# A Guide to Integrate Plant Cover Data from Two Different Methods:

## POINT INTERCEPT AND OCULAR COVER

### PROJECT GOAL

Integration of data from two common methods estimating marsh plant cover: Point-intercept & Ocular cover

### PROJECT TEAM


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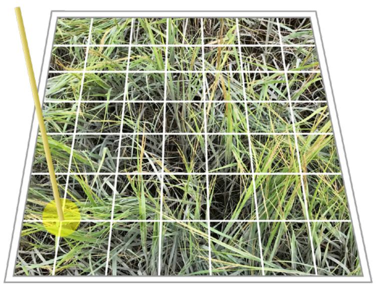
### OVERVIEW

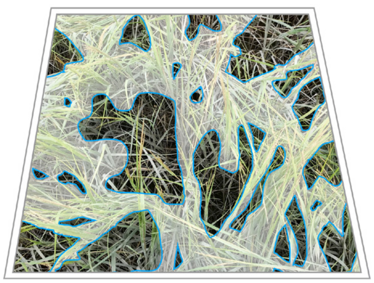
When it comes to monitoring plant cover in tidal marshes, there is a lack of consensus on how. Multiple methods exist to estimate plant cover, which can confound interpretation when making comparisons across methods. Here, we provide a novel and accurate approach to integrate the two most common methods:

**PI**
**Point Intercept**



Presence/absence of cover categories using a thin pin in a gridded fixed area: 50 points in a 1m² plot.

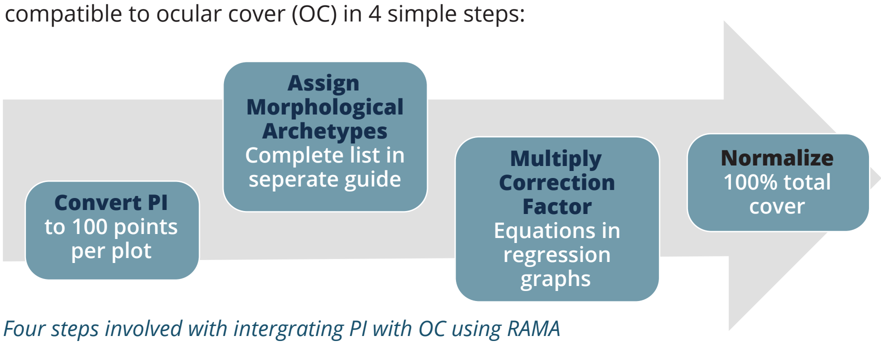
**OC**
**Ocular Cover**



Visual estimates of abundance for cover categories in a fixed area: non-binned estimates totaling to 100% in a 1m² plot.

### METHOD

Our project team assessed over 100 salt marsh vegetation plots throughout New England located in four National Estuarine Research Reserves using both methods. From this monitoring, we developed a statistical relationship between them using a series of **Regressions Across Morphological Archetypes (RAMA)**. See figure and table below for details on regressions and archetypes. Our results provide a new method to convert point intercept (PI) data into a format more compatible to ocular cover (OC) in 4 simple steps:




