Seagrass Restoration Areas

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Data sources

- Seagrass Data Sources
  - BB Density Data for BOPP.xlsx (Phil Worboys and Sarah Manuel)
  - Seagrass Presence Data for BOPP.xlsx (Phil Worboys and Sarah Manuel)
  - From Robbie Smith - BOPP Fish Seagrass and Mangrove data.xlsx (Robbie Smith)
  - All REEF data for Bermuda.xlsx
  - Seagrass density data for 2021-2022 (Sarah Manuel)
- Seagrass cages (installed, onsite (uninstalled), not yet deployed)
  - Seagrass protection cages sites BOPP 20211026.xlsx
- Permanent monitoring sites
  - Locations from Sarah Manuel

We used all available seagrass data from 2004 to 2022 to identify areas that may be useful for restoration. Sites that had halophila present during any survey were removed from analyses. Seagrass presence and density was then calculated as the sum of thalassia, syringodium, and halodule data. After removing sites with halophila present, survey data from 1,360 sites were available; 585 of these sites were surveyed more than once and 59 were surveyed more than twice.

Permanent monitoring sites

The following sites are permanent monitoring sites that were established in December 2006. These sites have been described in Fourqurean et al., (2019).

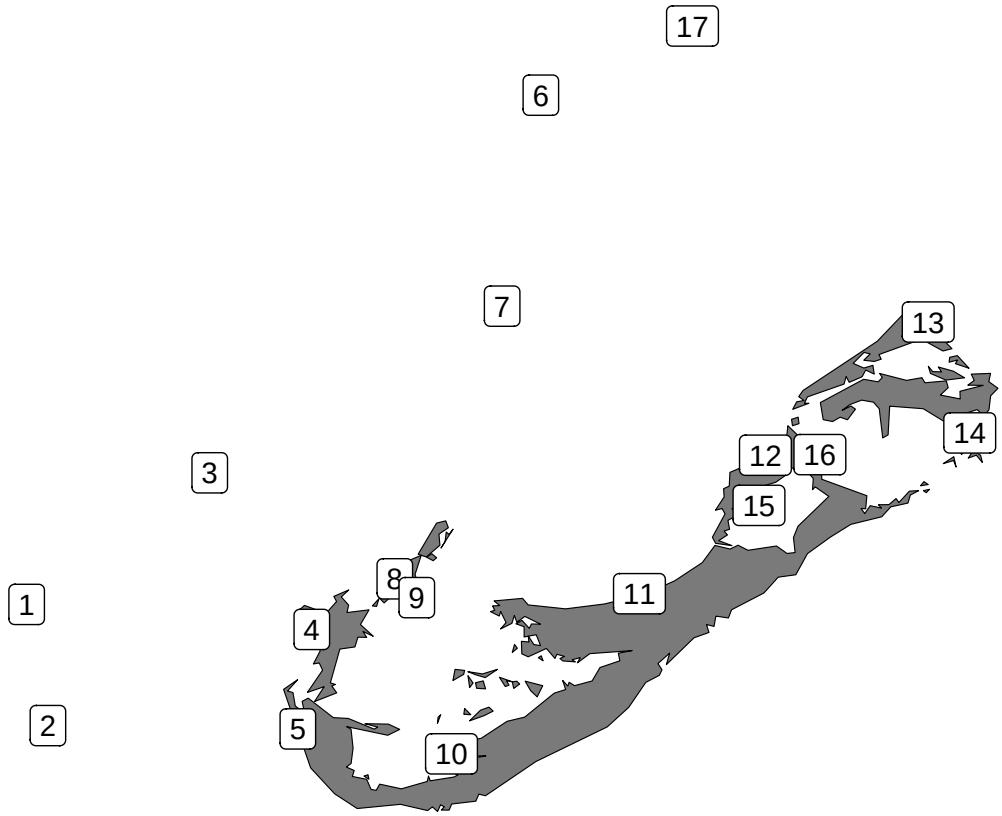

Figure 1: Seagrass permanent monitoring sites.

Table 1: Seagrass permanent monitoring sites.

