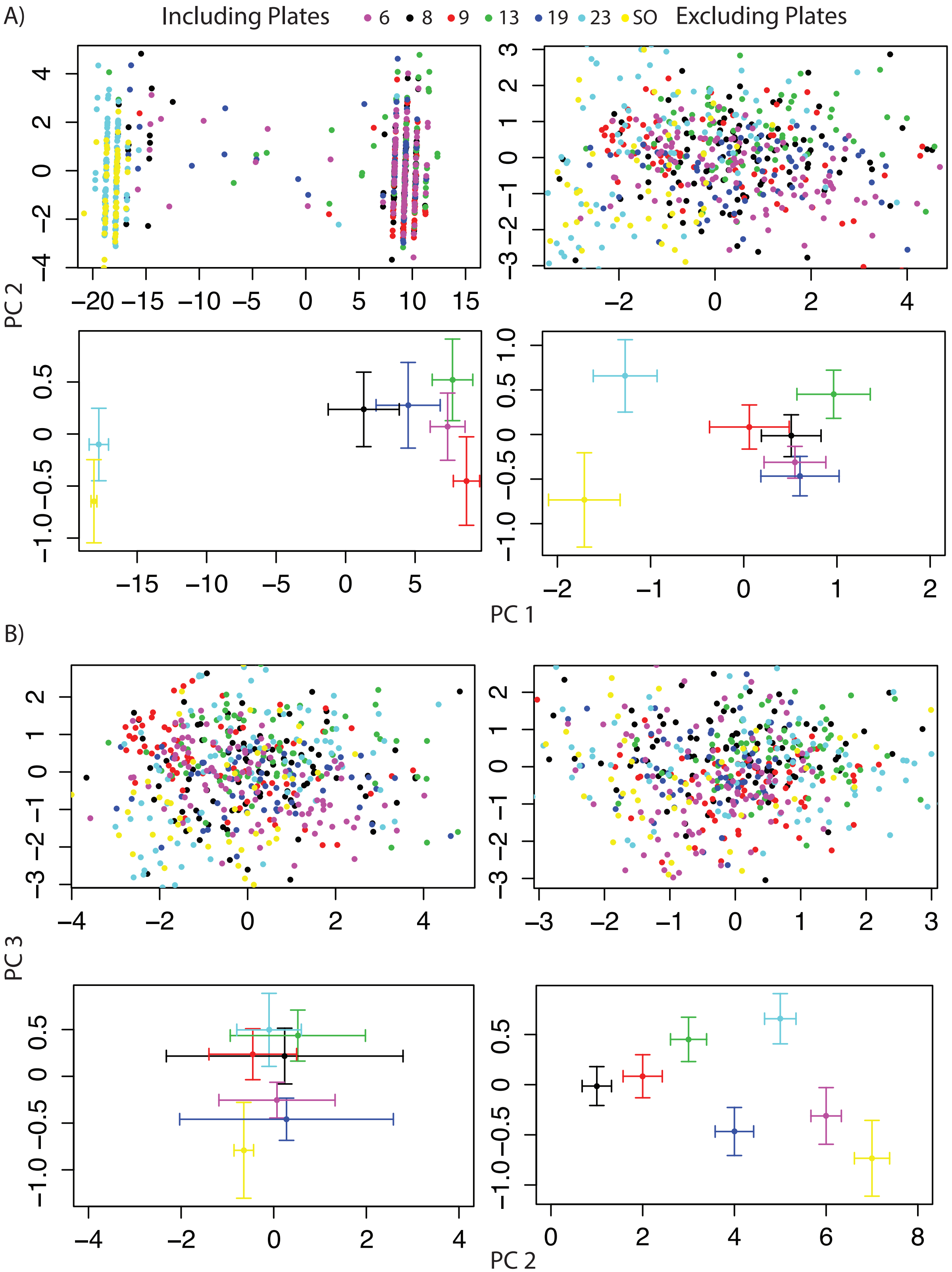
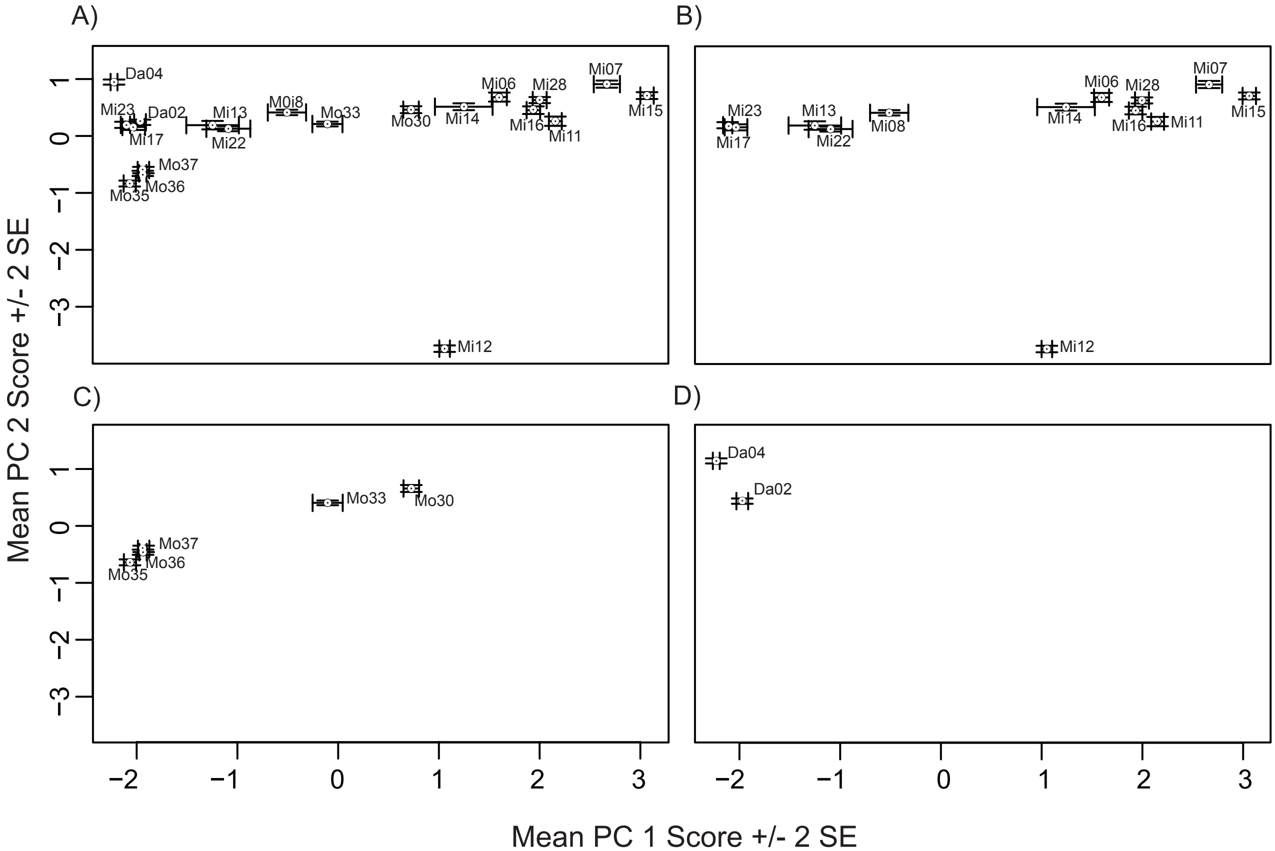
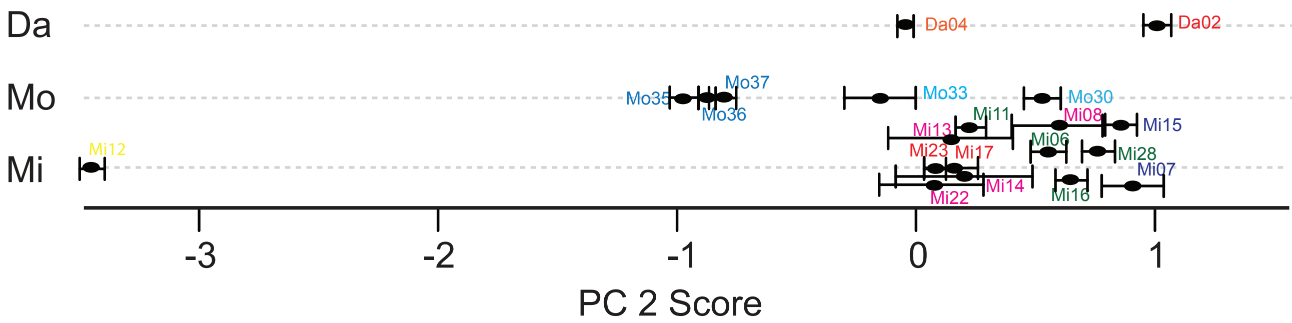
d
a
ad
abc
bd

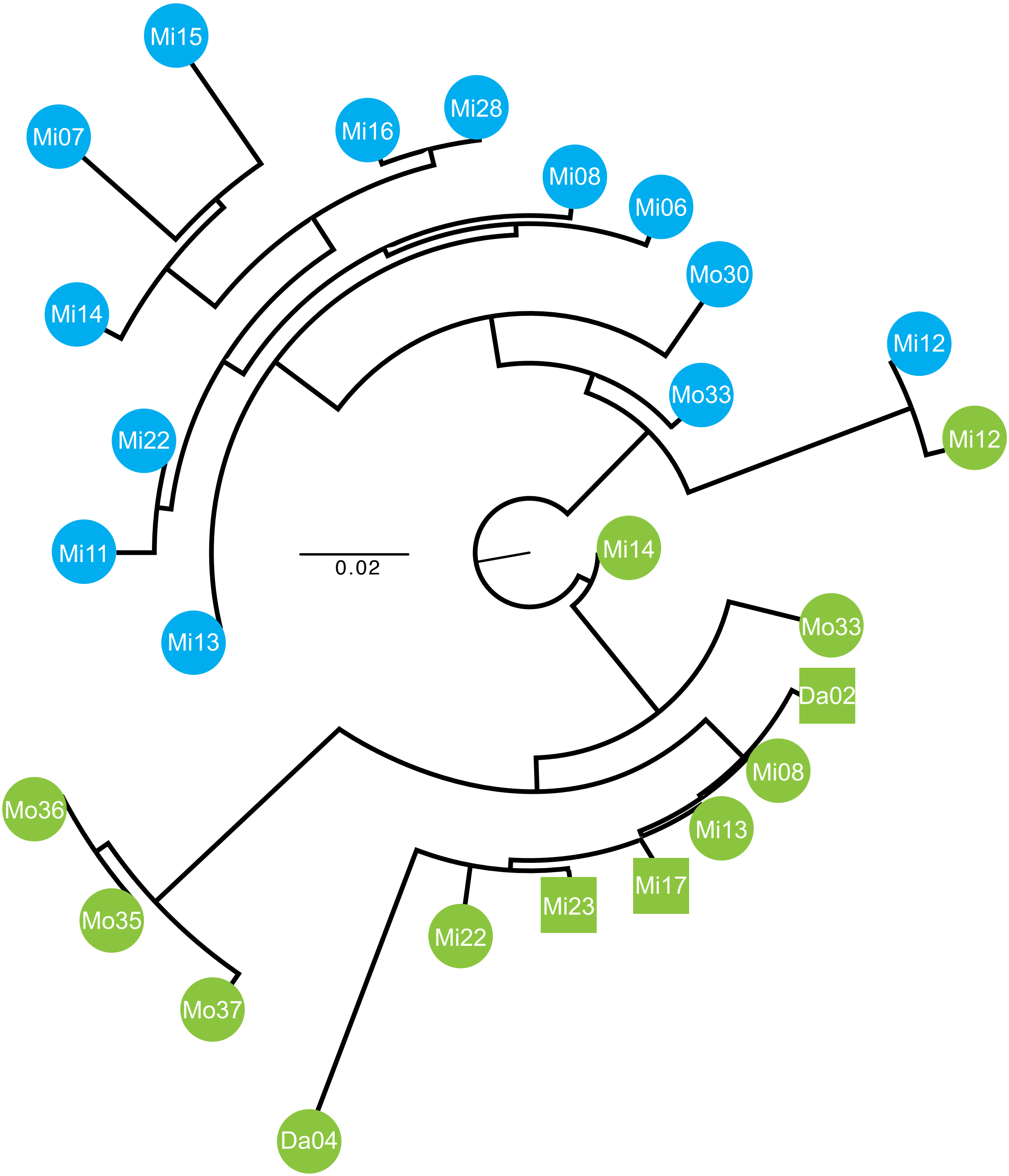

A)
Including Plates
6
8
9
13
19
23
SO
Excluding Plates
PC 2
PC 1
B)
PC 3
PC 2



A)
B)
C)
D)
Da04
Mi23
Da02
Mi17
Mi13
Mi22
M0i8
Mo33
Mo30
Mi14
Mi06
Mi28
Mi16
Mi11
Mi07
Mi15
Mo37
Mo36
Mo35
Mi12
Mi08
Mean PC 2 Score +/- 2 SE
Mean PC 1 Score +/- 2 SE



Da
Mo
Mi
Da04
Da02
Mo35
Mo37
Mo36
Mo33
Mo30
Mi11
Mi08
Mi15
Mi13
Mi06
Mi12
Mi23
Mi17
Mi28
Mi07
Mi14
Mi22
Mi16
-3
-2
-1
0
1
PC 2 Score


Mi15
Mi07
Mi16
Mi28
Mi08
Mi06
Mo30
Mi14
Mi12
Mo33
Mi12
Mi22
Mi11
Mi13
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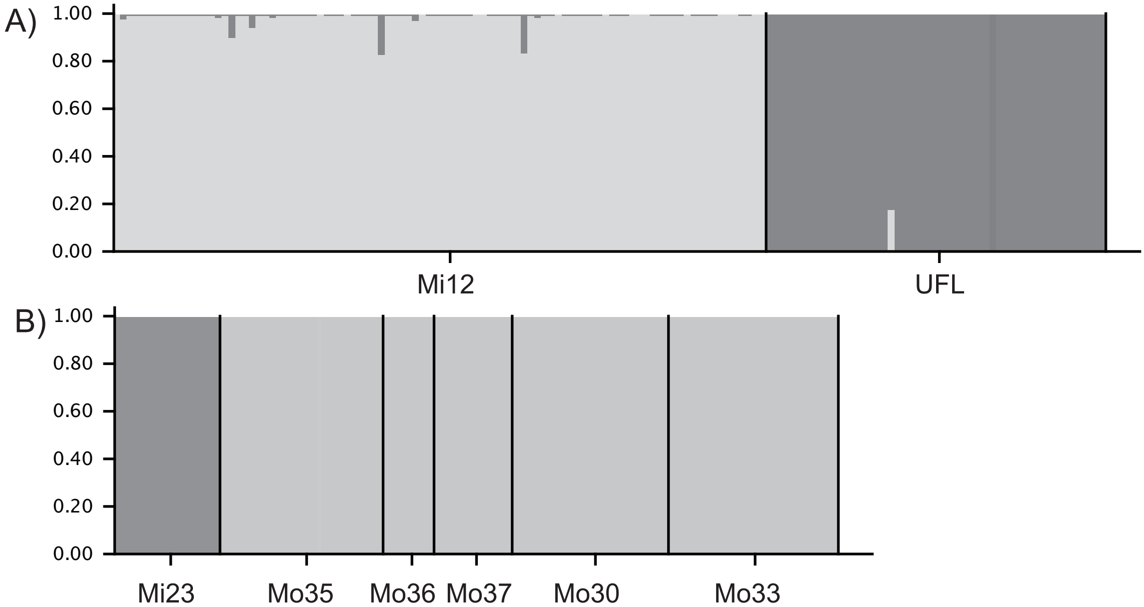
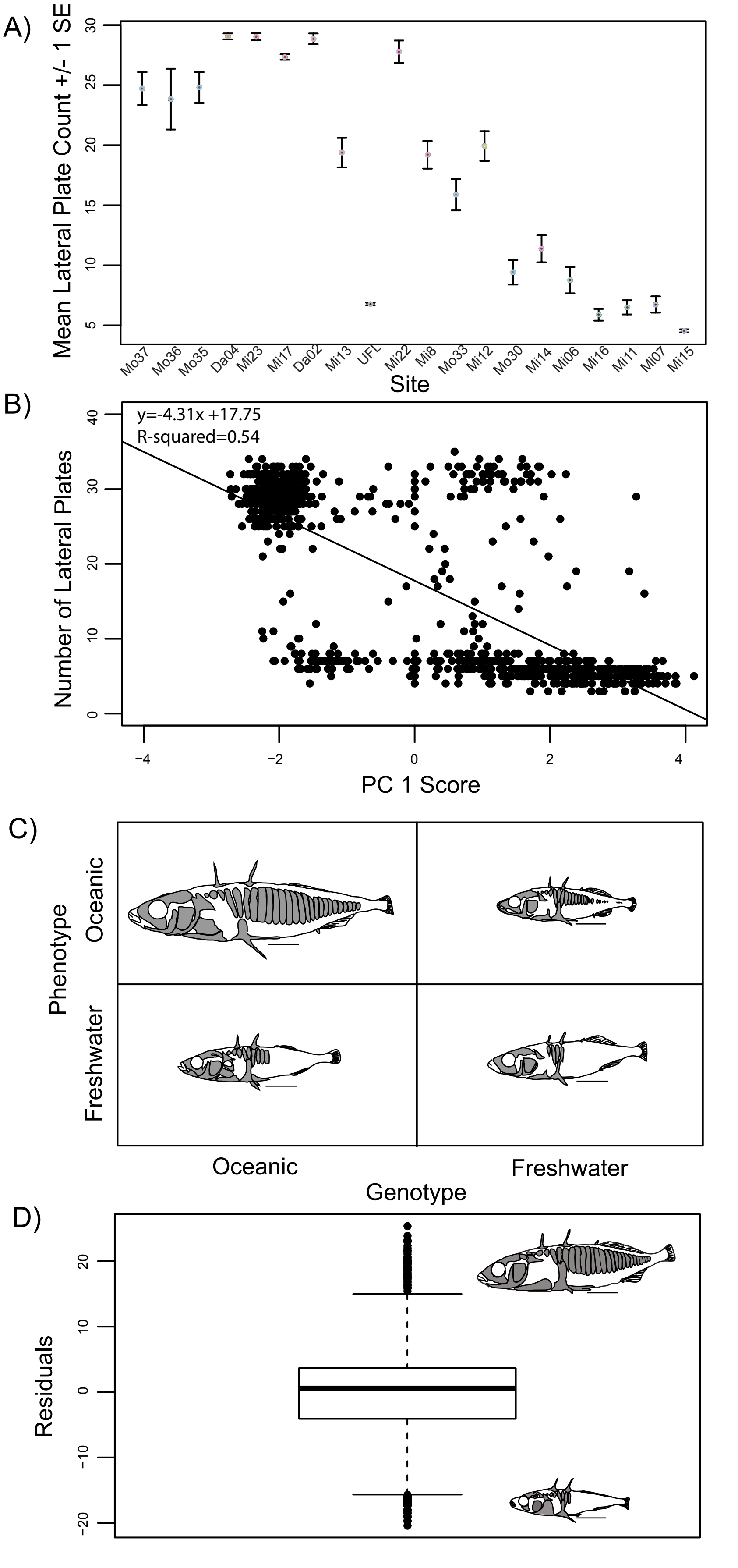
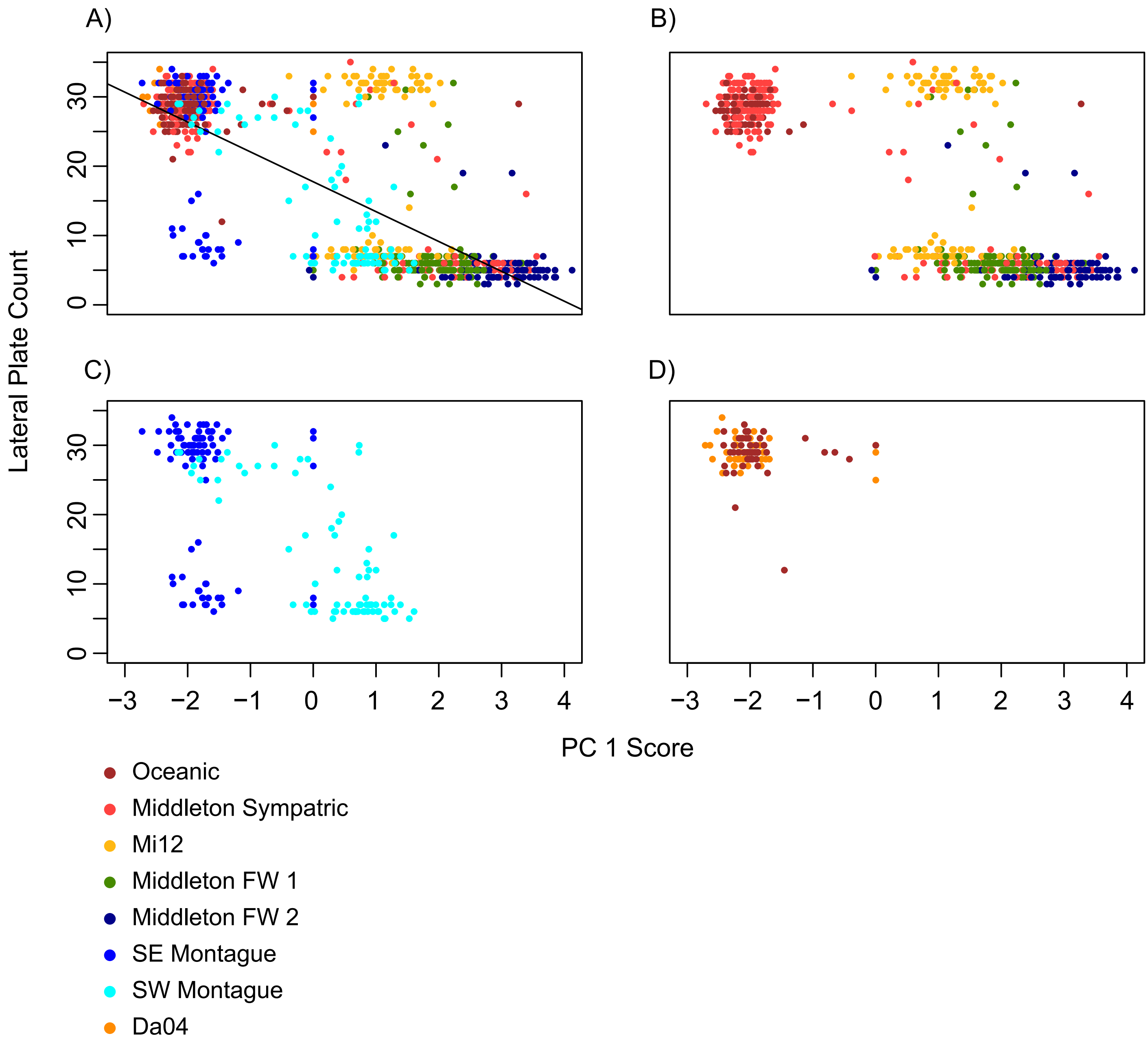
Mi14
Mo33
Da02
Mi08
Mo36
Mi13
Mi17
Mi23
Mo35
Mi22
Mo37
Da04


