PERMANOVA
Permutational MANOVA

Resemblance worksheet
Name: Heron_NGS_vs_qPCR_boundary_350_stand_sqrt_resem
Data type: Similarity
Selection: All
Standardise Samples by Total
Transform: Square root
Resemblance: S17 Bray Curtis similarity

Sums of squares type: Type III (partial)
Fixed effects sum to zero for mixed terms
Permutation method: Unrestricted permutation of raw data
Number of permutations: 999

Factors
Name Type Levels
Technique Fixed 2
Site Fixed 3
Habitat Fixed 3
Season Fixed 2

PAIR-WISE TESTS

Term 'TechniquexSitexHabitatxSeason' for pairs of levels of factor 'Technique'
Within level 'Site 1' of factor 'Site'
Within level 'Water' of factor 'Habitat'
Within level 'Spawning' of factor 'Season'

Unique
Groups t P(perm) perms
qPCR, NGS 3.9589 0.03 35

Denominators
Groups Denominator Den.df
qPCR, NGS 1*Res 6

Average Similarity between/within groups
qPCR NGS
qPCR 98.434
NGS 91.994 95.797

Within level 'Site 1' of factor 'Site'
Within level 'Water' of factor 'Habitat'
Within level 'Summer' of factor 'Season'

Unique
Groups t P(perm) perms
qPCR, NGS 2.6862 0.056 35

Denominators
Groups Denominator Den.df
qPCR, NGS 1*Res 6

Average Similarity between/within groups
qPCR NGS
qPCR 94.259
NGS 89.451 92.903

Within level 'Site 1' of factor 'Site'
Within level 'Sediment' of factor 'Habitat'
Within level 'Spawning' of factor 'Season'

Unique
Groups t P(perm) perms
<table>
<thead>
<tr>
<th>Groups</th>
<th>Denominator</th>
<th>Den.df</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>qPCR, NGS</td>
<td>1*Res</td>
<td>6</td>
<td></td>
</tr>
</tbody>
</table>

**Denominators**

**Average Similarity between/within groups**

<table>
<thead>
<tr>
<th>Groups</th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>qPCR</td>
<td>NGS</td>
<td></td>
<td></td>
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<tr>
<td>qPCR</td>
<td>65.536</td>
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</tr>
<tr>
<td>NGS</td>
<td>66.037 83.22</td>
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Within level 'Site 1' of factor 'Site'
Within level 'Sediment' of factor 'Habitat'
Within level 'Summer' of factor 'Season'

**Groups**

<table>
<thead>
<tr>
<th>Denominators</th>
<th>t</th>
<th>P(perm)</th>
<th>perms</th>
</tr>
</thead>
<tbody>
<tr>
<td>qPCR, NGS</td>
<td>2.4841</td>
<td>0.018</td>
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**Denominators**

**Average Similarity between/within groups**

<table>
<thead>
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<th>Groups</th>
<th>Denominator</th>
<th>Den.df</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>qPCR</td>
<td>NGS</td>
<td></td>
<td></td>
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<tr>
<td>qPCR</td>
<td>85.354</td>
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</tr>
<tr>
<td>NGS</td>
<td>73.601 83</td>
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</tbody>
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Within level 'Site 1' of factor 'Site'
Within level 'Macroalgae' of factor 'Habitat'
Within level 'Spawning' of factor 'Season'

**Groups**

<table>
<thead>
<tr>
<th>Denominators</th>
<th>t</th>
<th>P(perm)</th>
<th>perms</th>
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<tbody>
<tr>
<td>qPCR, NGS</td>
<td>2.9512</td>
<td>0.027</td>
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**Denominators**

**Average Similarity between/within groups**

<table>
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<th>Groups</th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>qPCR</td>
<td>NGS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>qPCR</td>
<td>91.466</td>
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<tr>
<td>NGS</td>
<td>78.584 84.708</td>
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Within level 'Site 1' of factor 'Site'
Within level 'Macroalgae' of factor 'Habitat'
Within level 'Summer' of factor 'Season'

**Groups**

<table>
<thead>
<tr>
<th>Denominators</th>
<th>t</th>
<th>P(perm)</th>
<th>perms</th>
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</thead>
<tbody>
<tr>
<td>qPCR, NGS</td>
<td>3.1985</td>
<td>0.034</td>
<td>35</td>
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</table>

**Denominators**

**Average Similarity between/within groups**

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<tr>
<th>Groups</th>
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<th></th>
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</thead>
<tbody>
<tr>
<td>qPCR</td>
<td>NGS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>qPCR</td>
<td>92.855</td>
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<tr>
<td>NGS</td>
<td>77.738 84.129</td>
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Within level 'Site 2' of factor 'Site'
Within level 'Water' of factor 'Habitat'
Within level 'Spawning' of factor 'Season'

**Groups**

<table>
<thead>
<tr>
<th>Denominators</th>
<th>t</th>
<th>P(perm)</th>
<th>perms</th>
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<tbody>
<tr>
<td>qPCR, NGS</td>
<td>1.8327</td>
<td>0.105</td>
<td>35</td>
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Denominators
Groups Denominator Den.df
qPCR, NGS 1*Res 6