ID	Site Name	Grid Number
1	North of Chub Hd	PSG01
2	West of Chub Hd	PSG02
3	Western Blue	PSG03
4	King Charles Hole	PSG04
5	Hog Bay Park	PSG05
6	PSG06	PSG06
7	Crescent West	PSG07
8	Grey's Bridge	PSG08
9	Regatta Island	PSG09A
10	Riddell's Bay Golf Course	PSG09B
11	Tynes Bay	PSG13
12	Bailey's Bay	PSG15
13	Ft. St Catherine's	PSG16
14	Annie's Bay	PSG17
15	Trunk Island	PSG18
16	Walsingham Park	PSG19

ID	Site Name	Grid Number
17	Conch Bed	PSG20

Sites of interest

The following sites were surveyed across multiple years. For each site shown, seagrass was present during at least one survey and was absent the most recent survey. We overlaid the sites of interest with areas where seagrass cages are already installed or have a potential to be installed.

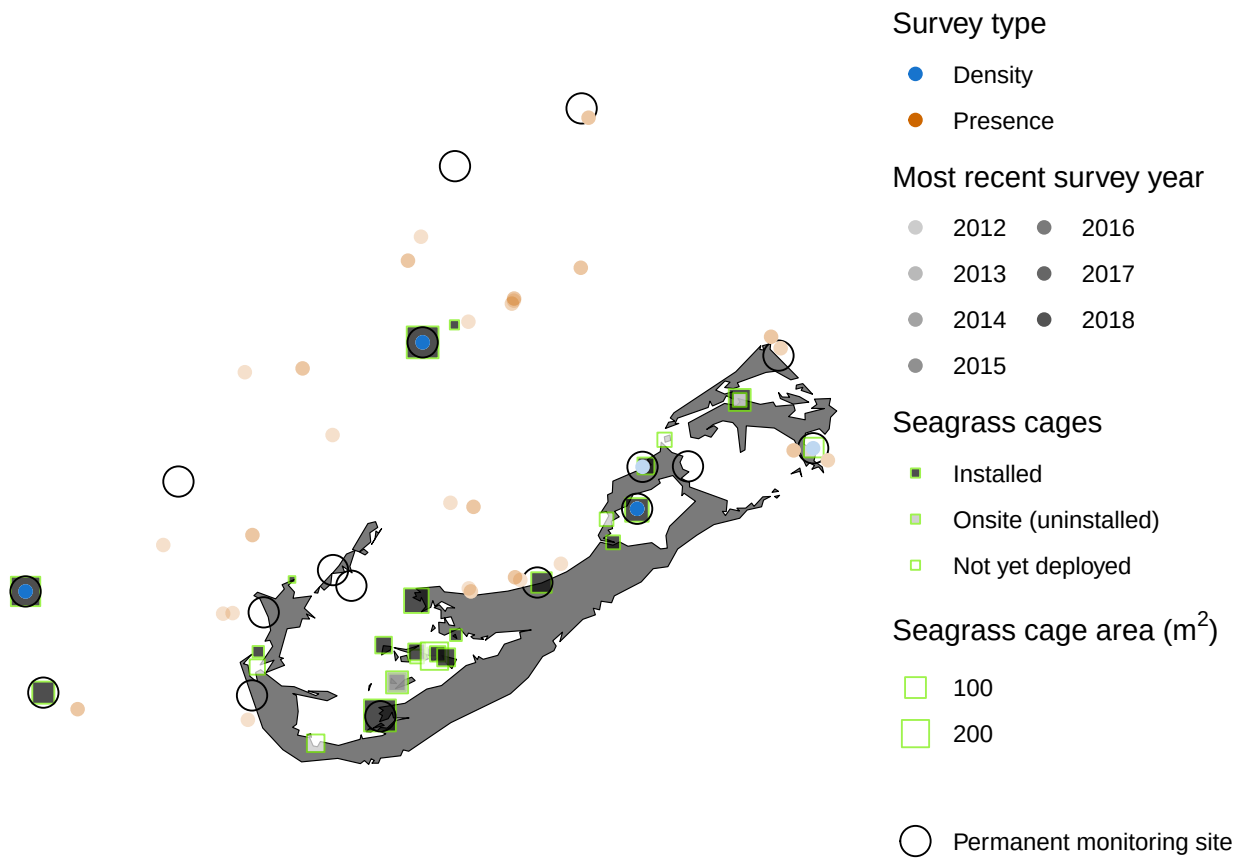

Figure 2: Seagrass sites of interest for restoration. These are locations that were surveyed more than once, had seagrass in at least one survey, and had no seagrass the most recent survey. Sites are colored based on survey type (density, presence) and the most recent survey date. Squares indicate seagrass cage locations. Square sizes are not to scale. Open circles indicate pemanent monitoring sites.