A)
1.00
0.80
0.60
0.40
0.20
0.00
Mi12
UFL
B)
1.00
0.80
0.60
0.40
0.20
0.00
Mi23
Mo35
Mo36
Mo37
Mo30
Mo33


A)
Mean Lateral Plate Count +/- 1 SE
Site
Mo37
Mo36
Mo35
Da04
Mi23
Mi17
Da02
Mi13
UFL
Mi22
Mi8
Mo33
Mi12
Mo30
Mi14
Mi06
Mi16
Mi11
Mi07
Mi15
B)
y=-4.31x +17.75
R-squared=0.54
Number of Lateral Plates
PC 1 Score
C)
Phenotype
Oceanic
Freshwater
Oceanic
Freshwater
Genotype
D)
Residuals


A)
B)
C)
D)
Lateral Plate Count
PC 1 Score
0
10
20
30
−3
−2
−1
0
1
2
3
4
Oceanic
Middleton Sympatric
Mi12
Middleton FW 1
Middleton FW 2
SE Montague
SW Montague
Da04

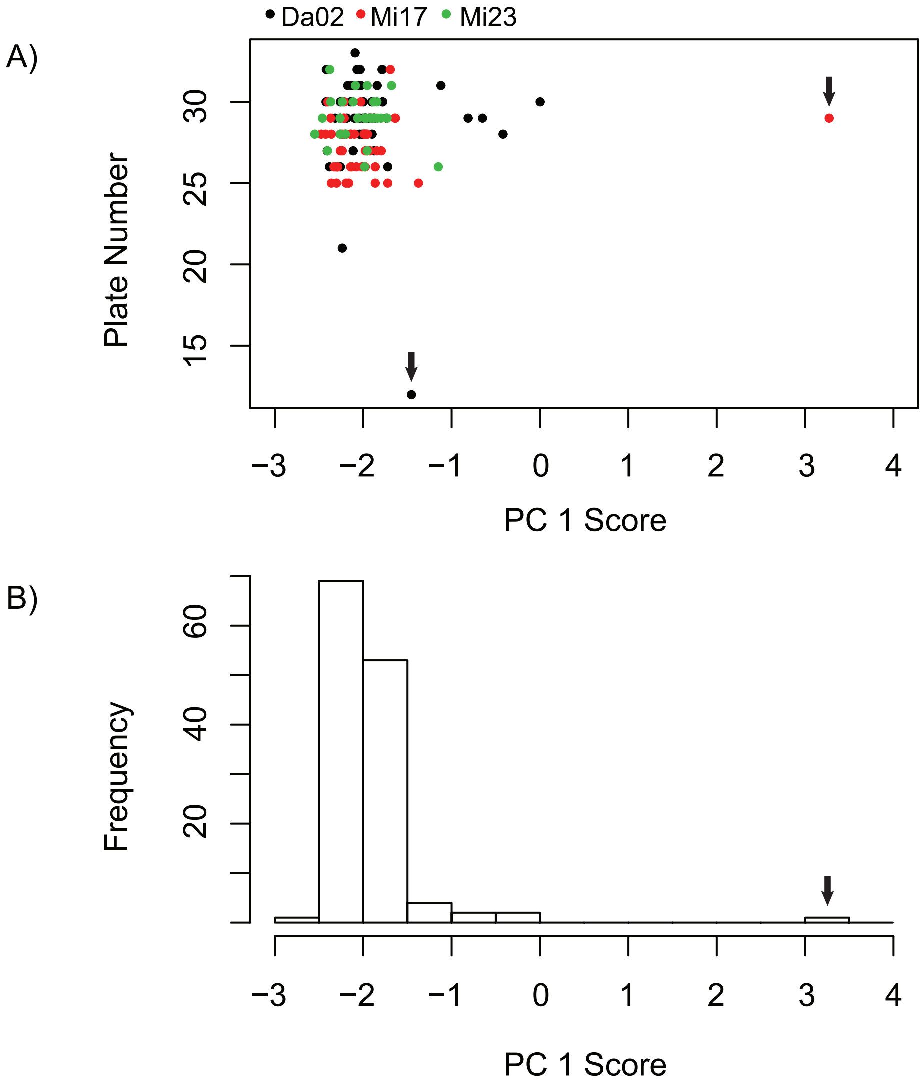

A)
Da02
Mi17
Mi23
Plate Number
15
20
25
30
−3
−2
−1
0
1
2
3
4
PC 1 Score
B)
Frequency
20
40
60
−3
−2
−1
0
1
2
3
4
PC 1 Score

Table S1. Sample collection data, including site name (Da=Danger Island, Mi=Middleton Island, Mo=Montague Island, UFL=Upper Fire Lake), coordinates, and habitat type based on water chemistry (FW = freshwater, OC = oceanic), and whether genotype and/or detailed morphometric data (Phenotype) were collected for each.

Site	Island/Region	Latitude	Longitude	Habitat	Genotype	Phenotype
Da02	Danger	59.925	-148.083	OC	Y	N
Da04	Danger	59.923	-148.078	FW	Y	N
Mi06	Middleton	59.439	-146.331	FW	Y	Y
Mi07	Middleton	59.448	-146.325	FW	Y	N
Mi08	Middleton	59.426	-146.357	FW	Y	Y
Mi09	Middleton	59.4282	-146.3532	FW	N	Y
Mi11	Middleton	59.412	-146.338	FW	Y	N
Mi12	Middleton	59.439	-146.331	FW	Y	N
Mi13	Middleton	59.432	-146.314	FW	Y	Y
Mi14	Middleton	59.437	-146.311	FW	Y	N
Mi15	Middleton	59.463	-146.299	FW	Y	N
Mi16	Middleton	59.429	-146.349	FW	Y	N
Mi17	Middleton	59.427	-146.359	OC	Y	N
Mi19	Middleton	59.4183	-146.3696	FW	N	Y
Mi22	Middleton	59.412	-146.333	FW	Y	N
Mi23	Middleton	59.461	-146.296	OC	Y	Y
Mi28	Middleton	59.826	-147.478	FW	Y	N
Mo30	Montague	59.823	-147.905	FW	Y	N
Mo33	Montague	59.83705	-147.911	FW	Y	N
Mo35	Montague	59.872	-147.438	FW	Y	N
Mo36	Montague	59.872	-147.437	FW	Y	N
Mo37	Montague	59.872	-147.437	FW	Y	N
UFL	Cook Inlet	61.349	-149.536	FW	Y	N

Table S2. Trait means for six sites from Middleton Island. All measurements are in mm. FW = resident freshwater; O = oceanic.

Site	Mi06	Mi08		Mi09		Mi13		Mi19		Mi23
Variable	FW	FW	O	FW	O	FW	O	FW	O	O
SL	44.6	44.7	57.9	41.1	63.4	45.6	63.2	46.1	58.5	61.9
Pelvic Spine Length (left)	4.4	4.5	7.4	3.9	7.2	4.2	7.9	4.5	7.4	7.8
Second Dorsal Spine Length	3.2	3.1	5.0	2.9	5.1	3.1	5.7	3.2	5.2	5.5
Snout Length	3.1	3.3	4.2	3.0	4.8	3.3	5.2	3.3	4.8	4.8
Eye Diameter (left)	3.9	3.9	4.9	3.5	5.2	4.0	5.4	4.1	5.1	5.2
Operculum Width (left)	3.9	3.9	4.9	3.6	6.5	3.8	5.0	4.1	4.9	5.0
Diagonal of Pectoral Fin Muscle (left)	4.2	4.1	6.8	3.7	7.0	4.2	7.4	4.3	6.8	7.2
Pectoral Fin Insertion Length (left)	2.1	2.1	3.1	1.9	3.5	2.1	3.4	2.1	3.1	3.3
Length of First Lateral Plate behind Second Dorsal Spine (left)	4.4	5.2	7.4	4.7	7.9	4.8	8.0	5.0	7.3	7.5
Distance between 2nd-3rd Dorsal Spines	5.7	5.9	7.6	5.2	8.1	6.1	8.6	5.9	7.6	8.8
Dorsal Fin Length	8.9	9.3	12.7	8.9	13.5	9.3	13.8	9.6	12.8	13.8
Lateral Plate Number (left)	8.0	10.0	33.6	6.5	32.5	7.3	33.3	10.8	33.4	33.8
Number of Gill Rakers (right)	18.9	18.1	21.3	18.5	22.0	18.4	22.2	19.0	22.3	21.6
Number of Pectoral Fin Rays (left)	10.0	10.0	9.8	10.0	10.0	9.9	10.0	10.0	10.0	10.0
Number of Dorsal Fin Rays	10.3	10.3	11.3	10.7	11.5	10.3	11.6	10.6	11.7	11.5
Number of Anal Fin Rays	7.5	7.6	8.0	7.9	8.5	7.3	8.5	7.7	8.7	8.1
Number of Caudal Fin Rays	12.0	12.0	11.7	12.0	12.0	11.7	11.0	11.9	11.5	11.1
n	100	95	5	75	2	73	27	64	19	100

Table S3. Principal Components Analysis was used to determine the major axes of phenotypic variation for six sites on Middleton Island including and excluding lateral plates. Percent of variation explained and Eigenvalues for each of the first ten principal components (PCs) in each of these analyses.

	Including Plates		**Excluding Plates**	
PC	**Percent Variation Explained**	**Eigenvalue**	**Percent Variation Explained**	**Eigenvalue**
1	93.09	13.96	27.59	4.14
2	1.62	0.24	15.77	2.37
3	1.14	0.17	10.76	1.61
4	0.77	0.12	9.69	1.45
5	0.69	0.10	6.07	0.91
6	0.44	0.07	5.92	0.89
7	0.43	0.06	4.62	0.69
8	0.33	0.05	4.47	0.67
9	0.32	0.05	3.51	0.53
10	0.26	0.04	2.71	0.41

Table S4. Results of Tukey's Post-Hoc tests comparing principal component (PC) scores in analyses including and excluding lateral plates. SO signifies oceanic individuals from sympatric sites. Bold represents significance at p<0.05.

		Including Plates			**Excluding Plates**		
		PC1	**PC2**	**PC3**	**PC1**	**PC2**	**PC3**
Mi06	Mi08	0.265	1.00	0.847	1.00	0.731	**0.001**
	Mi09	0.815	0.385	0.219	0.472	0.489	0.905
	Mi13	1.00	0.569	**0.016**	0.663	**0.005**	**<0.001**
	Mi19	0.084	0.987	0.965	1.00	0.992	0.696
	Mi23	**<0.001**	0.991	**0.002**	**<0.001**	**<0.001**	0.123
	SO	**<0.001**	0.151	0.236	**<0.001**	0.540	0.998
Mi08	Mi09	**0.011**	0.179	0.922	**<0.001**	**0.037**	**<0.001**
	Mi13	0.183	0.846	0.370	0.574	0.298	1.00
	Mi19	0.991	1.00	0.357	1.00	0.383	0.396
	Mi23	**<0.001**	0.898	0.142	**<0.001**	**0.011**	0.759
	SO	**<0.001**	0.060	**0.013**	**<0.001**	**0.037**	0.072
Mi09	Mi13	0.964	**0.007**	0.973	**0.018**	0.659	**<0.001**
	Mi19	**0.003**	0.138	**0.044**	0.474	0.217	0.151
	Mi23	**<0.001**	0.814	0.874	**<0.001**	0.091	**0.007**
	SO	**<0.001**	0.995	**<0.001**	**<0.001**	**0.017**	**0.038**
Mi13	Mi19	0.056	0.978	**0.002**	0.864	**0.002**	0.245
	Mi23	**<0.001**	0.182	1.00	**<0.001**	0.957	0.549
	SO	**<0.001**	**0.002**	**<0.001**	**<0.001**	**<0.001**	0.741
Mi19	Mi23	**<0.001**	0.790	**<0.001**	**<0.001**	**<0.001**	0.991
	SO	**<0.001**	**0.047**	0.845	**<0.001**	0.942	0.979
Mi23	SO	1.00	0.465	**<0.001**	0.718	**<0.001**	0.670

Table S5. Loadings of each variable on principal components (PCs) 1, 2 and 3 for the phenotypic analysis of six sites on Middleton Island. Asterisks indicate variables with the largest loadings.

	Including Lateral Plates			Excluding Lateral Plates		
Trait	PC1	PC 2	PC 3	PC 1	PC 2	PC 3
Left Pelvic Spine Length	0.0319	0.3984	-0.2146	-0.4272	0.1708	-0.0041
2nd Dorsal Spine Length	0.0257	0.3916	-0.1752	-0.3981	0.1296	0.0128
Left Plate Number*	0.9978	-0.0631	0.0161	NA	NA	NA
Gill Raker Count	0.0263	0.2252	-0.0156	-0.2735	-0.0052	-0.0917
Snout Length	0.0082	0.2121	0.4156	-0.1667	-0.4252	0.0678
Eye Diameter	0.0042	0.1432	0.3701	-0.1035	-0.3681	0.4016
Operculum Length	-0.0055	-0.0166	0.4335	0.0600	-0.4219	0.1775
Pectoral Muscle Length	0.0289	0.4489	-0.0336	-0.4530	-0.0154	0.1391
Pelvic Fin Insertion Length	0.0237	0.4032	-0.0584	-0.3971	0.0137	0.2110
Distance Between Dorsal and Pelvic Spines*	-0.0032	-0.0747	-0.2592	0.0568	0.2769	0.5160
Length of Plate Behind Dorsal Spine	0.0113	0.1332	-0.0559	-0.1436	0.0431	0.3855
Distance Between Dorsal Spines*	0.0038	-0.1163	-0.5249	0.0446	0.5337	0.0044
Dorsal Fin Length	0.0125	0.2347	-0.0657	-0.2271	0.0255	-0.2959
Dorsal Fin Ray Count	0.0113	0.2671	0.0614	-0.2454	-0.1079	-0.3749
Anal Fin Ray Count	0.0021	0.1524	0.1235	-0.1253	-0.1707	-0.2945
Caudal Fin Ray Count	-0.0128	-0.1297	0.2270	0.1606	-0.2333	-0.0186

Table S6. Per sample read statistics after cleaning and demultiplexing.

Illumina Run	Lane	Length	Total Sequences	Low Quality	Ambiguous Barcodes	Ambiguous RAD Site	Retained Reads	Percent Retained
1014.120208_SN747_0217_BD0N93ACXX	6	101bp	182,762,273	20,088,037	18,799,510	18,237,584	125,637,142	68.74%
1244.120913_SN747_0261_BD1B3MACXX	4	101bp	131,141,192	9,613,822	6,269,459	6,181,216	109,076,695	83.18%
1245.120913_SN747_0261_BD1B3MACXX	6	101bp	206,462,539	32,097,222	8,155,160	7,795,305	158,414,852	76.73%
1246.120913_SN747_0261_BD1B3MACXX	7	101bp	154,194,316	22,701,413	13,257,570	7,513,548	110,721,785	71.81%
1355.130308_SN747_0284_BD1TWNACXX	6	101bp	204,867,187	14,081,086	97,750,540	5,010,495	88,025,066	42.97%
816.111021_SN747_0188_AC09HWACXX	1	101bp	134,207,441	8,531,479	9,659,014	10,662,855	105,354,093	78.50%
817.111021_SN747_0188_AC09HWACXX	2	101bp	100,624,872	4,801,129	8,530,767	8,690,723	78,602,253	78.11%
818.111021_SN747_0188_AC09HWACXX	3	101bp	167,850,213	14,141,932	18,824,350	10,860,644	124,023,287	73.89%
853.111021_SN747_0188_AC09HWACXX	6	101bp	128,494,316	8,192,987	10,455,374	7,035,635	102,810,320	80.01%
854.111104_SN747_0191_BD0GGAACXX	8	101bp	169,797,064	15,811,286	9,965,169	9,353,829	134,666,780	79.31%
855.111104_SN747_0191_BD0GGAACXX	7	101bp	156,398,983	12,059,427	12,264,617	10,517,437	121,557,502	77.72%
856.111122_SN747_0195_BD0F9KACXX	8	101bp	147,245,303	26,478,540	9,987,762	9,882,678	100,896,323	68.52%
Total			1,884,045,699	188,598,360	223,919,292	111,741,949	1,359,786,098	
Average			157,003,808	15,716,530	18,659,941	9,311,829	113,315,508	72.17%
Standard Error			9,114,296	2,360,023	7,277,543	973,423	6,167,810	

Table S7. Per sample read statistics after cleaning and demultiplexing.