*Four steps involved with intergrating PI with OC using RAMA*

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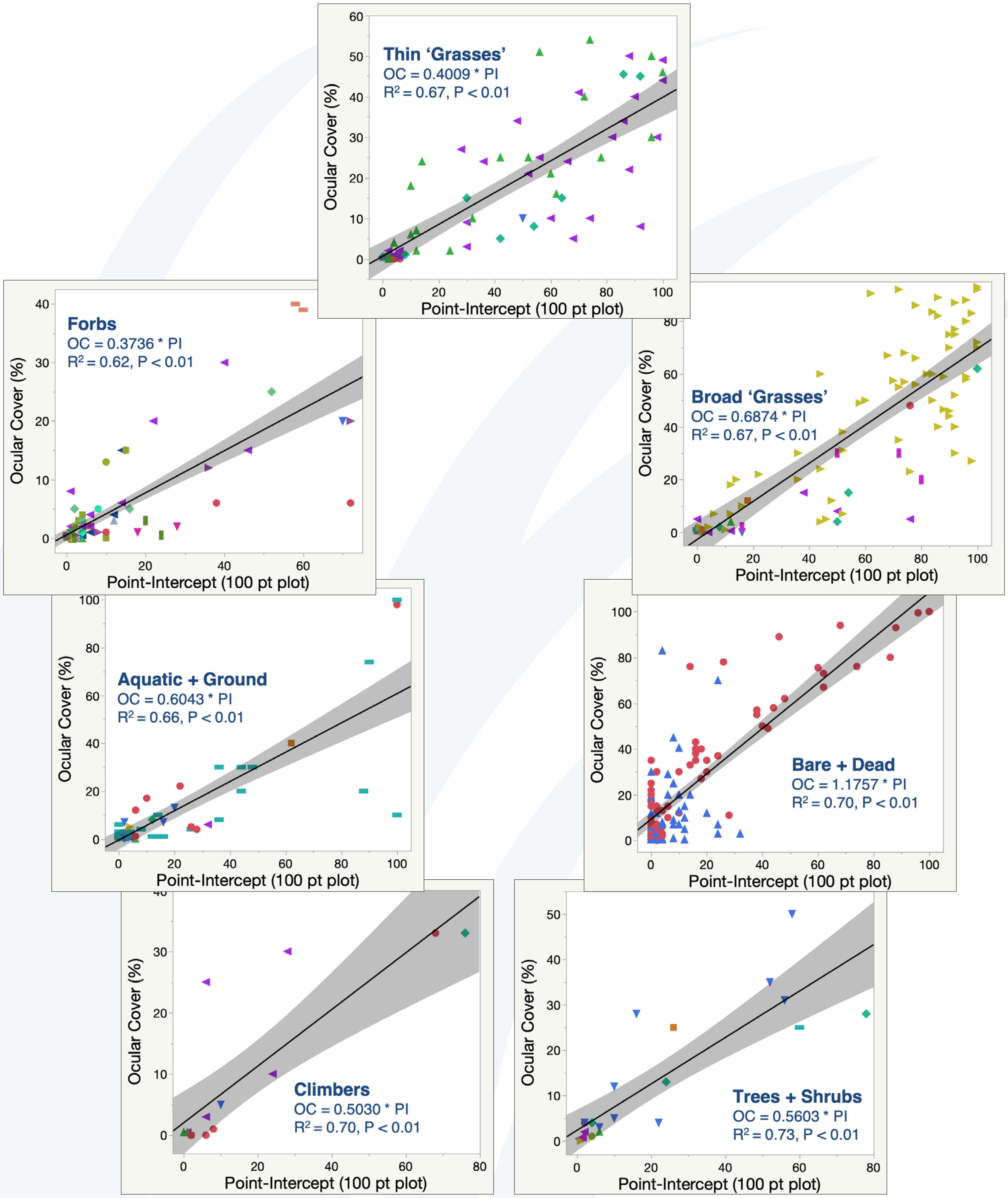
## TRANSFORMATIONS OF PI ➔ OC

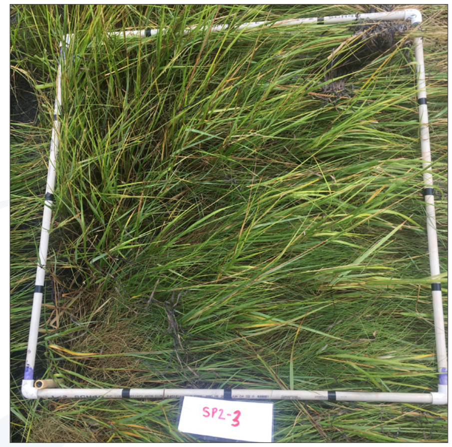
Transformations were most similar when using linear regressions across morphological archetypes (groupings of abiotic cover and plant species similar in structure). To transform, use a correction factor (provided as the **slope in the figures**) from the appropriate morphological archetype. For a full list of each morphological archetype, see page 3. **Full details on page 2.**