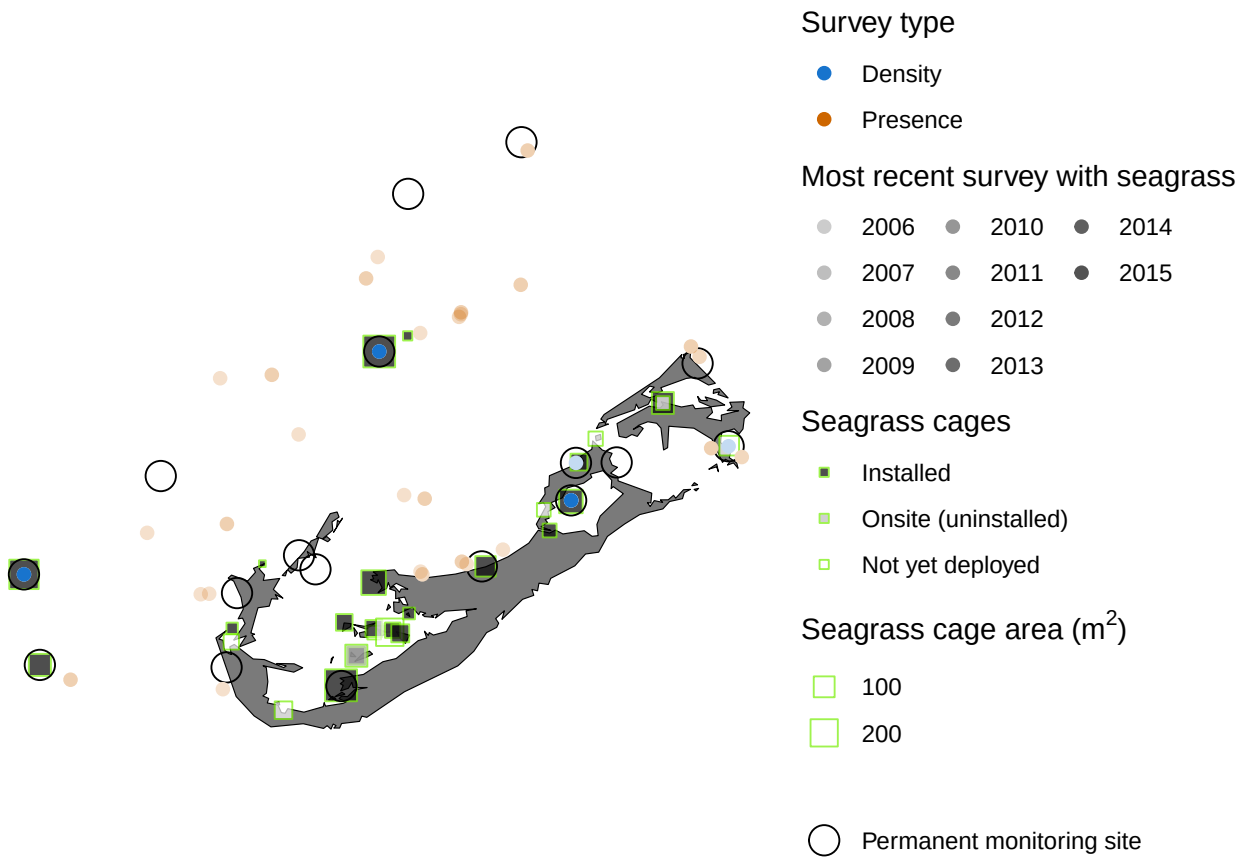

Figure 3: Seagrass sites of interest for restoration. These are locations that were surveyed more than once, had seagrass in at least one survey, and had no seagrass the most recent survey. Sites are colored based on survey type (density, presence) and the most recent survey with seagrass present. Squares indicate seagrass cage locations. Square sizes are not to scale. Open circles indicate pemanent monitoring sites.

We ranked locations that had seagrass previously, but no longer have seagrass present. Ranking was based on the most recent year in which seagrass was present. Areas of particular interest are those that had seagrass most recently.