Sample	Population	Read Length	Raw Read Counts	GSNAP Aligned	Used by Stacks
da02_2197.01	Danger Island Site #2	95	1,906,746	1,611,624	1,594,628
da02_2197.02	Danger Island Site #2	95	2,305,763	1,926,978	1,911,112
da02_2197.03	Danger Island Site #2	95	2,340,487	1,987,976	1,969,657
da02_2197.04	Danger Island Site #2	95	1,985,044	1,681,222	1,664,832
da02_2197.05	Danger Island Site #2	95	2,065,780	1,749,063	1,738,419
da02_2197.06	Danger Island Site #2	95	1,638,737	1,380,513	1,366,260
da02_2197.07	Danger Island Site #2	95	1,981,870	1,648,714	1,638,057
da02_2197.08	Danger Island Site #2	95	1,840,170	1,569,110	1,555,185
da02_2197.09	Danger Island Site #2	95	1,823,374	1,545,899	1,536,063
da02_2197.10	Danger Island Site #2	95	2,146,611	1,821,804	1,804,580
da02_2197.11	Danger Island Site #2	95	1,967,217	1,673,203	1,643,510
da02_2197.12	Danger Island Site #2	95	1,767,012	1,505,101	1,491,103
da02_2197.13	Danger Island Site #2	95	1,925,900	1,600,370	1,585,443
da02_2197.14	Danger Island Site #2	95	1,579,690	1,337,440	1,314,898
da02_2197.15	Danger Island Site #2	95	2,025,701	1,715,843	1,698,447
da02_2197.16	Danger Island Site #2	95	2,146,030	1,809,928	1,790,102
da02_2197.17	Danger Island Site #2	95	1,337,993	1,141,222	1,129,285
da02_2197.18	Danger Island Site #2	95	1,386,630	1,161,604	1,144,942
da02_2197.19	Danger Island Site #2	95	2,253,489	1,902,417	1,890,601
da02_2197.20	Danger Island Site #2	95	1,969,609	1,674,366	1,662,322
da02_2197.21	Danger Island Site #2	95	2,236,086	1,888,899	1,876,667
da02_2197.22	Danger Island Site #2	95	2,155,969	1,827,890	1,813,747
da02_2197.23	Danger Island Site #2	95	1,829,926	1,527,231	1,513,549
da02_2197.24	Danger Island Site #2	95	2,282,386	1,924,736	1,910,415
da02_2197.25	Danger Island Site #2	95	1,625,409	1,353,611	1,340,238
da02_2197.26	Danger Island Site #2	95	1,849,319	1,551,611	1,532,845
da02_2197.27	Danger Island Site #2	95	1,584,994	1,329,532	1,310,194
da02_2197.28	Danger Island Site #2	95	1,981,792	1,677,442	1,659,693
da02_2197.29	Danger Island Site #2	95	2,611,558	2,201,904	2,194,329
da02_2197.30	Danger Island Site #2	95	1,477,362	1,247,049	1,235,126
da02_2197.31	Danger Island Site #2	95	1,756,924	1,463,048	1,454,640
da02_2197.32	Danger Island Site #2	95	1,696,243	1,435,333	1,424,126
da02_2197.33	Danger Island Site #2	95	1,102,615	926,888	914,897
da02_2197.34	Danger Island Site #2	95	1,511,543	1,275,536	1,255,883
da02_2197.35	Danger Island Site #2	95	1,505,415	1,272,621	1,260,583
da02_2197.36	Danger Island Site #2	95	1,694,232	1,413,347	1,397,517
da02_2197.37	Danger Island Site #2	95	1,249,386	1,055,625	1,029,127
da02_2197.38	Danger Island Site #2	95	1,488,640	1,252,048	1,243,922
da02_2197.39	Danger Island Site #2	95	1,749,210	1,471,538	1,460,929
da02_2197.40	Danger Island Site #2	95	1,832,114	1,542,717	1,521,827
da02_2197.41	Danger Island Site #2	95	2,073,265	1,750,851	1,721,536
da02_2197.42	Danger Island Site #2	95	1,622,210	1,357,006	1,341,012
da02_2197.43	Danger Island Site #2	95	1,181,577	996,026	984,013
da02_2197.44	Danger Island Site #2	95	997,086	836,476	829,658
da02_2197.45	Danger Island Site #2	95	1,670,591	1,405,408	1,383,829
da02_2197.46	Danger Island Site #2	95	1,987,316	1,678,312	1,659,097
da02_2197.47	Danger Island Site #2	95	1,752,746	1,472,283	1,458,944
da02_2197.48	Danger Island Site #2	95	1,618,310	1,341,890	1,330,279
da02_2197.49	Danger Island Site #2	95	244	200	6
da02_2197.50	Danger Island Site #2	95	1,566,209	1,309,713	1,297,852
da04_2165.01	Danger Island Site #4	95	1,002,091	839,674	830,961
da04_2165.02	Danger Island Site #4	95	1,403,706	1,178,963	1,172,420

Sample	Population	Read Length	Raw Read Counts	GSNAP Aligned	Used by Stacks
da04_2165.03	Danger Island Site #4	95	1,602,579	1,346,379	1,338,672
da04_2165.04	Danger Island Site #4	95	1,153,220	966,672	958,317
da04_2165.05	Danger Island Site #4	95	1,294,620	1,099,549	1,092,726
da04_2165.06	Danger Island Site #4	95	1,904,513	1,601,943	1,594,220
da04_2165.07	Danger Island Site #4	95	1,119,506	944,739	938,691
da04_2165.08	Danger Island Site #4	95	1,173,279	990,626	985,649
da04_2165.09	Danger Island Site #4	95	1,272,205	1,071,045	1,065,793
da04_2165.10	Danger Island Site #4	95	502,130	424,629	417,380
da04_2165.11	Danger Island Site #4	95	448	377	102
da04_2165.12	Danger Island Site #4	95	668,643	562,897	556,309
da04_2165.13	Danger Island Site #4	95	591,910	498,872	491,687
da04_2165.14	Danger Island Site #4	95	806,340	676,966	667,097
da04_2165.15	Danger Island Site #4	95	778,280	653,126	645,345
da04_2165.16	Danger Island Site #4	95	725,661	614,932	608,645
da04_2165.17	Danger Island Site #4	95	213,544	180,646	165,968
da04_2165.18	Danger Island Site #4	95	655,430	555,224	548,798
da04_2165.19	Danger Island Site #4	95	1,271,187	1,078,516	1,073,090
da04_2165.20	Danger Island Site #4	95	16,016	9,282	3,692
da04_2165.21	Danger Island Site #4	95	1,511,382	1,269,375	1,255,772
da04_2165.22	Danger Island Site #4	95	1,133,554	965,479	960,983
da04_2165.23	Danger Island Site #4	95	822	680	86
da04_2165.24	Danger Island Site #4	95	1,196,001	1,006,832	1,000,088
da04_2165.25	Danger Island Site #4	95	1,369,499	1,158,081	1,153,336
da04_2165.26	Danger Island Site #4	95	1,135,990	965,246	960,949
da04_2165.27	Danger Island Site #4	95	1,089,271	911,824	902,891
da04_2165.28	Danger Island Site #4	95	1,114,578	938,140	930,129
da04_2165.29	Danger Island Site #4	95	1,184,786	994,160	980,650
da04_2165.30	Danger Island Site #4	95	1,106,925	929,324	916,787
da04_2165.31	Danger Island Site #4	95	1,195,952	1,002,788	994,473
da04_2165.32	Danger Island Site #4	95	1,173,937	985,304	976,213
da04_2165.33	Danger Island Site #4	95	1,107,917	933,923	918,665
da04_2165.34	Danger Island Site #4	95	1,066,974	893,174	885,193
da04_2165.35	Danger Island Site #4	95	977,385	828,559	817,390
da04_2165.36	Danger Island Site #4	95	1,097,675	920,900	912,441
da04_2165.37	Danger Island Site #4	95	1,156,937	968,798	958,997
da04_2165.38	Danger Island Site #4	95	1,115,185	932,213	923,775
da04_2165.39	Danger Island Site #4	95	1,105,497	926,637	919,629
da04_2165.40	Danger Island Site #4	95	1,202,626	1,006,037	997,193
da04_2165.41	Danger Island Site #4	95	1,143,961	956,980	947,067
da04_2165.42	Danger Island Site #4	95	1,153,410	975,208	965,840
da04_2165.43	Danger Island Site #4	95	1,031,649	863,586	848,690
da04_2165.44	Danger Island Site #4	95	960,286	814,553	799,006
da04_2165.45	Danger Island Site #4	95	1,031,256	872,452	861,937
da04_2165.46	Danger Island Site #4	95	1,124,861	950,200	937,787
da04_2165.47	Danger Island Site #4	95	1,046,259	886,297	876,769
da04_2165.48	Danger Island Site #4	95	1,116,845	943,493	935,243
da04_2165.49	Danger Island Site #4	95	1,102,917	924,528	913,584
da04_2165.50	Danger Island Site #4	95	1,058,304	890,874	884,317
mi06_2162.01	Middleton Island Site #6	95	975,500	818,393	803,149
mi06_2162.02	Middleton Island Site #6	95	815,132	681,111	673,870
mi06_2162.03	Middleton Island Site #6	95	1,177,368	973,979	951,866
mi06_2162.04	Middleton Island Site #6	95	793,806	662,829	649,513
mi06_2162.05	Middleton Island Site #6	95	1,091,867	917,202	905,203

Sample	Population	Read Length	Raw Read Counts	GSNAP Aligned	Used by Stacks
mi06_2162.06	Middleton Island Site #6	95	874,718	730,557	718,394
mi06_2162.07	Middleton Island Site #6	95	406,145	341,449	330,985
mi06_2162.08	Middleton Island Site #6	95	1,012,076	850,514	834,008
mi06_2162.09	Middleton Island Site #6	95	929,209	778,309	767,137
mi06_2162.10	Middleton Island Site #6	95	1,182,674	993,442	983,841
mi06_2162.11	Middleton Island Site #6	95	1,048,544	867,993	860,266
mi06_2162.12	Middleton Island Site #6	95	1,592,905	1,261,788	1,222,860
mi06_2162.13	Middleton Island Site #6	95	823,104	656,666	634,855
mi06_2162.14	Middleton Island Site #6	95	1,070,082	901,808	891,965
mi06_2162.15	Middleton Island Site #6	95	1,089,596	905,881	891,196
mi06_2162.16	Middleton Island Site #6	95	1,080,678	911,783	900,596
mi06_2162.17	Middleton Island Site #6	95	867,756	729,284	720,542
mi06_2162.18	Middleton Island Site #6	95	1,221,231	1,019,515	1,004,340
mi06_2162.19	Middleton Island Site #6	95	712,673	591,427	577,742
mi06_2162.20	Middleton Island Site #6	95	1,200,199	973,739	938,454
mi06_2162.21	Middleton Island Site #6	95	1,278,144	1,076,335	1,068,941
mi06_2162.22	Middleton Island Site #6	95	1,053,978	878,451	871,055
mi06_2162.23	Middleton Island Site #6	95	681,406	565,959	557,960
mi06_2162.24	Middleton Island Site #6	95	924,389	779,867	773,248
mi06_2162.25	Middleton Island Site #6	95	1,090,924	917,697	910,390
mi06_2162.26	Middleton Island Site #6	95	978,925	822,642	811,327
mi06_2162.27	Middleton Island Site #6	95	1,236,339	1,037,758	1,029,676
mi06_2162.28	Middleton Island Site #6	95	870,959	686,157	655,673
mi06_2162.29	Middleton Island Site #6	95	651,501	548,122	541,922
mi06_2162.30	Middleton Island Site #6	95	995,537	819,895	803,743
mi06_2162.31	Middleton Island Site #6	95	805,213	665,325	653,734
mi06_2162.32	Middleton Island Site #6	95	685,668	562,179	545,944
mi06_2162.33	Middleton Island Site #6	95	980,343	818,875	805,552
mi06_2162.34	Middleton Island Site #6	95	998,315	830,959	816,608
mi06_2162.35	Middleton Island Site #6	95	919,026	769,116	763,386
mi06_2162.36	Middleton Island Site #6	95	522,977	433,819	424,044
mi06_2162.37	Middleton Island Site #6	95	907,790	765,125	758,263
mi06_2162.38	Middleton Island Site #6	95	1,073,787	903,136	891,084
mi06_2162.39	Middleton Island Site #6	95	889,148	730,926	718,126
mi06_2162.40	Middleton Island Site #6	95	1,021,867	840,889	823,785
mi07_2179.01	Middleton Island Site #7	95	1,067,313	899,049	888,036
mi07_2179.02	Middleton Island Site #7	95	679,864	564,526	550,660
mi07_2179.03	Middleton Island Site #7	95	807,620	678,549	668,910
mi07_2179.04	Middleton Island Site #7	95	1,572,967	1,318,121	1,295,998
mi07_2179.05	Middleton Island Site #7	95	1,393,117	1,178,619	1,165,955
mi07_2179.06	Middleton Island Site #7	95	1,816,138	1,514,599	1,489,687
mi07_2179.07	Middleton Island Site #7	95	1,559,126	1,314,634	1,303,777
mi07_2179.08	Middleton Island Site #7	95	645,459	544,193	525,715
mi07_2179.09	Middleton Island Site #7	95	1,652,516	1,394,751	1,386,560
mi07_2179.10	Middleton Island Site #7	95	1,536,111	1,292,414	1,279,640
mi07_2179.11	Middleton Island Site #7	95	967,419	813,756	801,360
mi07_2179.12	Middleton Island Site #7	95	1,216,118	1,011,688	992,915
mi07_2179.13	Middleton Island Site #7	95	586,370	495,442	483,461
mi07_2179.14	Middleton Island Site #7	95	1,373,345	1,154,773	1,145,350
mi07_2179.15	Middleton Island Site #7	95	1,524,528	1,269,970	1,258,604
mi07_2179.16	Middleton Island Site #7	95	1,651,424	1,370,057	1,345,520
mi07_2179.17	Middleton Island Site #7	95	799,908	672,814	653,480
mi07_2179.18	Middleton Island Site #7	95	1,512,108	1,273,106	1,261,671

Sample	Population	Read Length	Raw Read Counts	GSNAP Aligned	Used by Stacks
mi07_2179.19	Middleton Island Site #7	95	1,510,898	1,258,920	1,240,615
mi07_2179.20	Middleton Island Site #7	95	1,792,399	1,482,010	1,452,688
mi07_2179.21	Middleton Island Site #7	95	1,236,668	1,045,667	1,034,820
mi07_2179.22	Middleton Island Site #7	95	345,315	291,532	280,594
mi07_2179.23	Middleton Island Site #7	95	1,512,453	1,233,938	1,159,243
mi07_2179.24	Middleton Island Site #7	95	987,435	824,322	801,120
mi07_2179.25	Middleton Island Site #7	95	1,241,503	1,047,856	1,028,984
mi07_2179.26	Middleton Island Site #7	95	1,671,593	1,388,080	1,365,915
mi07_2179.27	Middleton Island Site #7	95	493,414	415,965	402,929
mi07_2179.28	Middleton Island Site #7	95	917,253	770,904	751,705
mi07_2179.29	Middleton Island Site #7	95	807,030	681,415	640,142
mi07_2179.30	Middleton Island Site #7	95	1,622,270	1,348,165	1,329,376
mi07_2179.31	Middleton Island Site #7	95	739,178	611,318	597,837
mi07_2179.32	Middleton Island Site #7	95	837,355	700,584	679,986
mi07_2179.33	Middleton Island Site #7	95	371,719	310,718	292,002
mi07_2179.34	Middleton Island Site #7	95	745,900	618,791	586,187
mi07_2179.35	Middleton Island Site #7	95	653,090	547,177	539,380
mi07_2179.36	Middleton Island Site #7	95	484,568	407,714	388,693
mi07_2179.37	Middleton Island Site #7	95	741,570	604,301	560,328
mi07_2179.38	Middleton Island Site #7	95	1,186,571	991,634	967,065
mi07_2179.39	Middleton Island Site #7	95	584,878	490,465	476,862
mi07_2179.40	Middleton Island Site #7	95	903,894	750,326	739,401
mi07_2179.41	Middleton Island Site #7	95	467,375	391,788	376,740
mi07_2179.42	Middleton Island Site #7	95	603,467	505,089	487,813
mi07_2179.43	Middleton Island Site #7	95	1,024,710	848,313	825,132
mi07_2179.44	Middleton Island Site #7	95	229,285	190,071	165,694
mi07_2179.45	Middleton Island Site #7	95	473,140	398,463	387,516
mi07_2179.46	Middleton Island Site #7	95	497,832	422,027	408,775
mi07_2179.47	Middleton Island Site #7	95	318,048	266,548	245,049
mi07_2179.48	Middleton Island Site #7	95	876,784	734,353	716,168
mi07_2179.49	Middleton Island Site #7	95	1,946,134	1,629,799	1,604,763
mi07_2179.50	Middleton Island Site #7	95	1,127,376	941,271	926,991
mi08_2180.01	Middleton Island Site #8	95	977,233	817,234	808,677
mi08_2180.02	Middleton Island Site #8	95	937,584	771,315	750,843
mi08_2180.03	Middleton Island Site #8	95	978,356	816,124	805,800
mi08_2180.04	Middleton Island Site #8	95	841,155	701,328	692,571
mi08_2180.051	Middleton Island Site #8	95	2,331,315	1,974,790	1,963,733
mi08_2180.052	Middleton Island Site #8	95	1,397,719	1,183,030	1,176,888
mi08_2180.053	Middleton Island Site #8	95	1,547,963	1,297,079	1,287,174
mi08_2180.054	Middleton Island Site #8	95	1,922,765	1,617,701	1,611,170
mi08_2180.055	Middleton Island Site #8	95	1,829,594	1,538,260	1,530,084
mi08_2180.056	Middleton Island Site #8	95	1,568,156	1,303,326	1,293,034
mi08_2180.057	Middleton Island Site #8	95	1,424,367	1,207,141	1,201,266
mi08_2180.058	Middleton Island Site #8	95	1,524,090	1,300,395	1,294,660
mi08_2180.059	Middleton Island Site #8	95	1,744,991	1,472,188	1,465,825
mi08_2180.05	Middleton Island Site #8	95	956,569	799,145	790,695
mi08_2180.060	Middleton Island Site #8	95	2,089,174	1,767,370	1,759,838
mi08_2180.061	Middleton Island Site #8	95	2,148,498	1,814,951	1,808,378
mi08_2180.062	Middleton Island Site #8	95	1,483,388	1,255,981	1,249,906
mi08_2180.063	Middleton Island Site #8	95	1,135,343	961,371	955,788
mi08_2180.064	Middleton Island Site #8	95	1,182,819	1,003,740	997,632
mi08_2180.065	Middleton Island Site #8	95	1,584,772	1,329,644	1,323,579
mi08_2180.066	Middleton Island Site #8	95	1,713,896	1,458,166	1,451,661