Average Similarity between/within groups
qPCR NGS
qPCR 92.197
NGS 90.024 91.494

Within level 'Site 2' of factor 'Site'
Within level 'Water' of factor 'Habitat'
Within level 'Summer' of factor 'Season'

Groups t P(perm) perms
qPCR, NGS 1.4946 0.239 35

Denominators
Groups Denominator Den.df
qPCR, NGS 1*Res 6

Average Similarity between/within groups
qPCR NGS
qPCR 92.955
NGS 83.979 81.668

Within level 'Site 2' of factor 'Site'
Within level 'Sediment' of factor 'Habitat'
Within level 'Spawning' of factor 'Season'

Groups t P(perm) perms
qPCR, NGS Negative

Denominators
Groups Denominator Den.df
qPCR, NGS 1*Res 6

Average Similarity between/within groups
qPCR NGS
qPCR 64.54
NGS 73.393 89.085

Within level 'Site 2' of factor 'Site'
Within level 'Sediment' of factor 'Habitat'
Within level 'Summer' of factor 'Season'

Groups t P(perm) perms
qPCR, NGS 1.7854 0.121 35

Denominators
Groups Denominator Den.df
qPCR, NGS 1*Res 6

Average Similarity between/within groups
qPCR NGS
qPCR 74.021
NGS 67.831 86.451

Within level 'Site 2' of factor 'Site'
Within level 'Macroalgae' of factor 'Habitat'
Within level 'Spawning' of factor 'Season'

Groups t P(perm) perms
qPCR, NGS 2.182 0.06 35

Denominators
Groups Denominator Den.df
Average Similarity between/within groups

qPCR  NGS
qPCR  89.996
NGS  75.542    75.951

Within level 'Site 2' of factor 'Site'
Within level 'Macroalgae' of factor 'Habitat'
Within level 'Summer' of factor 'Season'

Unique Groups t P(perm) perms
qPCR, NGS  2.1557   0.063     35

Denominators

Groups Denominator Den.df
qPCR, NGS  1*Res      6

Average Similarity between/within groups

qPCR  NGS
qPCR  89.706
NGS  76.676    80.04

Within level 'Site 3' of factor 'Site'
Within level 'Water' of factor 'Habitat'
Within level 'Spawning' of factor 'Season'

Unique Groups t P(perm) perms
qPCR, NGS  1.0631   0.392     35

Denominators

Groups Denominator Den.df
qPCR, NGS  1*Res      6

Average Similarity between/within groups

qPCR  NGS
qPCR  88.272
NGS  78.133    73.487

Within level 'Site 3' of factor 'Site'
Within level 'Water' of factor 'Habitat'
Within level 'Summer' of factor 'Season'

Unique Groups t P(perm) perms
qPCR, NGS  1.4079   0.186     35

Denominators

Groups Denominator Den.df
qPCR, NGS  1*Res      6

Average Similarity between/within groups

qPCR  NGS
qPCR  92.148
NGS  83.895    83.316

Within level 'Site 3' of factor 'Site'
Within level 'Sediment' of factor 'Habitat'
Within level 'Spawning' of factor 'Season'

Unique Groups t P(perm) perms
qPCR, NGS  1.2641   0.258     25

Denominators

Groups Denominator Den.df
qPCR, NGS  1*Res      6
**Average Similarity between/within groups**

<table>
<thead>
<tr>
<th></th>
<th>qPCR</th>
<th>NGS</th>
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</thead>
<tbody>
<tr>
<td>qPCR</td>
<td>68.681</td>
<td>89.126</td>
</tr>
<tr>
<td>NGS</td>
<td>71.34</td>
<td>89.126</td>
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Within level 'Site 3' of factor 'Site'
Within level 'Sediment' of factor 'Habitat'
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<tbody>
<tr>
<td>qPCR, NGS</td>
<td>3.2677</td>
<td>0.032</td>
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**Denominators**

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<tr>
<td>qPCR, NGS</td>
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<tr>
<th></th>
<th>qPCR</th>
<th>NGS</th>
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</thead>
<tbody>
<tr>
<td>qPCR</td>
<td>82.622</td>
<td>90.494</td>
</tr>
<tr>
<td>NGS</td>
<td>65.551</td>
<td>90.494</td>
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Within level 'Site 3' of factor 'Site'
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<tr>
<td>qPCR, NGS</td>
<td>6.2968</td>
<td>0.032</td>
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<tr>
<th></th>
<th>qPCR</th>
<th>NGS</th>
</tr>
</thead>
<tbody>
<tr>
<td>qPCR</td>
<td>94.993</td>
<td>91.542</td>
</tr>
<tr>
<td>NGS</td>
<td>74.935</td>
<td>91.542</td>
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Within level 'Site 3' of factor 'Site'
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Within level 'Summer' of factor 'Season'

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<tbody>
<tr>
<td>qPCR, NGS</td>
<td>0.4526</td>
<td>0.717</td>
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<td>qPCR, NGS</td>
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**Average Similarity between/within groups**

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<thead>
<tr>
<th></th>
<th>qPCR</th>
<th>NGS</th>
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</thead>
<tbody>
<tr>
<td>qPCR</td>
<td>78.14</td>
<td>63.772</td>
</tr>
<tr>
<td>NGS</td>
<td>74.494</td>
<td>63.772</td>
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