**Summary of main questions being asked in comparing plate analysis methods**

Q1: How does variability in frequency change with number of plates set, relative to area?

Factorial design where 10, 20, or 30 plates are set in small, medium, and large areas (approx. in m2)

|  |  |  |
| --- | --- | --- |
| Rushbrook (L) | 21211 | 30 |
| Atlin (M) | 4235 | 20 |
| Aero (S) | 546 | 10 |
| RVYC-Jericho (L) | 36288 | 10 |
| Deep Cove Marina (M) | 4561 | 30 |
| Lynnwood (S) | set all on a single finger | 20 |
| Victoria FW (L) | 24133 | 20 |
| Ladysmith FW (M) | 6530 | 10 |
| Maple Bay (S) | set all on a single finger | 30 |

H0: Variability (error around the mean) in frequency is homoscedastic (uniform), regardless of number of plates set or the site size.

Avg. freq of species X:

|  |  |  |  |
| --- | --- | --- | --- |
|  | 10 plates | 20 plates | 30 plates |
| Small site | 0.4 +/- 0.1 | 0.4 +/- 0.1 | 0.38 +/- 0.1 |
| Medium site | 0.4 +/- 0.1 | 0.4 +/- 0.1 | 0.38 +/- 0.1 |
| Large site | 0.4 +/- 0.1 | 0.4 +/- 0.1 | 0.38 +/- 0.1 |

H1: Variability in frequency is heteroskedastic (not uniform).

* 1. This is because species distribution is always highly variable, so error around the mean decreases with more plates (increased sampling effort).

Avg. freq of species X:

|  |  |  |  |
| --- | --- | --- | --- |
|  | 10 plates | 20 plates | 30 plates |
| Small site | 0.6 +/- 0.3 | 0.55 +/- 0.2 | 0.52 +/- 0.1 |
| Medium site | 0.6 +/- 0.3 | 0.55 +/- 0.2 | 0.52 +/- 0.1 |
| Large site | 0.6 +/- 0.3 | 0.55 +/- 0.2 | 0.52 +/- 0.1 |

* 1. This is because species distribution becomes more variable at larger sites, so error around the mean increases with site size.

Avg. freq of species X:

|  |  |  |  |
| --- | --- | --- | --- |
|  | 10 plates | 20 plates | 30 plates |
| Small site | 0.6 +/- 0.1 | 0.55 +/- 0.1 | 0.52 +/- 0.1 |
| Medium site | 0.6 +/- 0.2 | 0.55 +/- 0.2 | 0.52 +/- 0.2 |
| Large site | 0.6 +/- 0.3 | 0.55 +/- 0.3 | 0.52 +/- 0.3 |

Q2: Which method best captures biodiversity on a plate, relative to processing time?

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Species detected | | | Processing time (minutes) | | |
| Site/Plate | Freq. analysis | Point count | Species list | Freq. analysis | Point count | Species list |
| Rushbrook-2 | 8 | 12 | 15 | 15 | 55 | 25 |
| Rushbrook-8 | 6 | 6 | 12 | 20 | 40 | 10 |
| MK Bay-4 | 3 | 3 | 3 | 5 | 20 | 8 |

…etc

Doesn’t matter which plates/sites, just want to do all three methods on **as many plates as possible.**

For each plate, **a separate person is needed to do each method** (so observations are independent). Photos can be processed at any time, so prioritize having different people conduct the point counts and full species lists. For example, if Calley and Katie both wrap up a point count at the same time, they switch plates and each does a full species list for the other person’s plate. Or if someone needs a break from point counts, they can take the finished point counted plates and do some species lists. **Plates need to be more or less intact by the time they’re processed for a species list (always done last).** So plates covered in mussels won’t be great for this.

Q3: Which method (point count, NFA, or listing) is best at detecting rare species? Invasive species?

Using the same data as above, so only consideration is again to maximize the number of plates that get all three treatments.

Q4: Is there agreement on the relative abundance of species between point counts and nested frequency analysis (NFA)?

Once all the NFA photos are processed, conduct a simple comparison of point count results and NFA results. Ideally, there will be an NFA photo for every plate, or at least every plate that is point-counted. But no additional field methods required.

Q5: Is the additional effort and technology being used for the NFA photos necessary?

For as many plates as possible, both a standard point+shoot photo and quality high-res NFA photo should be taken. Later, both photos will be processed using SampleFreq software and results compared. So **only additional consideration in the field is taking both photo types**. My suggestion is that there is a dedicated third person in charge of photos.

As we get closer to retrieval, I will have formalized methods and revised data sheets ready. In my opinion the priority this year should be getting quality data for this methods study, with the ‘usual’ survey data as a secondary goal (i.e., if its between doing 30 point counts but only 10 species lists, or 15 of each, **do 15 of each**).