Sample	Population	Read Length	Raw Read Counts	GSNAP Aligned	Used by Stacks
mi08_2180.067	Middleton Island Site #8	95	1,865,382	1,563,031	1,550,021
mi08_2180.068	Middleton Island Site #8	95	1,879,222	1,576,543	1,569,858
mi08_2180.069	Middleton Island Site #8	95	760,641	632,781	627,750
mi08_2180.06	Middleton Island Site #8	95	1,007,884	841,596	833,531
mi08_2180.070	Middleton Island Site #8	95	1,823,900	1,519,126	1,513,148
mi08_2180.071	Middleton Island Site #8	95	1,883,692	1,564,943	1,553,017
mi08_2180.072	Middleton Island Site #8	95	1,199,900	1,015,532	1,007,092
mi08_2180.073	Middleton Island Site #8	95	1,462,301	1,233,110	1,224,457
mi08_2180.074	Middleton Island Site #8	95	1,706,003	1,446,246	1,440,821
mi08_2180.075	Middleton Island Site #8	95	1,152,333	980,171	970,578
mi08_2180.076	Middleton Island Site #8	95	1,736,802	1,465,611	1,456,651
mi08_2180.077	Middleton Island Site #8	95	1,813,741	1,519,870	1,508,464
mi08_2180.078	Middleton Island Site #8	95	1,638,083	1,384,078	1,375,964
mi08_2180.079	Middleton Island Site #8	95	1,910,535	1,621,006	1,606,589
mi08_2180.07	Middleton Island Site #8	95	903,178	760,803	752,661
mi08_2180.080	Middleton Island Site #8	95	2,422,731	2,065,122	2,050,003
mi08_2180.081	Middleton Island Site #8	95	1,220,856	1,024,287	1,017,574
mi08_2180.082	Middleton Island Site #8	95	2,302,458	1,905,852	1,886,705
mi08_2180.083	Middleton Island Site #8	95	2,112,818	1,772,760	1,760,353
mi08_2180.084	Middleton Island Site #8	95	1,624,236	1,370,239	1,358,273
mi08_2180.085	Middleton Island Site #8	95	1,441,459	1,207,359	1,195,735
mi08_2180.086	Middleton Island Site #8	95	1,816,304	1,532,722	1,513,838
mi08_2180.087	Middleton Island Site #8	95	967,341	809,955	797,432
mi08_2180.088	Middleton Island Site #8	95	2,343,359	1,963,922	1,942,845
mi08_2180.089	Middleton Island Site #8	95	1,582,752	1,327,258	1,314,150
mi08_2180.08	Middleton Island Site #8	95	949,067	799,279	791,713
mi08_2180.090	Middleton Island Site #8	95	1,881,367	1,586,762	1,575,842
mi08_2180.091	Middleton Island Site #8	95	1,704,706	1,415,621	1,403,355
mi08_2180.092	Middleton Island Site #8	95	2,199,417	1,853,288	1,841,322
mi08_2180.093	Middleton Island Site #8	95	1,183,676	1,001,471	992,523
mi08_2180.094	Middleton Island Site #8	95	2,403,820	2,018,190	2,006,284
mi08_2180.095	Middleton Island Site #8	95	2,493,654	2,119,701	2,109,828
mi08_2180.096	Middleton Island Site #8	95	2,239,489	1,893,952	1,876,557
mi08_2180.097	Middleton Island Site #8	95	1,941,676	1,630,948	1,619,504
mi08_2180.098	Middleton Island Site #8	95	1,780,447	1,509,619	1,495,106
mi08_2180.099	Middleton Island Site #8	95	2,619,998	2,203,113	2,192,614
mi08_2180.09	Middleton Island Site #8	95	873,853	733,333	724,443
mi08_2180.100	Middleton Island Site #8	95	2,281,117	1,902,445	1,884,146
mi08_2180.10	Middleton Island Site #8	95	1,025,306	862,449	853,004
mi08_2180.11	Middleton Island Site #8	95	869,897	727,007	718,795
mi08_2180.12	Middleton Island Site #8	95	1,049,847	869,512	857,638
mi08_2180.13	Middleton Island Site #8	95	1,067,936	881,048	869,344
mi08_2180.14	Middleton Island Site #8	95	988,820	822,200	814,795
mi08_2180.15	Middleton Island Site #8	95	981,585	810,956	795,261
mi08_2180.16	Middleton Island Site #8	95	910,634	765,172	756,855
mi08_2180.17	Middleton Island Site #8	95	846,436	704,904	697,173
mi08_2180.18	Middleton Island Site #8	95	890,775	757,438	750,092
mi08_2180.19	Middleton Island Site #8	95	847,298	709,033	701,805
mi08_2180.20	Middleton Island Site #8	95	839,558	704,318	695,088
mi08_2180.21	Middleton Island Site #8	95	771,241	651,031	643,360
mi08_2180.22	Middleton Island Site #8	95	863,688	725,736	715,946
mi08_2180.23	Middleton Island Site #8	95	861,914	717,927	707,634
mi08_2180.24	Middleton Island Site #8	95	765,452	628,035	613,257

Sample	Population	Read Length	Raw Read Counts	GSNAP Aligned	Used by Stacks
mi08_2180.25	Middleton Island Site #8	95	806,978	675,674	663,976
mi08_2180.27	Middleton Island Site #8	95	666,618	555,541	548,896
mi08_2180.28	Middleton Island Site #8	95	648,584	540,721	533,037
mi08_2180.29	Middleton Island Site #8	95	842,672	708,547	701,604
mi08_2180.30	Middleton Island Site #8	95	888,950	741,937	734,323
mi08_2180.31	Middleton Island Site #8	95	791,029	661,326	654,684
mi08_2180.32	Middleton Island Site #8	95	819,935	681,989	674,815
mi08_2180.33	Middleton Island Site #8	95	858,892	713,710	704,838
mi08_2180.34	Middleton Island Site #8	95	660,500	554,852	545,449
mi08_2180.35	Middleton Island Site #8	95	817,838	684,665	676,960
mi08_2180.36	Middleton Island Site #8	95	793,479	671,474	660,824
mi08_2180.37	Middleton Island Site #8	95	934,056	780,479	773,208
mi08_2180.38	Middleton Island Site #8	95	775,756	651,506	643,670
mi11_2182.01	Middleton Island Site #11	95	1,784,125	1,465,018	1,415,696
mi11_2182.02	Middleton Island Site #11	95	1,221,132	1,033,840	1,027,055
mi11_2182.03	Middleton Island Site #11	95	2,024,596	1,687,116	1,675,258
mi11_2182.04	Middleton Island Site #11	95	1,673,105	1,388,656	1,373,478
mi11_2182.05	Middleton Island Site #11	95	1,395,290	1,167,727	1,158,737
mi11_2182.06	Middleton Island Site #11	95	2,160,339	1,809,593	1,790,860
mi11_2182.07	Middleton Island Site #11	95	1,374,991	1,144,762	1,137,747
mi11_2182.08	Middleton Island Site #11	95	1,439,907	1,194,944	1,184,530
mi11_2182.09	Middleton Island Site #11	95	2,057,190	1,711,392	1,699,501
mi11_2182.10	Middleton Island Site #11	95	451,800	380,373	365,101
mi11_2182.11	Middleton Island Site #11	95	1,815,195	1,508,590	1,473,791
mi11_2182.12	Middleton Island Site #11	95	725,290	608,606	596,429
mi11_2182.13	Middleton Island Site #11	95	1,817,313	1,527,026	1,521,222
mi11_2182.14	Middleton Island Site #11	95	1,487,087	1,248,590	1,236,855
mi11_2182.15	Middleton Island Site #11	95	1,118,144	932,725	926,135
mi11_2182.16	Middleton Island Site #11	95	1,441,060	1,210,835	1,198,058
mi11_2182.17	Middleton Island Site #11	95	1,274,623	1,062,229	1,047,648
mi11_2182.18	Middleton Island Site #11	95	624,464	516,428	499,520
mi11_2182.19	Middleton Island Site #11	95	1,367,431	1,156,667	1,145,696
mi11_2182.20	Middleton Island Site #11	95	5,692	4,626	1,825
mi11_2182.21	Middleton Island Site #11	95	1,619,007	1,358,926	1,349,822
mi11_2182.22	Middleton Island Site #11	95	1,683,176	1,390,192	1,356,222
mi11_2182.23	Middleton Island Site #11	95	546,891	456,943	446,588
mi11_2182.24	Middleton Island Site #11	95	1,432,867	1,209,680	1,198,140
mi11_2182.25	Middleton Island Site #11	95	1,185,783	984,941	979,262
mi11_2182.26	Middleton Island Site #11	95	1,884,022	1,568,728	1,560,746
mi11_2182.27	Middleton Island Site #11	95	1,603,027	1,335,637	1,329,665
mi11_2182.28	Middleton Island Site #11	95	1,210,771	1,015,621	1,007,907
mi11_2182.29	Middleton Island Site #11	95	947,503	799,467	789,595
mi11_2182.30	Middleton Island Site #11	95	388,253	326,968	315,210
mi11_2182.31	Middleton Island Site #11	95	533,185	441,050	432,282
mi11_2182.32	Middleton Island Site #11	95	243,311	201,764	184,769
mi11_2182.33	Middleton Island Site #11	95	567,216	474,217	466,152
mi11_2182.34	Middleton Island Site #11	95	1,406,402	1,163,976	1,153,817
mi11_2182.35	Middleton Island Site #11	95	945,512	794,900	785,153
mi11_2182.36	Middleton Island Site #11	95	919,825	763,333	748,799
mi11_2182.37	Middleton Island Site #11	95	1,813,354	1,538,694	1,531,094
mi11_2182.38	Middleton Island Site #11	95	404,305	341,200	330,189
mi11_2182.39	Middleton Island Site #11	95	1,129,175	942,053	932,799
mi11_2182.40	Middleton Island Site #11	95	1,231,762	1,039,322	1,033,877

Sample	Population	Read Length	Raw Read Counts	GSNAP Aligned	Used by Stacks
mi12_1283.01	Middleton Island Site #12	95	584,733	498,247	483,505
mi12_1283.02	Middleton Island Site #12	95	1,273,351	1,075,267	1,060,072
mi12_1283.03	Middleton Island Site #12	95	1,150,539	966,112	953,023
mi12_1283.04	Middleton Island Site #12	95	1,151,475	969,933	949,703
mi12_1283.05	Middleton Island Site #12	95	1,124,263	952,319	943,470
mi12_1283.06	Middleton Island Site #12	95	865,988	736,031	726,742
mi12_1283.07	Middleton Island Site #12	95	906,192	766,171	757,498
mi12_1283.08	Middleton Island Site #12	95	947,140	794,795	783,870
mi12_1283.09	Middleton Island Site #12	95	694,133	588,366	578,139
mi12_1283.10	Middleton Island Site #12	95	792,179	671,412	652,603
mi12_1283.11	Middleton Island Site #12	95	746,581	631,930	614,775
mi12_1283.12	Middleton Island Site #12	95	1,175,236	996,423	986,675
mi12_1283.13	Middleton Island Site #12	95	832,316	703,888	694,371
mi12_1283.14	Middleton Island Site #12	95	1,149,720	972,253	948,476
mi12_1283.15	Middleton Island Site #12	95	814,766	688,138	678,816
mi12_1283.16	Middleton Island Site #12	95	1,098,499	931,732	916,726
mi12_1283.17	Middleton Island Site #12	95	1,009,638	854,959	839,178
mi12_1283.18	Middleton Island Site #12	95	976,457	819,363	804,981
mi12_1283.19	Middleton Island Site #12	95	991,139	840,473	826,223
mi12_1283.20	Middleton Island Site #12	95	672,981	567,672	555,534
mi12_1283.21	Middleton Island Site #12	95	1,000,020	844,507	830,384
mi12_1283.22	Middleton Island Site #12	95	607,143	511,331	502,616
mi12_1283.23	Middleton Island Site #12	95	792,321	665,647	651,507
mi12_1283.24	Middleton Island Site #12	95	697,885	585,348	571,369
mi12_1283.25	Middleton Island Site #12	95	1,205,467	1,013,271	997,965
mi12_1283.26	Middleton Island Site #12	95	772,239	654,047	643,435
mi12_1283.27	Middleton Island Site #12	95	777,578	661,782	649,114
mi12_1283.28	Middleton Island Site #12	95	1,109,970	940,707	932,246
mi12_1283.29	Middleton Island Site #12	95	920,410	781,839	771,505
mi12_1283.30	Middleton Island Site #12	95	452,585	379,571	372,168
mi12_1283.31	Middleton Island Site #12	95	430,059	363,361	352,974
mi12_1283.32	Middleton Island Site #12	95	616,707	523,062	514,203
mi12_1283.33	Middleton Island Site #12	95	837,417	713,673	705,820
mi12_1283.34	Middleton Island Site #12	95	849,993	717,285	706,829
mi12_1283.35	Middleton Island Site #12	95	594,167	503,501	493,587
mi12_1283.36	Middleton Island Site #12	95	564,445	479,741	471,981
mi12_1283.37	Middleton Island Site #12	95	884,100	744,742	732,897
mi12_1283.38	Middleton Island Site #12	95	714,304	597,178	588,393
mi12_1283.39	Middleton Island Site #12	95	674,717	571,152	562,619
mi12_1283.40	Middleton Island Site #12	95	847,348	710,879	704,235
mi12_1283.41	Middleton Island Site #12	95	921,630	786,638	777,600
mi12_1283.42	Middleton Island Site #12	95	971,740	817,397	807,915
mi12_1283.43	Middleton Island Site #12	95	737,612	625,574	620,344
mi12_1283.44	Middleton Island Site #12	95	792,302	667,411	657,659
mi12_1283.45	Middleton Island Site #12	95	992,588	839,892	833,466
mi12_1283.46	Middleton Island Site #12	95	455,346	387,462	376,731
mi12_1283.47	Middleton Island Site #12	95	692,116	583,570	570,898
mi12_1283.48	Middleton Island Site #12	95	672,970	570,340	563,942
mi12_1283.51	Middleton Island Site #12	95	765,607	648,723	638,532
mi12_1283.52	Middleton Island Site #12	95	811,695	689,519	677,980
mi12_1283.53	Middleton Island Site #12	95	798,564	664,497	645,562
mi12_1283.54	Middleton Island Site #12	95	970,124	816,960	809,080
mi12_1283.55	Middleton Island Site #12	95	551,460	469,486	460,231

Sample	Population	Read Length	Raw Read Counts	GSNAP Aligned	Used by Stacks
mi12_1283.56	Middleton Island Site #12	95	630,129	534,557	529,003
mi12_1283.57	Middleton Island Site #12	95	588,550	499,312	491,391
mi12_1283.58	Middleton Island Site #12	95	513,216	434,560	424,622
mi12_1283.59	Middleton Island Site #12	95	1,159,537	985,515	974,124
mi12_1283.60	Middleton Island Site #12	95	986,024	838,802	827,620
mi12_1283.61	Middleton Island Site #12	95	759,492	646,460	638,065
mi12_1283.62	Middleton Island Site #12	95	1,247,322	1,057,173	1,044,849
mi12_1283.63	Middleton Island Site #12	95	675,352	570,263	562,885
mi12_1283.64	Middleton Island Site #12	95	1,383,701	1,165,162	1,135,982
mi12_1283.65	Middleton Island Site #12	95	2,261,631	1,902,393	1,875,162
mi12_1283.66	Middleton Island Site #12	95	1,053,109	897,267	887,185
mi12_1283.67	Middleton Island Site #12	95	867,257	728,238	716,038
mi12_1283.68	Middleton Island Site #12	95	810,770	683,030	671,940
mi12_1283.69	Middleton Island Site #12	95	630,432	530,472	510,093
mi12_1283.70	Middleton Island Site #12	95	958,741	817,627	811,213
mi12_1283.71	Middleton Island Site #12	95	806,799	675,750	656,331
mi12_1283.72	Middleton Island Site #12	95	853,762	722,595	708,461
mi12_1283.73	Middleton Island Site #12	95	643,201	545,267	537,716
mi12_1283.74	Middleton Island Site #12	95	897,932	752,101	737,260
mi12_1283.75	Middleton Island Site #12	95	762,100	645,453	632,096
mi12_1283.76	Middleton Island Site #12	95	848,545	716,720	704,475
mi12_1283.77	Middleton Island Site #12	95	696,793	581,624	558,180
mi12_1283.78	Middleton Island Site #12	95	671,713	563,329	555,951
mi12_1283.79	Middleton Island Site #12	95	547,332	463,177	453,325
mi12_1283.80	Middleton Island Site #12	95	639,853	541,981	534,862
mi12_1283.81	Middleton Island Site #12	95	584,843	496,421	486,821
mi12_1283.82	Middleton Island Site #12	95	1,007,624	844,816	832,951
mi12_1283.83	Middleton Island Site #12	95	483,238	408,154	399,316
mi12_1283.84	Middleton Island Site #12	95	513,770	436,235	428,617
mi12_1283.85	Middleton Island Site #12	95	601,743	502,720	487,354
mi12_1283.86	Middleton Island Site #12	95	870,915	738,178	717,583
mi12_1283.87	Middleton Island Site #12	95	592,185	501,834	495,088
mi12_1283.88	Middleton Island Site #12	95	1,337,248	1,128,303	1,103,911
mi12_1283.89	Middleton Island Site #12	95	900,984	764,255	748,406
mi12_1283.90	Middleton Island Site #12	95	703,240	591,057	575,582
mi12_1283.91	Middleton Island Site #12	95	782,065	652,394	642,513
mi12_1283.92	Middleton Island Site #12	95	405,293	341,000	329,867
mi12_1283.93	Middleton Island Site #12	95	521,540	439,049	430,835
mi12_1283.94	Middleton Island Site #12	95	374,691	314,231	299,819
mi12_1283.95	Middleton Island Site #12	95	544,236	459,426	446,906
mi12_1283.96	Middleton Island Site #12	95	1,117,201	944,542	928,216
mi12_1283.97	Middleton Island Site #12	95	635,044	538,002	531,692
mi12_1283.98	Middleton Island Site #12	95	293,145	248,524	229,549
mi13_2184.35	Middleton Island Site #13	95	1,295,447	1,079,976	1,066,794
mi13_2184.36	Middleton Island Site #13	95	1,396,886	1,162,899	1,155,210
mi13_2184.37	Middleton Island Site #13	95	1,412,043	1,190,376	1,179,364
mi13_2184.38	Middleton Island Site #13	95	1,353,438	1,132,386	1,119,398
mi13_2184.39	Middleton Island Site #13	95	1,532,513	1,281,649	1,270,019
mi13_2184.40	Middleton Island Site #13	95	1,739,272	1,459,897	1,446,248
mi13_2184.41	Middleton Island Site #13	95	1,451,621	1,211,245	1,200,176
mi13_2184.42	Middleton Island Site #13	95	1,651,730	1,382,576	1,368,669
mi13_2184.43	Middleton Island Site #13	95	1,641,488	1,384,177	1,369,191
mi13_2184.44	Middleton Island Site #13	95	1,732,808	1,455,936	1,439,513