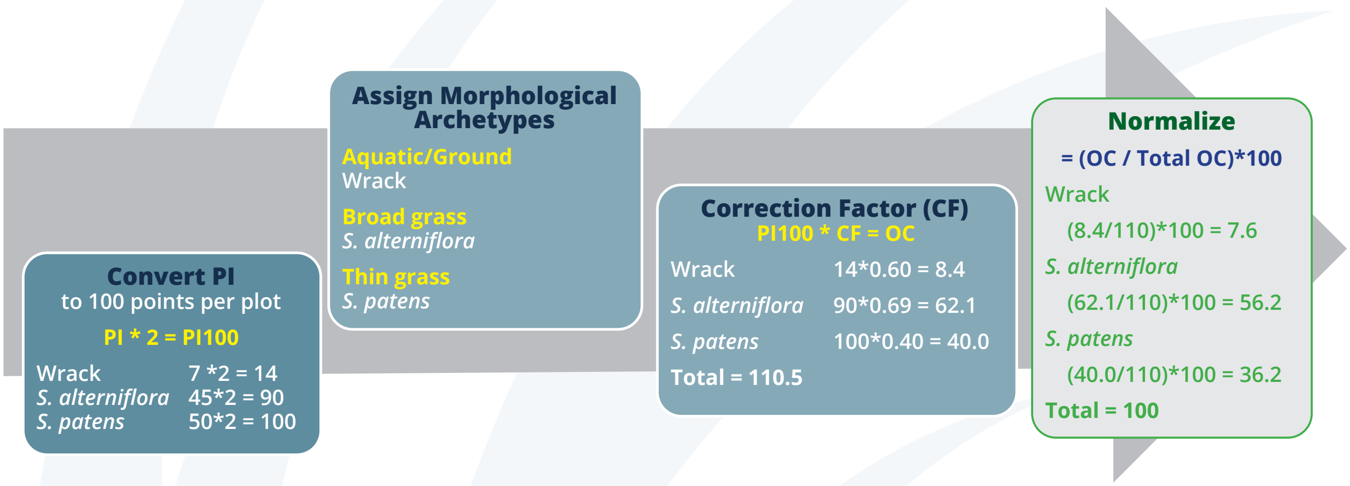

*Notes: Regressions were created using a linear model (shown). Correction factors are derived from the slope of a regression constrained to zero (not shown). Graph symbols represent different plant species or abiotic cover categories.*

## PLOT EXAMPLE

Using data from one of our plots monitored with both PI and OC (Great Bay SP3-3), we illustrate how to transform the data. The below table shows PI raw values (50-point plot, 1m$^2$) being transformed using a couple of steps to become more compatible to OC data. See figure below for details, including equations




| | Point -Intercept | | | | Ocular |
|---|---|---|---|---|---|
| | Raw data | to 100 pts | Apply Cor. Factor (CF) | Normalize to 100% | Cover (field) |
| Wrack | 7 | 14 | 8.4 | 7.6 | 10 |
| *S. alterniflora* | 45 | 90 | 62.1 | 56.2 | 50 |
| *S. patens* | 50 | 100 | 40.0 | 36.2 | 40 |
| Total | 102 | 204 | 110.5 | 100.0 | 100 |




*Example data shown above is from a 50-point plot in a 1m$^2$ quadrat.*

## SUMMARY


We provide an easy process for transforming point-intercept data to be more compatible with ocular cover data: **Regressions Across Morphological Archetypes (RAMA)**. This transformation method was compared with traditional methods and provided the most statistically similar data to OC. Transformed data, however, remains less accurate than data collected with a single method due to inherent differences between the protocols. For instance, we found greater dissimilarity between transformed PI and OC in the Bare + Dead archetype. This is likely the result of the PI method only counting bare or dead cover when the pin does not 'hit' any live cover categories, whereas OC weights all covers equally. As such, we recommend utilizing a single protocol when possible. This work is from a larger project funded by the National Science Collaborative. For a full list of project participants who help create this guide, see Burdick et al. 2020.