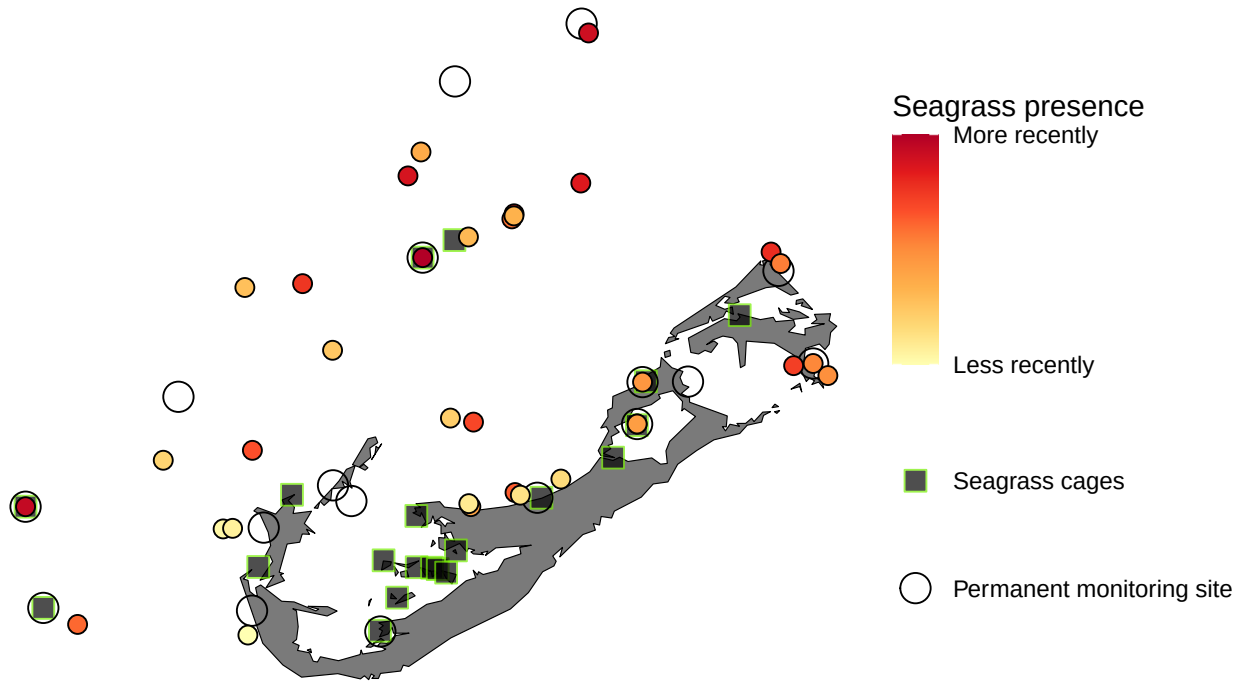

Figure 4: Seagrass sites of interest for restoration. These are locations that were surveyed more than once, had seagrass in at least one survey, and had no seagrass the most recent survey. Sites are colored based on how recently seagrass was present. Squares indicate seagrass cage locations. Open circles indicate pemanent monitoring sites.

We also investigated sites that previously had high seagrass densities (density score ≥ 2) that declined to low seagrass densities (density score < 1) at any point, regardless of whether seagrass was present in the most recent survey.