Sample	Population	Read Length	Raw Read Counts	GSNAP Aligned	Used by Stacks
mi13_2184.45	Middleton Island Site #13	95	1,692,402	1,423,031	1,402,821
mi13_2184.46	Middleton Island Site #13	95	1,770,373	1,495,703	1,479,271
mi13_2184.47	Middleton Island Site #13	95	1,101,905	927,781	916,067
mi13_2184.48	Middleton Island Site #13	95	1,074,016	898,459	888,812
mi13_2184.49	Middleton Island Site #13	95	1,041,351	876,008	871,067
mi13_2184.50	Middleton Island Site #13	95	1,004,089	845,010	838,947
mi13_2184.51	Middleton Island Site #13	95	1,124,745	942,191	933,102
mi13_2184.52	Middleton Island Site #13	95	1,209,137	1,018,933	1,007,677
mi13_2184.53	Middleton Island Site #13	95	1,311,465	1,109,610	1,101,598
mi13_2184.54	Middleton Island Site #13	95	1,041,970	871,734	863,182
mi13_2184.55	Middleton Island Site #13	95	1,160,225	979,688	970,525
mi13_2184.56	Middleton Island Site #13	95	1,284,392	1,075,289	1,066,355
mi13_2184.57	Middleton Island Site #13	95	1,145,039	953,508	943,301
mi13_2184.58	Middleton Island Site #13	95	1,454,372	1,217,606	1,207,076
mi13_2184.59	Middleton Island Site #13	95	1,075,541	900,903	887,648
mi13_2184.60	Middleton Island Site #13	95	1,089,082	909,769	897,327
mi13_2184.61	Middleton Island Site #13	95	1,055,384	879,005	872,484
mi13_2184.62	Middleton Island Site #13	95	1,135,911	960,972	951,878
mi13_2184.63	Middleton Island Site #13	95	953,014	799,188	790,950
mi13_2184.65	Middleton Island Site #13	95	1,280,979	1,051,421	1,025,526
mi13_2184.66	Middleton Island Site #13	95	970,789	811,281	804,725
mi13_2184.67	Middleton Island Site #13	95	1,083,212	916,834	908,938
mi13_2184.68	Middleton Island Site #13	95	1,314,380	1,104,196	1,092,143
mi13_2402.01	Middleton Island Site #13	95	1,075,563	899,257	892,054
mi13_2402.02	Middleton Island Site #13	95	1,057,386	875,719	868,190
mi13_2402.03	Middleton Island Site #13	95	1,279,078	1,076,070	1,066,884
mi13_2402.04	Middleton Island Site #13	95	1,217,450	1,017,965	1,008,335
mi13_2402.05	Middleton Island Site #13	95	1,001,301	838,193	833,078
mi13_2402.06	Middleton Island Site #13	95	1,129,742	950,816	943,925
mi13_2402.07	Middleton Island Site #13	95	1,117,765	925,407	918,366
mi13_2402.08	Middleton Island Site #13	95	1,072,859	904,077	898,608
mi14_2185.11	Middleton Island Site #14	95	1,261,664	1,042,709	1,027,268
mi14_2185.12	Middleton Island Site #14	95	1,089,614	916,460	908,377
mi14_2185.13	Middleton Island Site #14	95	1,204,195	998,552	991,505
mi14_2185.14	Middleton Island Site #14	95	1,414,301	1,177,149	1,168,897
mi14_2185.15	Middleton Island Site #14	95	1,157,969	852,670	848,178
mi14_2185.16	Middleton Island Site #14	95	1,639,504	1,374,181	1,364,885
mi14_2185.17	Middleton Island Site #14	95	160,447	132,372	110,741
mi14_2185.18	Middleton Island Site #14	95	1,486,951	1,232,745	1,224,255
mi14_2185.19	Middleton Island Site #14	95	1,153,327	970,450	965,492
mi14_2185.20	Middleton Island Site #14	95	1,343,948	1,120,925	1,116,159
mi14_2185.21	Middleton Island Site #14	95	1,723,616	1,435,096	1,430,433
mi14_2185.22	Middleton Island Site #14	95	1,240,896	1,045,269	1,040,425
mi14_2185.23	Middleton Island Site #14	95	1,227,437	1,032,092	1,027,635
mi14_2185.24	Middleton Island Site #14	95	1,232,980	1,025,719	1,015,544
mi14_2185.26	Middleton Island Site #14	95	1,261,962	1,065,233	1,059,962
mi14_2185.27	Middleton Island Site #14	95	1,140,474	947,209	939,146
mi14_2185.28	Middleton Island Site #14	95	588,512	479,185	464,840
mi14_2185.29	Middleton Island Site #14	95	1,285,316	1,076,101	1,062,497
mi14_2185.30	Middleton Island Site #14	95	631,011	525,853	514,806
mi14_2185.31	Middleton Island Site #14	95	1,298,934	1,082,707	1,077,257
mi14_2185.32	Middleton Island Site #14	95	959,282	792,585	784,230
mi14_2185.33	Middleton Island Site #14	95	529,821	434,576	418,288

Sample	Population	Read Length	Raw Read Counts	GSNAP Aligned	Used by Stacks
mi14_2185.34	Middleton Island Site #14	95	1,054,047	876,497	865,806
mi14_2185.35	Middleton Island Site #14	95	798,728	650,187	637,174
mi14_2185.36	Middleton Island Site #14	95	1,046,122	877,719	872,586
mi14_2185.37	Middleton Island Site #14	95	70,685	57,420	38,935
mi14_2185.38	Middleton Island Site #14	95	825,828	686,287	677,699
mi14_2185.39	Middleton Island Site #14	95	1,330,810	1,119,448	1,111,617
mi14_2185.40	Middleton Island Site #14	95	1,275,135	1,069,282	1,065,445
mi14_2185.41	Middleton Island Site #14	95	1,297,906	1,043,820	1,019,972
mi14_2185.42	Middleton Island Site #14	95	830,040	697,114	688,829
mi14_2185.43	Middleton Island Site #14	95	1,042,764	861,804	854,721
mi14_2185.44	Middleton Island Site #14	95	1,184,723	977,479	971,620
mi14_2185.45	Middleton Island Site #14	95	1,436,605	1,181,280	1,177,440
mi14_2185.46	Middleton Island Site #14	95	1,410,284	1,167,181	1,162,817
mi14_2185.48	Middleton Island Site #14	95	1,590,869	1,326,470	1,317,755
mi14_2185.51	Middleton Island Site #14	95	1,216,760	1,024,814	1,019,762
mi14_2185.52	Middleton Island Site #14	95	1,348,151	1,131,089	1,116,168
mi14_2185.53	Middleton Island Site #14	95	1,134,692	964,947	959,536
mi14_2185.54	Middleton Island Site #14	95	1,612,907	1,347,494	1,342,465
mi14_2185.55	Middleton Island Site #14	95	1,259,038	1,063,688	1,058,870
mi14_2185.56	Middleton Island Site #14	95	1,264,483	1,057,444	1,050,873
mi14_2185.57	Middleton Island Site #14	95	1,376,386	1,164,563	1,154,500
mi14_2185.58	Middleton Island Site #14	95	1,481,258	1,245,025	1,240,255
mi14_2185.59	Middleton Island Site #14	95	1,408,316	1,184,671	1,180,032
mi14_2185.60	Middleton Island Site #14	95	1,691,223	1,410,808	1,405,755
mi14_2185.61	Middleton Island Site #14	95	1,797,308	1,500,602	1,494,617
mi14_2185.62	Middleton Island Site #14	95	1,743,774	1,456,594	1,448,613
mi14_2185.63	Middleton Island Site #14	95	1,967,131	1,652,779	1,641,910
mi14_2185.64	Middleton Island Site #14	95	2,047,191	1,725,021	1,710,216
mi14_2185.65	Middleton Island Site #14	95	1,622,345	1,363,014	1,350,496
mi14_2185.66	Middleton Island Site #14	95	1,510,403	1,257,768	1,252,799
mi14_2185.67	Middleton Island Site #14	95	1,998,371	1,677,908	1,672,163
mi14_2185.68	Middleton Island Site #14	95	1,490,165	1,252,828	1,246,700
mi14_2185.69	Middleton Island Site #14	95	1,774,503	1,488,119	1,474,834
mi14_2185.70	Middleton Island Site #14	95	1,291,595	1,088,158	1,081,448
mi14_2185.71	Middleton Island Site #14	95	1,382,223	1,154,399	1,148,815
mi14_2185.72	Middleton Island Site #14	95	1,753,184	1,468,167	1,454,494
mi14_2185.73	Middleton Island Site #14	95	2,038,496	1,707,484	1,701,470
mi14_2185.74	Middleton Island Site #14	95	1,950,266	1,631,143	1,626,969
mi14_2525.01	Middleton Island Site #14	95	928,408	779,206	771,179
mi14_2525.02	Middleton Island Site #14	95	1,347,148	1,130,917	1,122,480
mi14_2525.03	Middleton Island Site #14	95	1,015,787	843,278	834,104
mi14_2525.04	Middleton Island Site #14	95	950,510	793,482	786,188
mi14_2525.05	Middleton Island Site #14	95	980,311	811,679	800,742
mi14_2525.06	Middleton Island Site #14	95	892,116	745,243	735,712
mi14_2525.07	Middleton Island Site #14	95	1,113,892	932,218	922,652
mi14_2525.08	Middleton Island Site #14	95	1,018,637	853,487	845,228
mi14_2525.09	Middleton Island Site #14	95	1,218,735	1,003,891	987,272
mi14_2525.10	Middleton Island Site #14	95	1,080,263	901,020	888,474
mi14_2525.11	Middleton Island Site #14	95	1,001,111	823,442	802,125
mi14_2525.12	Middleton Island Site #14	95	833,195	699,440	691,270
mi14_2525.13	Middleton Island Site #14	95	1,189,201	988,101	978,775
mi14_2525.14	Middleton Island Site #14	95	817,955	678,469	664,973
mi15_2186.01	Middleton Island Site #15	95	1,586,580	1,311,304	1,301,915

Sample	Population	Read Length	Raw Read Counts	GSNAP Aligned	Used by Stacks
mi15_2186.02	Middleton Island Site #15	95	1,675,017	1,388,408	1,378,884
mi15_2186.03	Middleton Island Site #15	95	1,423,926	1,196,843	1,187,536
mi15_2186.04	Middleton Island Site #15	95	645,414	542,882	536,318
mi15_2186.05	Middleton Island Site #15	95	1,144,212	958,583	950,700
mi15_2186.06	Middleton Island Site #15	95	1,964,217	1,631,267	1,626,470
mi15_2186.07	Middleton Island Site #15	95	1,832,144	1,537,899	1,533,547
mi15_2186.08	Middleton Island Site #15	95	2,372,519	1,972,861	1,963,356
mi15_2186.09	Middleton Island Site #15	95	769,468	646,539	639,338
mi15_2186.10	Middleton Island Site #15	95	1,655,654	1,386,057	1,379,147
mi15_2186.11	Middleton Island Site #15	95	814,002	680,663	674,288
mi15_2186.12	Middleton Island Site #15	95	1,247,350	1,044,231	1,035,471
mi15_2186.13	Middleton Island Site #15	95	1,666,016	1,383,112	1,370,387
mi15_2186.14	Middleton Island Site #15	95	1,468,608	1,216,861	1,212,515
mi15_2186.15	Middleton Island Site #15	95	1,538,144	1,273,541	1,263,844
mi15_2186.16	Middleton Island Site #15	95	1,606,895	1,324,454	1,315,877
mi15_2186.17	Middleton Island Site #15	95	1,564,657	1,294,254	1,287,132
mi15_2186.18	Middleton Island Site #15	95	1,230,401	1,016,079	1,008,483
mi15_2186.19	Middleton Island Site #15	95	981,989	817,066	811,430
mi15_2186.20	Middleton Island Site #15	95	42,379	32,180	13,359
mi15_2186.21	Middleton Island Site #15	95	1,967,451	1,641,292	1,635,580
mi15_2186.22	Middleton Island Site #15	95	2,569,063	2,145,514	2,139,546
mi15_2186.23	Middleton Island Site #15	95	2,682,951	2,219,151	2,212,267
mi15_2186.24	Middleton Island Site #15	95	1,850,510	1,542,707	1,530,142
mi15_2186.25	Middleton Island Site #15	95	1,523,442	1,267,671	1,260,871
mi15_2186.26	Middleton Island Site #15	95	2,035,624	1,684,240	1,677,195
mi15_2186.27	Middleton Island Site #15	95	1,736,314	1,445,810	1,436,218
mi15_2186.28	Middleton Island Site #15	95	589,453	494,923	487,186
mi15_2186.29	Middleton Island Site #15	95	1,874,623	1,542,451	1,533,026
mi15_2186.30	Middleton Island Site #15	95	2,481,054	2,068,228	2,061,168
mi15_2186.31	Middleton Island Site #15	95	2,078,062	1,710,840	1,694,080
mi15_2186.32	Middleton Island Site #15	95	1,539,407	1,289,150	1,284,198
mi15_2186.33	Middleton Island Site #15	95	9,112	7,151	3,016
mi15_2186.34	Middleton Island Site #15	95	1,557,631	1,298,739	1,292,828
mi15_2186.35	Middleton Island Site #15	95	2,519,004	2,107,627	2,091,220
mi15_2186.36	Middleton Island Site #15	95	1,141,696	953,021	944,458
mi15_2186.37	Middleton Island Site #15	95	1,492,829	1,234,958	1,212,701
mi15_2186.38	Middleton Island Site #15	95	1,426,250	1,185,490	1,168,800
mi15_2186.39	Middleton Island Site #15	95	1,417,562	1,184,992	1,174,697
mi15_2186.40	Middleton Island Site #15	95	1,340,921	1,113,859	1,096,543
mi15_2186.41	Middleton Island Site #15	95	1,319,402	1,107,365	1,096,112
mi15_2186.42	Middleton Island Site #15	95	1,343,217	1,116,266	1,102,051
mi15_2186.43	Middleton Island Site #15	95	1,389,244	1,158,808	1,140,495
mi15_2186.44	Middleton Island Site #15	95	1,258,988	1,042,097	1,033,530
mi15_2186.45	Middleton Island Site #15	95	1,461,347	1,211,417	1,202,332
mi15_2186.46	Middleton Island Site #15	95	1,259,341	1,057,514	1,051,217
mi15_2186.47	Middleton Island Site #15	95	1,749,556	1,444,299	1,435,530
mi15_2186.48	Middleton Island Site #15	95	1,699,212	1,417,926	1,404,664
mi15_2186.49	Middleton Island Site #15	95	1,605,093	1,333,265	1,307,509
mi15_2186.50	Middleton Island Site #15	95	1,455,163	1,215,743	1,197,799
mi16_2187.01	Middleton Island Site #16	95	2,201,836	1,854,289	1,827,965
mi16_2187.02	Middleton Island Site #16	95	1,266,330	1,058,585	1,045,629
mi16_2187.03	Middleton Island Site #16	95	2,800,137	2,310,500	2,246,167
mi16_2187.04	Middleton Island Site #16	95	1,489,936	1,249,227	1,229,635

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mi16_2187.05	Middleton Island Site #16	95	1,384,189	1,158,855	1,144,880
mi16_2187.06	Middleton Island Site #16	95	1,423,707	1,191,908	1,184,116
mi16_2187.07	Middleton Island Site #16	95	1,643,310	1,373,243	1,357,382
mi16_2187.08	Middleton Island Site #16	95	1,648,539	1,367,687	1,348,428
mi16_2187.09	Middleton Island Site #16	95	1,022,123	849,872	842,230
mi16_2187.10	Middleton Island Site #16	95	1,022,079	846,613	836,085
mi16_2187.11	Middleton Island Site #16	95	1,303,005	1,087,227	1,074,734
mi16_2187.12	Middleton Island Site #16	95	2,047,721	1,715,612	1,703,361
mi16_2187.13	Middleton Island Site #16	95	1,207,951	1,013,692	1,005,212
mi16_2187.14	Middleton Island Site #16	95	954,746	785,209	770,861
mi16_2187.15	Middleton Island Site #16	95	1,345,095	1,133,442	1,122,957
mi16_2187.16	Middleton Island Site #16	95	967,440	808,350	789,341
mi16_2187.17	Middleton Island Site #16	95	886,726	750,050	736,496
mi16_2187.18	Middleton Island Site #16	95	1,592,983	1,344,584	1,333,955
mi16_2187.19	Middleton Island Site #16	95	1,334,335	1,105,128	1,097,614
mi16_2187.20	Middleton Island Site #16	95	2,182,291	1,795,905	1,768,589
mi16_2187.21	Middleton Island Site #16	95	1,301,248	1,073,656	1,048,619
mi16_2187.22	Middleton Island Site #16	95	1,212,859	1,009,834	1,002,264
mi16_2187.23	Middleton Island Site #16	95	2,067,180	1,708,952	1,684,079
mi16_2187.24	Middleton Island Site #16	95	1,071,810	889,442	882,768
mi16_2187.25	Middleton Island Site #16	95	1,648,044	1,376,678	1,368,762
mi16_2187.26	Middleton Island Site #16	95	1,472,880	1,221,701	1,200,232
mi16_2187.27	Middleton Island Site #16	95	1,216,309	1,018,112	1,011,337
mi16_2187.28	Middleton Island Site #16	95	1,299,454	1,077,307	1,054,947
mi16_2187.29	Middleton Island Site #16	95	1,337,013	1,109,386	1,103,982
mi16_2187.30	Middleton Island Site #16	95	1,912,860	1,574,152	1,544,254
mi16_2187.31	Middleton Island Site #16	95	863,184	690,786	663,321
mi16_2187.32	Middleton Island Site #16	95	1,995,165	1,641,091	1,605,141
mi16_2187.33	Middleton Island Site #16	95	817,529	686,693	681,105
mi16_2187.34	Middleton Island Site #16	95	2,125,905	1,745,523	1,719,944
mi16_2187.35	Middleton Island Site #16	95	2,826,960	2,358,548	2,328,700
mi16_2187.36	Middleton Island Site #16	95	1,711,447	1,343,591	1,303,322
mi16_2187.37	Middleton Island Site #16	95	1,717,726	1,421,196	1,402,827
mi16_2187.38	Middleton Island Site #16	95	1,672,711	1,390,671	1,373,418
mi16_2187.39	Middleton Island Site #16	95	405,954	339,028	329,324
mi16_2187.40	Middleton Island Site #16	95	1,240,402	1,041,257	1,033,161
mi16_2187.41	Middleton Island Site #16	95	3,192,608	2,626,607	2,598,140
mi16_2187.42	Middleton Island Site #16	95	1,778,820	1,474,550	1,452,872
mi16_2187.43	Middleton Island Site #16	95	1,493,524	1,249,115	1,224,947
mi16_2187.44	Middleton Island Site #16	95	1,870,482	1,551,054	1,539,842
mi17_2188.01	Middleton Island Site #17	95	1,204,429	1,015,918	1,007,892
mi17_2188.02	Middleton Island Site #17	95	1,204,940	1,008,983	996,753
mi17_2188.03	Middleton Island Site #17	95	1,098,332	926,283	915,398
mi17_2188.04	Middleton Island Site #17	95	1,005,040	844,928	837,261
mi17_2188.05	Middleton Island Site #17	95	1,059,520	887,487	880,521
mi17_2188.06	Middleton Island Site #17	95	906,640	761,649	753,553
mi17_2188.07	Middleton Island Site #17	95	1,409,960	1,170,304	1,164,152
mi17_2188.08	Middleton Island Site #17	95	1,631,745	1,375,417	1,367,690
mi17_2188.09	Middleton Island Site #17	95	984,550	828,695	823,805
mi17_2188.10	Middleton Island Site #17	95	811,353	687,162	679,486
mi17_2188.11	Middleton Island Site #17	95	1,556,498	1,305,253	1,294,015
mi17_2188.12	Middleton Island Site #17	95	1,568,953	1,314,640	1,307,321
mi17_2188.13	Middleton Island Site #17	95	1,005,740	840,871	832,550