## REFERENCES


**Burdick, D.M., C.R. Peter, C. Feurt, B. Fischella, M. Tyrrell, J. Allen, J. Goldstein, K. Raposa, J. Mora, L. Crane. 2020.** Synthesizing NERR Sentinel Site data to improve coastal wetland management across New England. Final Report to National Science Collaborative. www.nerrssciencecollaborative.org/project/Burdick18

| Morphological Archetypes | Cover |
|---|---|
| Bare/Dead | Bare Ground |
| Bare/Dead | Dead |
| Ground / Algae | Algae |
| Ground / Algae | Ascophyllum nodosum |
| Ground / Algae | Fucus spp |
| Ground / Algae | Fucus vesiculosus |
| Ground / Algae | Gracilaria sp. |
| Ground / Algae | Moss |
| Ground / Algae | Ruppia maritima |
| Ground / Algae | Ulva Lactuca |
| Ground / Algae | Wrack |
| Forbs | Atriplex patula |
| Forbs | Galium palustre |
| Forbs | Impatiens capensis |
| Forbs | Iris versicolor |
| Forbs | Lepedium virginicum |
| Forbs | Limonium nashii |
| Forbs | Mentha arvensis |
| Forbs | Oenothera biennis |
| Forbs | Onoclea sensibilis |
| Forbs | Osmunda cinnamomea |
| Forbs | Plantago spp |
| Forbs | Polygonum ramosissimum |
| Forbs | Salicornia depressa |
| Forbs | Salicornia maritima |
| Forbs | Salicornia spp |
| Forbs | Solidago sempervirens |
| Forbs | Spergularia marina |
| Forbs | Suaeda linearis |
| Forbs | Sueda maritima |
| Forbs | Symphyotrichum novi-belgii |
| Forbs | Symphyotrichum spp. |
| Forbs | Symphyotrichum subulatas |
| Forbs | Teucrium canadense |
| Forbs | Thalictrum dioicum |
| Forbs | Thalictrum polygamum |
| Forbs | Trientalis borealis |

| Morphological Archetypes | Cover |
|---|---|
| Broad 'Grasses' | Agropyron pungens |
| Broad 'Grasses' | Ammophilia breviligulata |
| Broad 'Grasses' | Carex spp. |
| Broad 'Grasses' | Phragmites australis |
| Broad 'Grasses' | Phragmites australis var. americanus |
| Broad 'Grasses' | Schoenoplectus maritimus |
| Broad 'Grasses' | Schoenoplectus robustus |
| Broad 'Grasses' | Spartina alterniflora |
| Broad 'Grasses' | Spartina pectinata |
| Broad 'Grasses' | Typha angustifolia |
| Thin' Grasses' | Agrostis stolonifera |
| Thin' Grasses' | Distichlis spicata |
| Thin' Grasses' | Festuca rubra |
| Thin' Grasses' | Juncus balticus |
| Thin' Grasses' | Juncus gerardii |
| Thin' Grasses' | Spartina patens |
| Climbers | Calystegia sepium |
| Climbers | Cuscuta gronovii |
| Climbers | Cuscuta spp. |
| Climbers | Parthenocissus quinquefolia |
| Climbers | Smilax spp. |
| Climbers | Solanum dulcamara |
| Climbers | Toxicodendron radicans |
| Shrubs & Trees | Acer rubrum |
| Shrubs & Trees | Alnus spp |
| Shrubs & Trees | Baccharis halimifolia |
| Shrubs & Trees | Iva frutescens |
| Shrubs & Trees | Juniperus virginiana |
| Shrubs & Trees | Myrica pensylvanica |
| Shrubs & Trees | Myrica spp |
| Shrubs & Trees | Picea spp |
| Shrubs & Trees | Prunus maritima |
| Shrubs & Trees | Quercus rubra |
| Shrubs & Trees | Rosa multiflora |
| Shrubs & Trees | Rosa rugosa |
| Shrubs & Trees | Spiraea tomentosa |

*Full abiotic cover and plant species list grouped by morphological archetype.*