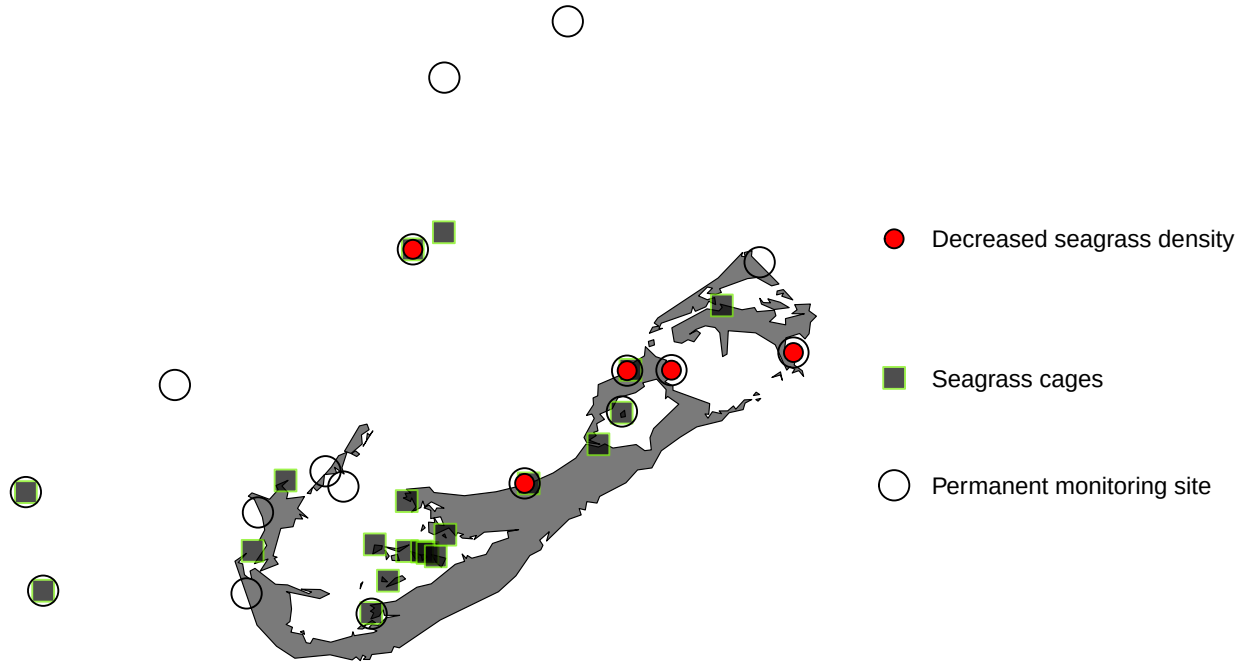

Figure 5: Seagrass sites of interest for restoration. These are locations that were surveyed more than once and previously had high seagrass densities (density score of 2 or higher) that declined drastically (density score lower than 1). Squares indicate seagrass cage locations. Open circles indicate pemanent monitoring sites.

Locations based on expert scientific knowledge

The following sites have been suggested for restoration based on expert knowledge and have been described in Fourqurean et al., (2019).

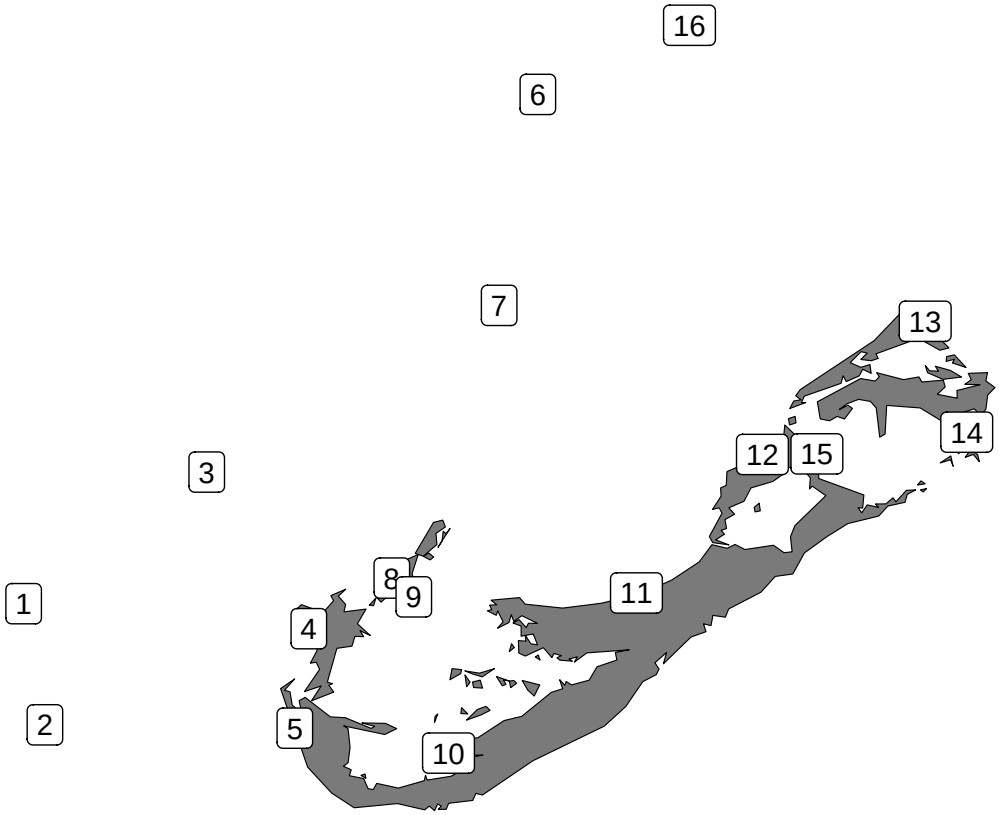

Figure 6: Seagrass sites suggested for restoration based on expert knowledge.