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mi17_2188.14	Middleton Island Site #17	95	1,320,410	1,113,994	1,107,162
mi17_2188.15	Middleton Island Site #17	95	1,235,149	1,035,508	1,026,779
mi17_2188.16	Middleton Island Site #17	95	997,244	841,638	832,625
mi17_2188.17	Middleton Island Site #17	95	1,126,344	946,106	940,335
mi17_2188.18	Middleton Island Site #17	95	1,098,685	929,094	917,507
mi17_2188.19	Middleton Island Site #17	95	759,135	637,706	628,780
mi17_2188.20	Middleton Island Site #17	95	1,190,422	988,844	977,146
mi17_2188.21	Middleton Island Site #17	95	1,644,678	1,369,619	1,341,222
mi17_2188.22	Middleton Island Site #17	95	1,110,371	944,205	936,150
mi17_2188.23	Middleton Island Site #17	95	994,528	832,394	824,471
mi17_2188.24	Middleton Island Site #17	95	1,335,335	1,115,765	1,109,804
mi17_2188.25	Middleton Island Site #17	95	1,337,255	1,125,472	1,119,798
mi17_2188.26	Middleton Island Site #17	95	1,139,941	965,795	956,407
mi17_2188.27	Middleton Island Site #17	95	684,424	577,793	567,938
mi17_2188.28	Middleton Island Site #17	95	1,185,955	988,905	982,720
mi17_2188.29	Middleton Island Site #17	95	1,448,578	1,193,825	1,168,355
mi17_2188.30	Middleton Island Site #17	95	1,299,358	1,097,955	1,092,954
mi17_2188.31	Middleton Island Site #17	95	1,067,239	895,842	887,057
mi17_2188.32	Middleton Island Site #17	95	1,124,204	949,128	942,728
mi17_2188.33	Middleton Island Site #17	95	1,386,602	1,158,525	1,149,152
mi17_2188.34	Middleton Island Site #17	95	1,476,312	1,238,760	1,230,627
mi17_2188.35	Middleton Island Site #17	95	1,141,348	954,640	948,009
mi17_2188.36	Middleton Island Site #17	95	1,418,467	1,196,134	1,189,948
mi17_2188.37	Middleton Island Site #17	95	746,857	624,363	618,927
mi17_2188.38	Middleton Island Site #17	95	926,899	778,156	768,243
mi17_2188.39	Middleton Island Site #17	95	1,134,838	956,431	950,026
mi17_2188.40	Middleton Island Site #17	95	1,527,176	1,286,551	1,278,340
mi17_2188.41	Middleton Island Site #17	95	1,065,063	900,127	895,022
mi17_2188.42	Middleton Island Site #17	95	1,321,963	1,107,163	1,098,376
mi17_2188.43	Middleton Island Site #17	95	955,344	801,044	792,309
mi17_2188.44	Middleton Island Site #17	95	1,016,503	851,251	844,267
mi17_2188.45	Middleton Island Site #17	95	1,248,684	1,038,528	1,032,203
mi17_2188.46	Middleton Island Site #17	95	1,403,829	1,165,835	1,158,903
mi17_2188.47	Middleton Island Site #17	95	1,400,590	1,178,876	1,169,401
mi17_2188.48	Middleton Island Site #17	95	1,397,617	1,179,046	1,168,138
mi17_2188.49	Middleton Island Site #17	95	1,618,733	1,346,479	1,335,035
mi17_2188.50	Middleton Island Site #17	95	1,227,084	1,029,774	1,021,927
mi22_2193.01	Middleton Island Site #22	95	1,422,433	1,188,348	1,180,752
mi22_2193.02	Middleton Island Site #22	95	1,237,630	1,027,102	1,008,157
mi22_2193.03	Middleton Island Site #22	95	1,601,782	1,335,555	1,329,077
mi22_2193.04	Middleton Island Site #22	95	1,523,794	1,263,436	1,250,556
mi22_2193.05	Middleton Island Site #22	95	1,552,738	1,297,920	1,292,063
mi22_2193.06	Middleton Island Site #22	95	2,107,731	1,763,330	1,753,247
mi22_2193.07	Middleton Island Site #22	95	1,074,974	903,165	897,219
mi22_2193.08	Middleton Island Site #22	95	1,134,529	948,854	942,968
mi22_2193.09	Middleton Island Site #22	95	1,675,040	1,390,949	1,384,715
mi22_2193.10	Middleton Island Site #22	95	1,659,352	1,387,345	1,378,644
mi22_2193.11	Middleton Island Site #22	95	655,838	512,891	506,536
mi22_2193.12	Middleton Island Site #22	95	1,313,707	1,098,315	1,092,109
mi22_2193.13	Middleton Island Site #22	95	1,469,699	1,230,471	1,224,704
mi22_2193.14	Middleton Island Site #22	95	1,278,996	1,063,885	1,058,241
mi22_2193.15	Middleton Island Site #22	95	1,329,845	1,100,006	1,094,203
mi22_2193.16	Middleton Island Site #22	95	1,441,427	1,199,946	1,195,052

Sample	Population	Read Length	Raw Read Counts	GSNAP Aligned	Used by Stacks
mi22_2193.17	Middleton Island Site #22	95	1,566,034	1,303,320	1,299,177
mi22_2193.18	Middleton Island Site #22	95	1,450,396	1,205,678	1,200,163
mi22_2193.19	Middleton Island Site #22	95	1,142,443	957,738	953,467
mi22_2193.20	Middleton Island Site #22	95	1,332,759	1,115,906	1,112,198
mi22_2193.21	Middleton Island Site #22	95	1,499,008	1,251,578	1,243,672
mi22_2193.22	Middleton Island Site #22	95	1,468,215	1,236,273	1,230,669
mi22_2193.23	Middleton Island Site #22	95	1,671,016	1,381,249	1,374,006
mi22_2193.24	Middleton Island Site #22	95	1,566,805	1,305,836	1,299,998
mi22_2193.25	Middleton Island Site #22	95	1,364,524	1,141,861	1,136,683
mi22_2193.26	Middleton Island Site #22	95	1,357,350	1,146,943	1,138,553
mi22_2193.27	Middleton Island Site #22	95	1,464,187	1,224,467	1,218,132
mi22_2193.28	Middleton Island Site #22	95	1,331,530	1,113,698	1,106,421
mi22_2193.29	Middleton Island Site #22	95	1,450,467	1,220,643	1,215,736
mi22_2193.30	Middleton Island Site #22	95	1,539,063	1,289,381	1,283,653
mi22_2193.31	Middleton Island Site #22	95	1,309,017	1,101,454	1,096,649
mi22_2193.32	Middleton Island Site #22	95	1,351,112	1,133,340	1,124,987
mi22_2193.33	Middleton Island Site #22	95	1,430,375	1,194,302	1,188,504
mi22_2193.34	Middleton Island Site #22	95	1,814,243	1,522,833	1,518,112
mi22_2193.35	Middleton Island Site #22	95	1,736,209	1,457,720	1,451,350
mi22_2193.36	Middleton Island Site #22	95	1,634,993	1,366,747	1,360,253
mi22_2193.37	Middleton Island Site #22	95	1,925,489	1,626,268	1,619,912
mi22_2193.38	Middleton Island Site #22	95	515,292	428,175	418,890
mi22_2193.39	Middleton Island Site #22	95	1,529,106	1,273,738	1,267,906
mi22_2193.40	Middleton Island Site #22	95	2,232,834	1,883,668	1,877,569
mi22_2193.41	Middleton Island Site #22	95	2,144,259	1,804,707	1,799,555
mi22_2193.42	Middleton Island Site #22	95	2,308,639	1,932,118	1,923,941
mi22_2193.43	Middleton Island Site #22	95	1,943,974	1,632,115	1,626,848
mi22_2193.44	Middleton Island Site #22	95	1,953,018	1,628,940	1,622,540
mi22_2193.45	Middleton Island Site #22	95	1,840,626	1,546,089	1,536,399
mi22_2193.46	Middleton Island Site #22	95	2,314,270	1,916,344	1,904,960
mi22_2193.47	Middleton Island Site #22	95	2,153,740	1,800,182	1,788,317
mi22_2193.48	Middleton Island Site #22	95	2,254,303	1,886,329	1,877,183
mi22_2193.49	Middleton Island Site #22	95	1,177,138	983,312	973,644
mi22_2193.50	Middleton Island Site #22	95	1,172,936	984,108	975,632
mi22_2193.51	Middleton Island Site #22	95	1,165,018	966,199	959,475
mi22_2193.52	Middleton Island Site #22	95	1,136,186	951,826	944,539
mi22_2193.53	Middleton Island Site #22	95	1,158,418	963,681	953,406
mi22_2193.54	Middleton Island Site #22	95	1,124,264	944,401	938,771
mi22_2193.55	Middleton Island Site #22	95	1,125,846	932,453	922,120
mi22_2193.56	Middleton Island Site #22	95	826,242	690,800	683,445
mi22_2404.01	Middleton Island Site #22	95	1,132,429	951,101	942,305
mi22_2404.02	Middleton Island Site #22	95	1,504,052	1,261,671	1,247,167
mi22_2404.03	Middleton Island Site #22	95	985,458	820,948	812,662
mi22_2404.04	Middleton Island Site #22	95	1,282,142	1,083,191	1,076,377
mi22_2404.05	Middleton Island Site #22	95	917,728	758,996	744,358
mi22_2404.06	Middleton Island Site #22	95	1,066,599	892,873	884,891
mi22_2404.07	Middleton Island Site #22	95	979,971	825,553	817,569
mi22_2404.08	Middleton Island Site #22	95	1,098,471	929,488	923,400
mi22_2404.09	Middleton Island Site #22	95	1,231,675	1,030,876	1,020,761
mi23_2194.01	Middleton Island Site #23	95	1,264,226	1,053,313	1,036,204
mi23_2194.02	Middleton Island Site #23	95	1,669,004	1,404,997	1,391,209
mi23_2194.03	Middleton Island Site #23	95	2,108,378	1,752,770	1,728,738
mi23_2194.04	Middleton Island Site #23	95	2,091,644	1,759,457	1,742,531

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mi23_2194.05	Middleton Island Site #23	95	2,057,497	1,738,174	1,721,455
mi23_2194.06	Middleton Island Site #23	95	2,133,168	1,798,005	1,781,805
mi23_2194.07	Middleton Island Site #23	95	1,994,384	1,695,831	1,681,238
mi23_2194.08	Middleton Island Site #23	95	1,578,094	1,323,737	1,310,208
mi23_2194.09	Middleton Island Site #23	95	1,831,443	1,537,476	1,526,264
mi23_2194.10	Middleton Island Site #23	95	2,526,313	2,090,283	2,069,885
mi23_2194.11	Middleton Island Site #23	95	2,009,853	1,652,783	1,637,901
mi23_2194.12	Middleton Island Site #23	95	1,696,048	1,413,866	1,400,872
mi23_2194.13	Middleton Island Site #23	95	1,718,493	1,451,542	1,436,948
mi23_2194.14	Middleton Island Site #23	95	1,919,720	1,602,634	1,587,411
mi23_2194.15	Middleton Island Site #23	95	1,717,694	1,447,772	1,434,696
mi23_2194.16	Middleton Island Site #23	95	2,522,538	2,121,157	2,106,841
mi23_2194.17	Middleton Island Site #23	95	1,846,111	1,558,373	1,541,934
mi23_2194.18	Middleton Island Site #23	95	1,504,088	1,260,386	1,244,038
mi23_2194.19	Middleton Island Site #23	95	2,308,240	1,924,619	1,906,394
mi23_2194.20	Middleton Island Site #23	95	1,386,331	1,165,522	1,151,437
mi23_2194.21	Middleton Island Site #23	95	1,694,654	1,438,877	1,424,926
mi23_2194.22	Middleton Island Site #23	95	1,769,440	1,483,890	1,467,999
mi23_2194.23	Middleton Island Site #23	95	925,621	775,278	763,163
mi23_2194.24	Middleton Island Site #23	95	1,596,847	1,346,059	1,331,592
mi23_2194.25	Middleton Island Site #23	95	157,929	130,107	105,823
mi23_2194.26	Middleton Island Site #23	95	988,578	829,298	819,906
mi23_2194.27	Middleton Island Site #23	95	1,902,726	1,593,315	1,576,734
mi23_2194.28	Middleton Island Site #23	95	1,847,610	1,550,907	1,535,516
mi23_2194.29	Middleton Island Site #23	95	571,042	475,485	466,674
mi23_2194.30	Middleton Island Site #23	95	1,493,620	1,263,343	1,246,482
mi23_2194.31	Middleton Island Site #23	95	1,187,842	990,919	979,516
mi23_2194.32	Middleton Island Site #23	95	1,561,773	1,304,200	1,291,436
mi28_2382.01	Middleton Island Site #28	95	944,551	772,669	758,488
mi28_2382.02	Middleton Island Site #28	95	706,341	585,051	577,996
mi28_2382.03	Middleton Island Site #28	95	908,568	762,339	755,140
mi28_2382.04	Middleton Island Site #28	95	1,325,493	1,106,134	1,091,434
mi28_2382.05	Middleton Island Site #28	95	841,797	705,090	699,633
mi28_2382.06	Middleton Island Site #28	95	1,293,031	1,074,642	1,070,254
mi28_2382.07	Middleton Island Site #28	95	713,144	589,206	585,012
mi28_2382.08	Middleton Island Site #28	95	945,325	785,567	780,827
mi28_2382.09	Middleton Island Site #28	95	1,298,224	1,080,386	1,076,936
mi28_2382.10	Middleton Island Site #28	95	1,365,804	1,124,870	1,111,364
mi28_2382.11	Middleton Island Site #28	95	1,171,237	982,281	977,131
mi28_2382.12	Middleton Island Site #28	95	1,521,416	1,277,914	1,272,615
mi28_2382.13	Middleton Island Site #28	95	949,445	785,528	781,683
mi28_2382.14	Middleton Island Site #28	95	799,669	661,840	655,380
mi28_2382.15	Middleton Island Site #28	95	1,144,579	955,458	951,432
mi28_2382.16	Middleton Island Site #28	95	1,063,337	890,723	886,416
mi28_2382.17	Middleton Island Site #28	95	1,159,272	967,534	963,609
mi28_2382.18	Middleton Island Site #28	95	1,272,714	1,068,934	1,064,549
mi28_2382.19	Middleton Island Site #28	95	827,545	684,849	676,875
mi28_2382.20	Middleton Island Site #28	95	410,347	341,752	330,474
mi28_2382.21	Middleton Island Site #28	95	1,069,810	890,996	886,316
mi28_2382.22	Middleton Island Site #28	95	1,085,517	904,476	899,860
mi28_2382.23	Middleton Island Site #28	95	1,364,144	1,142,745	1,138,086
mi28_2382.24	Middleton Island Site #28	95	1,635,063	1,369,360	1,359,437
mi28_2382.25	Middleton Island Site #28	95	1,162,901	961,166	955,386

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mi28_2382.26	Middleton Island Site #28	95	994,721	840,210	836,098
mi28_2382.27	Middleton Island Site #28	95	1,740,671	1,454,051	1,447,886
mi28_2382.28	Middleton Island Site #28	95	1,245,085	1,035,761	1,025,646
mi28_2382.29	Middleton Island Site #28	95	1,476,764	1,224,337	1,217,830
mi28_2382.30	Middleton Island Site #28	95	1,760,082	1,464,601	1,452,414
mi28_2382.31	Middleton Island Site #28	95	846,680	706,321	702,314
mi28_2382.32	Middleton Island Site #28	95	2,246,458	1,867,591	1,844,175
mi28_2382.33	Middleton Island Site #28	95	1,091,548	914,532	909,175
mi28_2382.34	Middleton Island Site #28	95	1,378,429	1,146,317	1,135,223
mi28_2382.35	Middleton Island Site #28	95	1,499,474	1,249,978	1,245,360
mi28_2382.36	Middleton Island Site #28	95	1,516,330	1,268,853	1,263,945
mi28_2382.37	Middleton Island Site #28	95	1,246,323	1,041,431	1,037,442
mi28_2382.38	Middleton Island Site #28	95	1,160,674	972,282	967,467
mi28_2382.39	Middleton Island Site #28	95	1,816,989	1,519,605	1,504,551
mi28_2382.40	Middleton Island Site #28	95	1,197,845	997,305	993,807
mi28_2382.41	Middleton Island Site #28	95	1,849,730	1,543,773	1,533,404
mi28_2382.42	Middleton Island Site #28	95	2,102,150	1,759,779	1,754,036
mi28_2382.44	Middleton Island Site #28	95	2,415,420	2,007,335	2,000,279
mi28_2382.45	Middleton Island Site #28	95	1,836,093	1,488,915	1,459,316
mi28_2382.46	Middleton Island Site #28	95	2,500,805	2,081,006	2,074,270
mi28_2382.47	Middleton Island Site #28	95	2,826,901	2,359,923	2,354,455
mi28_2382.48	Middleton Island Site #28	95	2,543,495	2,130,662	2,120,407
mi28_2382.49	Middleton Island Site #28	95	3,288	2,665	148
mi28_2382.50	Middleton Island Site #28	95	3,592	2,807	139
mo30_2203.025	Montague Island Site #30	95	1,161,192	975,495	961,911
mo30_2203.026	Montague Island Site #30	95	965,499	816,780	807,755
mo30_2203.027	Montague Island Site #30	95	930,876	781,060	772,427
mo30_2203.028	Montague Island Site #30	95	1,124,925	943,826	934,724
mo30_2203.029	Montague Island Site #30	95	1,163,786	965,433	956,635
mo30_2203.030	Montague Island Site #30	95	1,223,549	1,037,796	1,030,474
mo30_2203.031	Montague Island Site #30	95	1,180,647	990,700	982,960
mo30_2203.032	Montague Island Site #30	95	1,194,038	1,009,926	1,002,407
mo30_2203.033	Montague Island Site #30	95	1,131,490	946,147	940,063
mo30_2203.034	Montague Island Site #30	95	1,052,030	872,893	867,495
mo30_2203.035	Montague Island Site #30	95	1,068,044	905,394	897,146
mo30_2203.036	Montague Island Site #30	95	1,079,577	921,156	914,913
mo30_2203.037	Montague Island Site #30	95	1,217,534	1,014,891	1,002,510
mo30_2203.038	Montague Island Site #30	95	1,341,455	1,115,778	1,108,062
mo30_2203.039	Montague Island Site #30	95	1,164,775	977,266	969,286
mo30_2203.040	Montague Island Site #30	95	1,116,279	939,221	930,973
mo30_2203.041	Montague Island Site #30	95	1,088,983	911,921	906,197
mo30_2203.042	Montague Island Site #30	95	996,592	831,677	826,708
mo30_2203.043	Montague Island Site #30	95	957,101	806,053	800,902
mo30_2203.044	Montague Island Site #30	95	1,114,083	938,476	931,808
mo30_2203.045	Montague Island Site #30	95	1,099,943	916,061	907,645
mo30_2203.046	Montague Island Site #30	95	1,126,225	948,133	939,374
mo30_2203.047	Montague Island Site #30	95	972,352	815,510	810,333
mo30_2203.048	Montague Island Site #30	95	1,089,529	909,869	904,254
mo30_2203.049	Montague Island Site #30	95	1,201,689	1,014,582	1,008,883
mo30_2203.050	Montague Island Site #30	95	1,158,232	969,175	962,401
mo30_2203.101	Montague Island Site #30	95	1,123,291	944,933	936,292
mo30_2203.102	Montague Island Site #30	95	1,000,939	845,166	838,921
mo30_2203.103	Montague Island Site #30	95	1,057,028	889,945	884,492

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mo30_2203.104	Montague Island Site #30	95	1,127,192	949,827	943,080
mo30_2203.105	Montague Island Site #30	95	858,930	724,218	715,507
mo30_2203.106	Montague Island Site #30	95	1,002,673	841,608	831,078
mo30_2203.107	Montague Island Site #30	95	1,051,912	886,741	881,633
mo30_2203.108	Montague Island Site #30	95	1,023,191	861,619	854,099
mo30_2203.109	Montague Island Site #30	95	1,109,288	936,507	930,255
mo30_2203.110	Montague Island Site #30	95	1,286,540	1,088,671	1,080,983
mo30_2203.111	Montague Island Site #30	95	1,461,298	1,231,007	1,219,941
mo30_2203.112	Montague Island Site #30	95	1,418,664	1,190,991	1,185,579
mo30_2203.113	Montague Island Site #30	95	1,110,404	935,653	920,242
mo30_2203.114	Montague Island Site #30	95	1,465,899	1,221,323	1,210,954
mo30_2203.115	Montague Island Site #30	95	1,165,063	968,616	962,050
mo30_2203.116	Montague Island Site #30	95	1,359,472	1,136,406	1,127,491
mo30_2203.117	Montague Island Site #30	95	1,193,638	996,092	989,071
mo30_2203.118	Montague Island Site #30	95	1,222,356	1,029,352	1,023,021
mo30_2203.119	Montague Island Site #30	95	1,189,027	1,003,593	996,913
mo30_2203.120	Montague Island Site #30	95	1,338,867	1,114,290	1,107,326
mo33_2206.01	Montague Island Site #33	95	1,453,474	1,231,070	1,212,145
mo33_2206.02	Montague Island Site #33	95	1,608,371	1,353,799	1,332,654
mo33_2206.03	Montague Island Site #33	95	1,589,327	1,333,574	1,320,420
mo33_2206.04	Montague Island Site #33	95	821,570	693,030	673,099
mo33_2206.05	Montague Island Site #33	95	1,651,361	1,379,240	1,370,304
mo33_2206.06	Montague Island Site #33	95	1,568,532	1,310,305	1,299,127
mo33_2206.07	Montague Island Site #33	95	1,667,605	1,408,262	1,401,638
mo33_2206.08	Montague Island Site #33	95	1,574,228	1,331,154	1,313,658
mo33_2206.09	Montague Island Site #33	95	1,373,126	1,160,221	1,137,334
mo33_2206.10	Montague Island Site #33	95	1,276,662	1,069,775	1,047,873
mo33_2206.11	Montague Island Site #33	95	1,453,767	1,215,353	1,195,857
mo33_2206.12	Montague Island Site #33	95	766,662	648,054	635,738
mo33_2206.13	Montague Island Site #33	95	1,263,943	1,069,924	1,041,577
mo33_2206.14	Montague Island Site #33	95	1,555,386	1,297,891	1,269,203
mo33_2206.15	Montague Island Site #33	95	1,115,640	945,192	920,440
mo33_2206.16	Montague Island Site #33	95	1,377,067	1,147,206	1,124,768
mo33_2206.17	Montague Island Site #33	95	1,283,097	1,085,899	1,077,422
mo33_2206.18	Montague Island Site #33	95	1,162,934	967,841	959,193
mo33_2206.19	Montague Island Site #33	95	1,657,898	1,398,873	1,384,199
mo33_2206.20	Montague Island Site #33	95	1,196,108	1,012,833	994,940
mo33_2206.21	Montague Island Site #33	95	1,459,864	1,237,768	1,218,196
mo33_2206.22	Montague Island Site #33	95	1,434,064	1,202,227	1,188,834
mo33_2206.23	Montague Island Site #33	95	1,236,941	1,025,754	1,004,940
mo33_2206.24	Montague Island Site #33	95	1,549,194	1,298,953	1,284,374
mo33_2206.25	Montague Island Site #33	95	1,326,471	1,123,795	1,101,656
mo33_2206.26	Montague Island Site #33	95	2,993,771	2,531,754	2,513,054
mo33_2206.27	Montague Island Site #33	95	891,163	745,026	734,972
mo33_2206.28	Montague Island Site #33	95	1,530,990	1,296,545	1,283,987
mo33_2206.29	Montague Island Site #33	95	1,467,598	1,231,077	1,220,086
mo33_2206.30	Montague Island Site #33	95	1,677,080	1,403,146	1,383,119
mo33_2206.31	Montague Island Site #33	95	1,594,248	1,348,685	1,340,854
mo33_2206.32	Montague Island Site #33	95	1,595,084	1,344,538	1,334,585
mo33_2206.33	Montague Island Site #33	95	1,600,752	1,341,758	1,333,264
mo33_2206.34	Montague Island Site #33	95	1,351,342	1,124,038	1,111,551
mo33_2206.35	Montague Island Site #33	95	1,623,417	1,379,095	1,369,123
mo33_2206.36	Montague Island Site #33	95	1,729,936	1,467,982	1,461,467

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mo33_2206.37	Montague Island Site #33	95	1,256,236	1,050,197	1,037,657
mo33_2206.38	Montague Island Site #33	95	1,839,013	1,547,975	1,531,304
mo33_2206.39	Montague Island Site #33	95	1,172,176	983,196	971,728
mo33_2206.40	Montague Island Site #33	95	1,908,612	1,610,477	1,593,546
mo33_2206.41	Montague Island Site #33	95	1,388,740	1,158,490	1,149,768
mo33_2206.42	Montague Island Site #33	95	1,752,246	1,466,414	1,453,752
mo33_2206.43	Montague Island Site #33	95	1,533,180	1,296,676	1,291,114
mo33_2206.44	Montague Island Site #33	95	1,587,088	1,319,619	1,310,641
mo33_2206.45	Montague Island Site #33	95	1,558,470	1,329,742	1,321,811
mo33_2206.46	Montague Island Site #33	95	1,654,958	1,392,944	1,382,457
mo33_2206.47	Montague Island Site #33	95	1,782,754	1,510,449	1,500,083
mo33_2206.48	Montague Island Site #33	95	1,984,629	1,662,247	1,651,711
mo33_2206.49	Montague Island Site #33	95	1,416,609	1,203,789	1,193,741
mo33_2206.50	Montague Island Site #33	95	1,557,503	1,319,260	1,305,262
mo35_2409.01	Montague Island Site #35	95	1,171,434	987,714	974,496
mo35_2409.02	Montague Island Site #35	95	1,756,280	1,486,657	1,474,010
mo35_2409.03	Montague Island Site #35	95	1,500,414	1,249,985	1,241,848
mo35_2409.04	Montague Island Site #35	95	2,083,669	1,775,923	1,769,625
mo35_2409.05	Montague Island Site #35	95	1,842,365	1,546,965	1,534,323
mo35_2409.06	Montague Island Site #35	95	1,663,799	1,405,029	1,392,125
mo35_2409.07	Montague Island Site #35	95	1,763,763	1,496,904	1,488,412
mo35_2409.08	Montague Island Site #35	95	1,635,451	1,389,715	1,381,721
mo35_2409.09	Montague Island Site #35	95	1,707,268	1,444,724	1,438,503
mo35_2409.10	Montague Island Site #35	95	1,589,666	1,337,572	1,329,247
mo35_2409.11	Montague Island Site #35	95	912	745	99
mo35_2409.12	Montague Island Site #35	95	1,581,258	1,336,002	1,328,992
mo35_2409.13	Montague Island Site #35	95	1,477,021	1,245,324	1,240,865
mo35_2409.14	Montague Island Site #35	95	1,698,616	1,445,806	1,435,881
mo35_2409.15	Montague Island Site #35	95	1,384,187	1,172,022	1,165,470
mo35_2409.16	Montague Island Site #35	95	1,396,789	1,182,541	1,175,384
mo35_2409.17	Montague Island Site #35	95	1,902,935	1,606,607	1,597,778
mo35_2409.18	Montague Island Site #35	95	1,489,675	1,248,956	1,242,323
mo35_2409.19	Montague Island Site #35	95	1,240,692	1,034,644	1,022,668
mo35_2409.20	Montague Island Site #35	95	1,841,550	1,557,906	1,551,652
mo35_2409.21	Montague Island Site #35	95	1,713,355	1,447,170	1,440,454
mo35_2409.22	Montague Island Site #35	95	1,946,829	1,635,029	1,624,208
mo35_2409.23	Montague Island Site #35	95	1,039	871	163
mo35_2409.24	Montague Island Site #35	95	1,547,837	1,305,711	1,297,885
mo35_2409.25	Montague Island Site #35	95	1,527,291	1,288,755	1,282,621
mo35_2409.26	Montague Island Site #35	95	1,313,775	1,112,200	1,103,690
mo35_2409.27	Montague Island Site #35	95	1,476,450	1,240,096	1,217,524
mo35_2409.28	Montague Island Site #35	95	1,452,717	1,234,186	1,208,588
mo35_2409.29	Montague Island Site #35	95	1,608,721	1,350,967	1,333,018
mo35_2409.30	Montague Island Site #35	95	1,331,092	1,117,134	1,105,094
mo35_2409.31	Montague Island Site #35	95	1,341,307	1,122,577	1,114,470
mo35_2409.32	Montague Island Site #35	95	1,392,033	1,180,372	1,168,312
mo35_2409.33	Montague Island Site #35	95	1,291,658	1,095,006	1,083,187
mo35_2409.34	Montague Island Site #35	95	1,476,699	1,245,099	1,237,169
mo35_2409.35	Montague Island Site #35	95	1,318,368	1,116,498	1,105,847
mo35_2409.36	Montague Island Site #35	95	1,103,176	938,102	922,376
mo35_2409.37	Montague Island Site #35	95	1,299,205	1,089,629	1,076,991
mo35_2409.38	Montague Island Site #35	95	1,326,082	1,111,250	1,099,436
mo35_2409.39	Montague Island Site #35	95	1,458,619	1,219,203	1,208,601

Sample	Population	Read Length	Raw Read Counts	GSNAP Aligned	Used by Stacks
mo35_2409.40	Montague Island Site #35	95	1,339,998	1,123,935	1,113,901
mo35_2409.41	Montague Island Site #35	95	1,388,878	1,179,381	1,162,952
mo35_2409.42	Montague Island Site #35	95	1,320,740	1,120,459	1,112,487
mo35_2409.43	Montague Island Site #35	95	1,112,119	926,910	917,406
mo35_2409.44	Montague Island Site #35	95	1,539,479	1,309,325	1,299,583
mo35_2409.45	Montague Island Site #35	95	1,238,920	1,033,261	1,024,152
mo35_2409.46	Montague Island Site #35	95	1,495,806	1,275,403	1,262,121
mo35_2409.47	Montague Island Site #35	95	1,650,537	1,373,535	1,350,814
mo35_2409.48	Montague Island Site #35	95	1,376,077	1,178,079	1,158,364
mo35_2409.49	Montague Island Site #35	95	1,342,275	1,138,452	1,124,664
mo35_2409.50	Montague Island Site #35	95	1,194,501	1,003,995	980,201
mo36_2410.01	Montague Island Site #36	95	1,958,842	1,655,489	1,646,859
mo36_2410.02	Montague Island Site #36	95	1,744,247	1,470,361	1,465,137
mo36_2410.03	Montague Island Site #36	95	1,523,544	1,281,200	1,272,952
mo36_2410.04	Montague Island Site #36	95	1,414,821	1,206,887	1,200,758
mo36_2410.05	Montague Island Site #36	95	1,655,001	1,379,502	1,372,540
mo36_2410.06	Montague Island Site #36	95	1,224,305	1,036,161	1,030,734
mo36_2410.07	Montague Island Site #36	95	1,579,169	1,337,802	1,331,026
mo36_2410.08	Montague Island Site #36	95	1,651,034	1,402,227	1,391,977
mo36_2410.09	Montague Island Site #36	95	1,555,978	1,300,574	1,290,393
mo36_2410.10	Montague Island Site #36	95	1,527,427	1,287,456	1,281,100
mo36_2410.11	Montague Island Site #36	95	340	281	68
mo36_2410.12	Montague Island Site #36	95	1,773,640	1,516,836	1,507,475
mo36_2410.13	Montague Island Site #36	95	443,165	377,079	369,443
mo36_2410.14	Montague Island Site #36	95	1,726,317	1,468,571	1,456,800
mo36_2410.15	Montague Island Site #36	95	1,779,908	1,520,217	1,511,642
mo36_2410.16	Montague Island Site #36	95	496,884	423,491	415,077
mo36_2410.17	Montague Island Site #36	95	434,246	370,051	362,114
mo36_2410.18	Montague Island Site #36	95	1,772,709	1,482,632	1,475,057
mo37_2411.01	Montague Island Site #37	95	1,057,379	893,828	875,566
mo37_2411.02	Montague Island Site #37	95	2,018,050	1,685,834	1,660,805
mo37_2411.03	Montague Island Site #37	95	1,491,598	1,241,447	1,225,860
mo37_2411.04	Montague Island Site #37	95	1,883,747	1,604,212	1,589,600
mo37_2411.05	Montague Island Site #37	95	1,664,969	1,401,670	1,384,248
mo37_2411.06	Montague Island Site #37	95	2,337,416	1,940,977	1,880,223
mo37_2411.07	Montague Island Site #37	95	1,607,084	1,350,633	1,336,576
mo37_2411.08	Montague Island Site #37	95	1,613,191	1,358,261	1,346,042
mo37_2411.09	Montague Island Site #37	95	1,472,651	1,235,393	1,212,395
mo37_2411.10	Montague Island Site #37	95	1,421,537	1,202,008	1,185,874
mo37_2411.11	Montague Island Site #37	95	483	402	73
mo37_2411.12	Montague Island Site #37	95	1,854,980	1,560,778	1,542,305
mo37_2411.13	Montague Island Site #37	95	2,182,238	1,822,509	1,797,514
mo37_2411.14	Montague Island Site #37	95	1,714,147	1,434,661	1,405,473
mo37_2411.15	Montague Island Site #37	95	1,707,968	1,439,598	1,425,693
mo37_2411.16	Montague Island Site #37	95	2,020,701	1,687,883	1,653,445
mo37_2411.17	Montague Island Site #37	95	1,685,729	1,415,121	1,399,759
mo37_2411.18	Montague Island Site #37	95	2,056,482	1,720,343	1,681,184
mo37_2411.19	Montague Island Site #37	95	1,570,184	1,305,009	1,276,845
mo37_2411.20	Montague Island Site #37	95	2,308,328	1,940,487	1,899,724
mo37_2411.21	Montague Island Site #37	95	1,660,425	1,372,825	1,329,663
mo37_2411.22	Montague Island Site #37	95	1,453,735	1,221,846	1,214,354
mo37_2411.23	Montague Island Site #37	95	879	745	134
mo37_2411.24	Montague Island Site #37	95	1,766,129	1,500,915	1,480,614

Sample	Population	Read Length	Raw Read Counts	GSNAP Aligned	Used by Stacks
mo37_2411.25	Montague Island Site #37	95	1,994,874	1,676,627	1,640,933
ufl_2488.001	Upper Fire Lake	95	1,110,281	930,103	914,408
ufl_2488.002	Upper Fire Lake	95	1,199,335	994,337	980,672
ufl_2488.003	Upper Fire Lake	95	1,190,145	996,027	983,422
ufl_2488.004	Upper Fire Lake	95	1,230,227	1,020,029	1,003,755
ufl_2488.005	Upper Fire Lake	95	1,264,324	1,059,014	1,046,837
ufl_2488.006	Upper Fire Lake	95	880,553	745,685	735,637
ufl_2488.007	Upper Fire Lake	95	1,447,246	1,189,398	1,173,233
ufl_2488.008	Upper Fire Lake	95	1,196,877	1,002,641	991,967
ufl_2488.009	Upper Fire Lake	95	1,277,667	1,072,449	1,062,671
ufl_2488.010	Upper Fire Lake	95	1,306,208	1,093,320	1,085,484
ufl_2488.011	Upper Fire Lake	95	1,354,557	1,132,049	1,123,364
ufl_2488.012	Upper Fire Lake	95	1,144,544	950,954	940,796
ufl_2488.013	Upper Fire Lake	95	1,432,146	1,200,131	1,174,767
ufl_2488.014	Upper Fire Lake	95	1,343,220	1,138,602	1,126,024
ufl_2488.015	Upper Fire Lake	95	1,035,893	868,064	857,169
ufl_2488.016	Upper Fire Lake	95	1,029,555	861,511	852,081
ufl_2488.017	Upper Fire Lake	95	1,121,491	928,631	915,613
ufl_2488.018	Upper Fire Lake	95	1,205,455	1,006,878	996,477
ufl_2488.019	Upper Fire Lake	95	629,918	525,232	515,350
ufl_2488.020	Upper Fire Lake	95	955,072	793,300	783,275
ufl_2488.021	Upper Fire Lake	95	997,220	835,191	826,175
ufl_2488.022	Upper Fire Lake	95	1,446,312	1,205,688	1,194,408
ufl_2488.023	Upper Fire Lake	95	922,440	772,877	760,936
ufl_2488.024	Upper Fire Lake	95	1,247,765	1,039,958	1,030,940
ufl_2488.025	Upper Fire Lake	95	1,265,050	1,062,785	1,035,688
ufl_2488.026	Upper Fire Lake	95	1,121,314	935,575	918,085
ufl_2488.027	Upper Fire Lake	95	1,004,461	842,623	830,527
ufl_2488.028	Upper Fire Lake	95	1,094,640	915,789	901,690
ufl_2488.029	Upper Fire Lake	95	1,113,209	926,045	913,090
ufl_2488.030	Upper Fire Lake	95	1,224,870	1,032,695	1,025,161
ufl_2488.031	Upper Fire Lake	95	1,284,348	1,073,360	1,062,514
ufl_2488.032	Upper Fire Lake	95	1,170,334	983,161	973,951
ufl_2488.033	Upper Fire Lake	95	1,019,769	853,894	846,674
ufl_2488.034	Upper Fire Lake	95	1,068,326	892,195	883,145
ufl_2488.035	Upper Fire Lake	95	940,668	781,093	769,374
ufl_2488.036	Upper Fire Lake	95	1,380,762	1,154,576	1,144,086
ufl_2488.037	Upper Fire Lake	95	1,205,836	1,008,420	976,311
ufl_2488.038	Upper Fire Lake	95	1,187,283	994,984	969,387
ufl_2488.039	Upper Fire Lake	95	1,276,670	1,078,822	1,068,135
ufl_2488.040	Upper Fire Lake	95	1,082,325	908,552	896,820
ufl_2488.041	Upper Fire Lake	95	1,392,045	1,155,985	1,107,725
ufl_2488.042	Upper Fire Lake	95	1,174,467	981,875	968,655
ufl_2488.043	Upper Fire Lake	95	1,042,676	877,153	856,377
ufl_2488.044	Upper Fire Lake	95	1,247,961	1,037,742	1,018,559
ufl_2488.045	Upper Fire Lake	95	1,757,945	1,475,378	1,466,592
ufl_2488.046	Upper Fire Lake	95	1,281,048	1,071,657	1,062,344
ufl_2488.047	Upper Fire Lake	95	870,618	733,704	725,384
ufl_2488.048	Upper Fire Lake	95	1,415,522	1,179,324	1,165,973
ufl_2488.049	Upper Fire Lake	95	1,249,116	1,030,413	1,015,236
ufl_2488.050	Upper Fire Lake	95	1,475,072	1,231,035	1,214,023
Mean:			1,286,458	1,078,090	1,066,401

Sample	Population	Read Length	Raw Read Counts	GSNAP Aligned	Used by Stacks
Standard Error:			14,777.21	12,383.05	12,335.54
Percent:				83.80%	98.92%

Table S8. Summary genetic statistics for all sites calculated for 1) only nucleotide positions that are polymorphic in at least one site ("Variant Positions") and 2) all nucleotide positions across all RAD sites regardless of whether they are polymorphic or fixed ("All Positions"). These statistics include the average number of individuals genotyped at each locus (N), the number of variable sites unique to each site (Private), the number of polymorphic (top) or total (bottom) nucleotide sites across the data set (Sites), percentage of polymorphic loci (% poly), the average frequency of the major allele (P), the average observed homozygosity per locus (H_{obs}), the average nucleotide diversity (π), and the average Wright's inbreeding coefficient (F_{IS}).