Table 2: Seagrass sites suggested for restoration based on expert knowledge.

ID	Site Name	Grid Number
1	North of Chub Hd	PSG01
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13	Ft. St Catherine's	PSG16
14	Annie's Bay	PSG17
15	Walsingham Park	PSG19
16	Conch Bed	PSG20

Sites of success

The following sites were surveyed across multiple years. For each site shown, seagrass was present during all surveys. We overlaid the sites of success with areas where seagrass cages are already installed or have a potential to be installed.

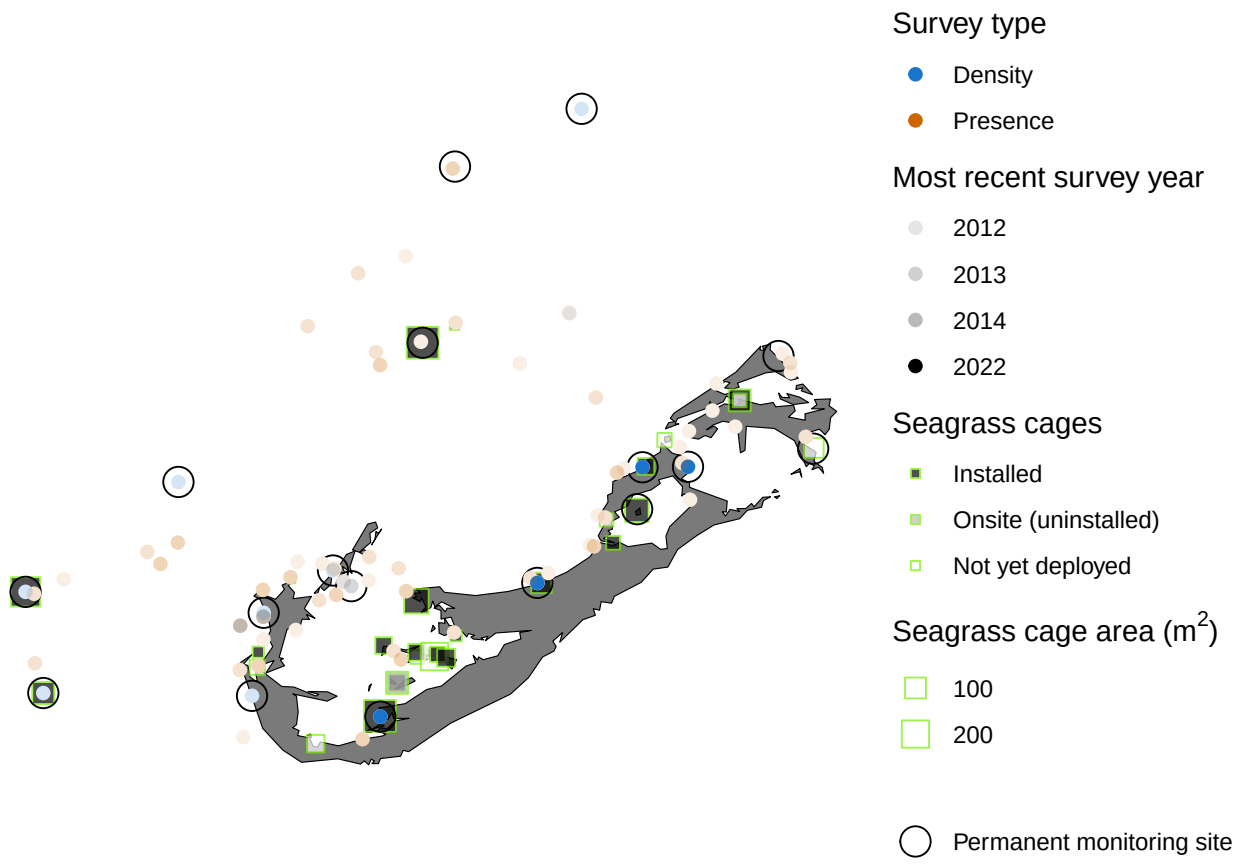

Figure 7: Seagrass sites that have consistently performed well. These are locations that were surveyed more than once, and always had seagrass present. Sites are colored based on survey type (density, presence) and the most recent survey date. Squares indicate seagrass cage locations. Square sizes are not to scale. Open circles indicate pemanent monitoring sites.