Site	N	% Poly	P	H_{OBS}	π	F_{IS}
Polymorphic in entire set of sites						
Da02	48.88	4.93	0.998	0.0028	0.0029	0.0004
Da04	46.32	4.94	0.999	0.0019	0.0020	0.0003
Mi06	39.74	4.93	0.998	0.0030	0.0032	0.0006
Mi07	48.89	4.93	0.998	0.0024	0.0026	0.0011
Mi08	36.66	4.93	0.998	0.0030	0.0032	0.0009
Mi11	38.01	4.93	0.998	0.0028	0.0032	0.0014
Mi12	94.70	4.94	0.998	0.0023	0.0025	0.0005
Mi13	40.88	4.93	0.998	0.0028	0.0031	0.0015
Mi14	71.03	4.93	0.998	0.0029	0.0034	0.0018
Mi15	47.72	4.94	0.998	0.0026	0.0027	0.0005
Mi16	43.74	4.93	0.998	0.0030	0.0032	0.0007
Mi17	49.83	4.93	0.998	0.0027	0.0029	0.0013
Mi22	64.77	4.92	0.998	0.0028	0.0032	0.0018
Mi23	31.48	4.93	0.998	0.0027	0.0029	0.0006
Mi28	46.75	4.93	0.998	0.0030	0.0032	0.0007
Mo30	45.74	4.94	0.998	0.0029	0.0030	0.0006
Mo33	49.84	4.93	0.998	0.0031	0.0032	0.0003
Mo35	47.86	4.94	0.998	0.0021	0.0021	0.0001
Mo36	16.77	4.94	0.999	0.0019	0.0021	0.0004
Mo37	22.95	4.94	0.998	0.0020	0.0021	0.0002
UFL	49.83	4.94	0.999	0.0019	0.0019	0.0000

Site	N	% Poly	P	H_{OBS}	π	F_{IS}
Polymorphic in the focal site						
Da02		NA	0.960925	0.942946	0.00288227	0.000398734
Da04		NA	0.970679	0.961429	0.00202103	0.0003
Mi06		NA	0.955751	0.938661	0.00318626	0.0006
Mi07		NA	0.963029	0.952094	0.00262713	0.0011
Mi08		NA	0.954994	0.938724	0.00324849	0.0009
Mi11		NA	0.95576	0.942421	0.0032035	0.0014
Mi12		NA	0.963278	0.953304	0.00245927	0.0005
Mi13		NA	0.958213	0.943469	0.00313516	0.0015
Mi14		NA	0.952591	0.941718	0.00340623	0.0018
Mi15		NA	0.960585	0.94721	0.00274771	0.0005
Mi16		NA	0.95553	0.938751	0.0031903	0.0007
Mi17		NA	0.961095	0.9450	0.0028885	0.0013
Mi22		NA	0.95699	0.942448	0.00321066	0.0018
Mi23		NA	0.961447	0.944694	0.00286329	0.0006
Mi28		NA	0.955873	0.939268	0.00316933	0.0007
Mo30		NA	0.957201	0.941948	0.00303252	0.0006
Mo33		NA	0.955019	0.937346	0.00320108	0.0003
Mo35		NA	0.969021	0.95834	0.00209344	0.0001
Mo36		NA	0.970137	0.961306	0.00206855	0.0004
Mo37		NA	0.969212	0.95947	0.00208994	0.0002
UFL		NA	0.972678	0.962037	0.00185155	0.0000

Table S9. Results of Analyses of Molecular Variance (AMOVA). For each analysis, most of the variation is at the level of the individual, which is consistent with recent colonization. Habitat Type = freshwater or oceanic, based on water chemistry. Lateral Plate Morph represents the mean phenotype of the population (low, partially, or high plated).

Comparison	Source of Variation	Nested In	% Variation	F-Statistic	P Value
All Populations	Within Individual	—	73.6	F_it	—
	Among Individual	Population	4.3	F_is	<0.001
	Among Population	Island	15.3	F_sc	<0.001
	Among Region	—	6.8	F_ct	<0.001
All Populations	Within Individual	—	72.7	F_it	—
	Among Individual	Population	4.2	F_is	<0.001
	Among Population	Habitat Type	17.7	F_sc	<0.001
	Among Habitat Type	—	5.3	F_ct	0.003
All Populations	Within Individual	—	77.6	F_it	—
	Among Individual	Population	4.9	F_is	0.001
	Among Population	Lateral Plate Morph	12.7	F_sc	0.001
	Among Lateral Plate Morph	—	4.7	F_ct	0.001
Middleton	Within Individual	—	71.2	F_it	—
	Among Individual	Population	4.8	F_is	<0.001
	Among Population	Habitat Type	10.1	F_sc	<0.001
	Among Habitat Type	—	13.9	F_ct	<0.001
Middleton FW	Within Individual	—	79.8	F_it	—
	Among Individual	Population	5.3	F_is	<0.001
	Among Population	Watershed	6.2	F_sc	<0.001
	Among Watershed	—	9.4	F_ct	0.016
Montague	Within Individual	—	75.4	F_it	—
	Among Individual	Population	2.5	F_is	<0.001
	Among Population	Region	4.7	F_sc	<0.001
	Among Region	—	17.4	F_ct	<0.001
Danger	Within Individual	—	83.4	F_it	—
	Among Individual	Population	2.9	F_is	<0.001

Comparison	Source of Variation	Nested In	% Variation	F-Statistic	P Value
	Among Population	—	13.7	F_st	<0.001
Ocean	Within Individual	—	89.1	F_it	—
	Among Individual	Population	5.6	F_is	<0.001
	Among Population	—	5.2	F_st	<0.001

Table S10. Heat map of pairwise comparisons of genetic distance (F_{ST}) among sites. Da=Danger Island, Mi=Middleton Island, Mo=Montague Island, UFL=Upper Fire Lake. Dark green represents the least amount of genetic divergence, yellow represents moderate levels, and red represents the most differentiated populations. Top: All populations. Bottom: Middleton site 12 and sympatric sites with individuals categorized based on lateral plate phenotype.

	Danger	Middleton Freshwater							Middleton Sympatric						Montague					Cook Inlet
	Da04	Mi06	Mi07	Mi11	Mi15	Mi16	Mi28	Mi12	Mi08	Mi13	Mi14	Mi22	Mi17	Mi23	Mo30	Mo33	Mo35	Mo36	Mo37	UFL
Da02	0.04	0.04	0.06	0.04	0.07	0.05	0.04	0.06	0.01	0.01	0.02	0.01	0.00	0.00	0.04	0.03	0.05	0.04	0.04	0.07
Da04		0.09	0.12	0.09	0.15	0.09	0.09	0.14	0.03	0.04	0.05	0.03	0.03	0.04	0.10	0.07	0.14	0.13	0.14	0.17
Mi06			0.04	0.02	0.04	0.01	0.01	0.07	0.01	0.02	0.01	0.02	0.03	0.04	0.03	0.03	0.09	0.07	0.08	0.10
Mi07				0.04	0.04	0.03	0.03	0.09	0.03	0.04	0.02	0.04	0.05	0.06	0.06	0.05	0.12	0.10	0.11	0.12
Mi11					0.04	0.01	0.01	0.06	0.02	0.03	0.01	0.02	0.04	0.04	0.03	0.03	0.09	0.07	0.08	0.09
Mi15						0.03	0.03	0.11	0.03	0.05	0.02	0.04	0.06	0.06	0.06	0.06	0.14	0.12	0.13	0.15
Mi16							0.00	0.07	0.02	0.03	0.01	0.02	0.04	0.04	0.03	0.03	0.09	0.07	0.08	0.10
Mi28								0.07	0.02	0.03	0.01	0.02	0.04	0.04	0.03	0.03	0.09	0.07	0.08	0.10
Mi12									0.04	0.05	0.04	0.04	0.05	0.05	0.08	0.07	0.13	0.11	0.12	0.15
Mi08										0.00	0.01	0.00	0.01	0.01	0.02	0.01	0.03	0.02	0.02	0.04
Mi13											0.01	0.00	0.00	0.00	0.03	0.02	0.04	0.03	0.03	0.06
Mi14												0.01	0.02	0.02	0.02	0.02	0.05	0.03	0.04	0.06
Mi22													0.00	0.00	0.02	0.01	0.03	0.02	0.03	0.05
Mi17														0.00	0.04	0.02	0.04	0.03	0.03	0.05
Mi23															0.04	0.02	0.04	0.04	0.04	0.07
Mo30																0.03	0.10	0.08	0.09	0.11
Mo33																	0.07	0.05	0.06	0.09
Mo35																		0.00	0.01	0.17
Mo36																			0.01	0.16
Mo37																				0.17

	Mi12 HP	Mi08 FW	Mi13 FW	Mi14 FW	Mi22 FW	Mo33 FW	Mi08 OC	Mi13 OC	Mi14 OC	Mi22 OC	Mo33 OC
Mi12 LP	0.00	0.06	0.05	0.06	0.05	0.07	0.05	0.05	0.04	0.05	0.09
Mi12 HP		0.06	0.06	0.07	0.06	0.08	0.05	0.05	0.05	0.05	0.10
Mi08 FW			0.01	0.01	0.01	0.03	0.03	0.03	0.01	0.03	0.04
Mi13 FW				0.01	0.01	0.02	0.03	0.03	0.01	0.03	0.05
Mi14 FW					0.01	0.03	0.04	0.04	0.02	0.04	0.06
Mi22 FW						0.02	0.03	0.04	0.01	0.04	0.05
Mo33 FW							0.03	0.03	0.02	0.03	0.04
Mi08 OC								0.00	0.01	0.00	0.01
Mi13 OC									0.01	0.00	0.02
Mi14 OC										0.01	0.02
Mi22 OC											0.02

Table S11. Posterior probabilities of assignment to the Middleton pre-1964 site (Mi12) and Upper Fire Lake (UFL) clusters in the overall Structure analysis.

Population	Mi12 Cluster	UFL Cluster	N
Mi12	0.993	0.007	96
UFL	0.005	0.995	50

Table S12. Posterior probabilities of assignment to the oceanic and freshwater clusters in the overall Structure analysis.

Population	Oceanic Cluster	Freshwater Cluster	N
Mo37	0.992	0.008	23
Mo36	0.946	0.054	15
Mo35	0.987	0.013	48
Da04	0.911	0.089	46
Mi23	0.965	0.035	31
Mi17	0.935	0.065	50
Da02	0.967	0.033	49
Mi13	0.835	0.165	41
Mi22	0.792	0.208	65
Mi08	0.675	0.325	87
Mo33	0.668	0.332	50
Mi12	0.194	0.806	96
Mo30	0.481	0.519	46
Mi14	0.381	0.619	66
Mi06	0.328	0.672	40
Mi16	0.269	0.731	44
Mi28	0.257	0.743	47
Mi11	0.157	0.843	38
Mi07	0.107	0.893	48
Mi15	0.048	0.952	48

Table S13. Posterior probabilities of assignment to clusters in the Middleton freshwater *STRUCTURE* analysis. Individuals from Mi08, Mi13, Mi14, and Mi22 are those with freshwater phenotypes and genotypes (low lateral plate count and positive PC 1 scores).

Site	Cluster 1	Cluster 2	Cluster 3	Cluster 4	N
Mi06	0.016	0.965	0.004	0.015	40
Mi07	0.863	0.096	0.027	0.015	50
Mi08	0.026	0.893	0.004	0.007	11
Mi11	0.104	0.816	0.035	0.045	39
Mi12	0.002	0.013	0.009	0.976	96
Mi13	0.222	0.673	0.000	0.104	8
Mi14	0.432	0.487	0.069	0.011	39
Mi15	0.968	0.011	0.003	0.017	48
Mi16	0.017	0.971	0.005	0.007	44
Mi22	0.132	0.712	0.000	0.156	14
Mi28	0.016	0.937	0.044	0.003	49

Table S14 . Summary genetic statistics and (standard deviation) for groups of sites split into those calculated for 1) only nucleotide positions that are polymorphic in at least one site (“Variant Positions”), or 2) all nucleotide positions positions across all RAD sites regardless of whether they are polymorphic or fixed (“All Positions”). These statistics include the average number of individuals genotyped at each locus (N), the number of variable sites unique to each site (Private), the number of polymorphic (top) or total (bottom) nucleotide sites across the data set (Sites), percentage of polymorphic loci (% poly), the average frequency of the major allele (P), the average observed heterozygosity per locus (Hobs), the average nucleotide diversity (π), and the average Wright’s inbreeding coefficient (FIS). “Ocean” = Danger site Da02 and Middleton Mi17 and Mi23. “Middleton FW 1” = Mi7 and Mi15. “Middleton FW 2” = sites Mi06, Mi11, Mi16, and Mi28. “Middleton sympatric” = Mi13, Mi14, and Mi22. “Montague SE” = Mo30 and Mo33. “Montague SW” = Mo35, Mo36 and Mo37.

Variant Positions							
Site Group	N	Private	P	Hobs	π	F_{IS}	Sites
Ocean	43.26 (10.31)	3810 (1524)	0.9612 (0.0003)	0.0558 (0.0011)	0.0584 (0.0003)	0.0162 (0.0100)	123203 (67.51)
Danger FW	46.06	1594	0.970679	0.0386	0.0409	0.0065	123491
Middleton FW 1	47.99 (5.994)	956 (2378)	0.9618 (0.0055)	0.0503 (0.0104)	0.0544 (0.0112)	0.0159 (0.0058)	123428 (69.30)
Middleton FW 2	41.81 (8.573)	1116 (2496)	0.9557 (0.0074)	0.0602 (0.0094)	0.0646 (0.0123)	0.0173 (0.0145)	123328 (27.72)
Middleton Sympatric	53.05 (14.70)	3939 (1604)	0.9557 (0.0067)	0.0584 (0.0107)	0.0660 (0.0113)	0.0303 (0.0063)	123481 (116.0)
Middleton Site 12	93.92	515	0.963278	0.0467	0.0498	0.0094	123182
Montague SW	47.59 (36.84)	935 (425.1)	0.9561 (0.0053)	0.0604 (0.0100)	0.0631 (0.0105)	0.0090 (0.0056)	123379 (26.16)
Montague SE	29.09 (16.41)	353 (210.3)	0.9695 (0.0006)	0.0403 (0.0015)	0.0422 (0.0003)	0.0051 (0.0031)	123510 (6.658)
Upper Fire Lake	49.69	908	0.972678	0.0380	0.0375	0.0008	123505
All Positions							
Site Group	N	P	Hobs	π	F_{IS}	Sites	% Poly
Ocean	43.40 (10.33)	0.9981 (0.0000)	0.0027 (0.0001)	0.0029 (0.0000)	0.0008 (0.0005)	2500030 (67.86)	0.0493 (0.0000)
Danger FW	46.32	0.9986	0.0019	0.0020	0.0003	2500318	0.0494 (0.0000)
Middleton FW 1	48.30 (0.8282)	0.9981 (0.0001)	0.0025 (0.0002)	0.0027 (0.0001)	0.0008 (0.0004)	2500234 (36.77)	0.0494 (0.0000)
Middleton FW 2	42.06 (3.940)	0.9978 (0.0000)	0.0030 (0.0001)	0.0032 (0.0000)	0.0009 (0.0004)	2500155 (32.59)	0.0493 (0.0000)
Middleton Sympatric	94.70 (17.10)	0.9981 (0.0001)	0.0023 (0.0001)	0.0025 (0.0001)	0.0005 (0.0004)	2500238 (119.5)	0.0494 (0.0000)

Middleton Site 12	53.33	0.9978	0.0029	0.0033	0.0015	2500010	0.0493 (0.0000)
Montague SW	47.79 (2.897)	0.9978 (0.0001)	0.0030 (0.0002)	0.0031 (0.0001)	0.0004 (0.0002)	2500215 (23.33)	0.0493 (0.0000)
Montague SE	29.19 (16.46)	0.9985 (0.0000)	0.0020 (0.0001)	0.0021 (0.0000)	0.0003 (0.0002)	2500229 (5.508)	0.0494 (0.0000)
Upper Fire Lake	49.83	0.9987	0.0019	0.0019	0.0000	2500137	0.0494 (0.0000)

Table S15. Posterior probabilities of assignment to clusters in the Montague Structure analysis. Loci were sampled from all populations pooled and the Montague populations were parsed out of the full data set. The optimal number of clusters (*K*) is 4 according to the DeltaK method (Evanno et al. 2005).

	Cluster			
Site	1	2	3	4
Mo30	0.003	0.008	0.007	0.982
Mo33	0.018	0.001	0.424	0.557
Mo35	0.994	0.003	0.003	0.001
Mo36	0.854	0.144	0.001	0.001
Mo37	0.997	0.001	0.002	0.001

Table S16. Posterior probabilities of assignment to the oceanic (Da02) and freshwater (Da04) clusters in the Structure analysis.

Population	Oceanic Cluster	Freshwater Cluster	N
Da02	1.0	0.0	49
Da04	0.033	0.967	47