

Contribution à la consolidation du protocole DCE pour le suivi de l'état écologique des herbiers à *Zostera noltei*

Création de schémas de pourcentage de recouvrement comme aide à l'évaluation de l'abondance des plantes

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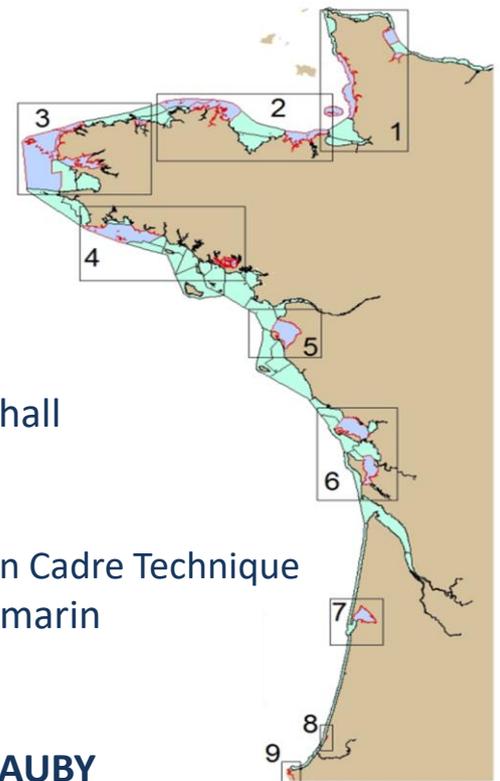
Annexe :
Catalogue des recouvrements
de *Zostera noltei*
Façades Manche et Atlantique

Présenté par
Maya SPITERI

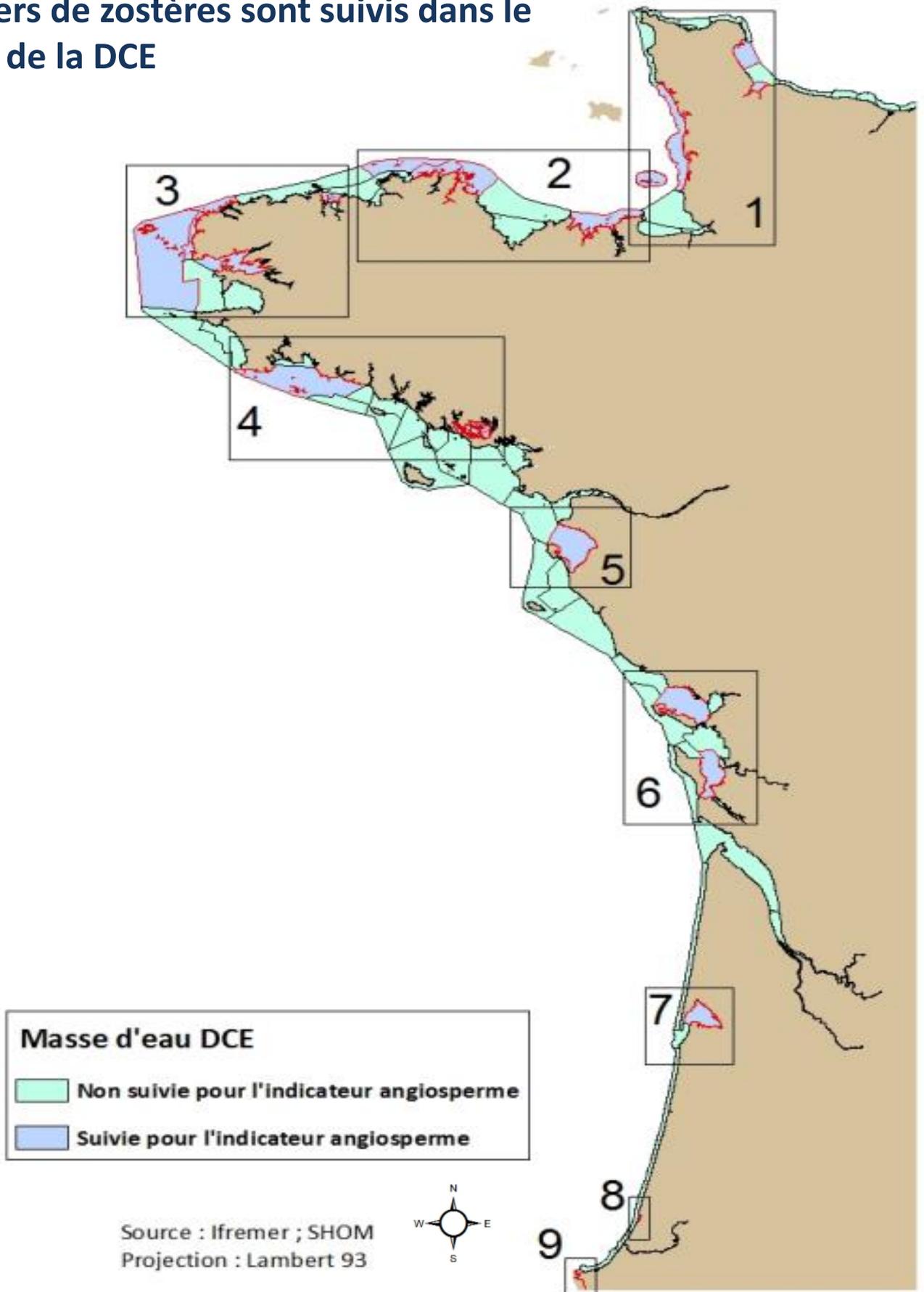
Promotion Andrea Marshall
2020-2023

Stage de deuxième année de la formation Cadre Technique
Génie de l'environnement marin

Encadrée par
Claire ROLLET et Isabelle AUBY



Localisation des sites dans lesquels les herbiers de zostères sont suivis dans le cadre de la DCE



Introduction :

Le protocole de suivi stationnel des herbiers de zostères (ou des Angiospermes) pour la DCE est mis en œuvre sur les masses d'eau des façades Manche et Atlantique, dans lesquelles leur présence est connue.

L'indicateur « Angiospermes » qui se calcule à partir de trois métriques : « composition taxonomique », « extension » et « abondance » permet de caractériser l'état d'une masse d'eau et de déterminer son évolution en fonction des années (Auby et al., 2010, Auby et al., 2018a). La métrique « abondance » correspond pour *Zostera noltei* au pourcentage de recouvrement des feuilles sur le sédiment.

Suite à différents essais inter-laboratoires (EIL) réalisés pour juger les pratiques des opérateurs chargés des suivis des zostères, il a été constaté une grande variabilité des résultats pour la métrique « abondance » (Auby et al., 2018b ; Rollet et Auby, 2022). En effet, il y aurait des erreurs dans l'estimation visuelle et dans l'utilisation du logiciel de traitement d'images ImageJ. Il a été convenu de produire, pour cette métrique, une fiche d'aide à l'évaluation visuelle du recouvrement de *Zostera noltei* à utiliser sur le terrain. Cette fiche est réduite à un format A4 recto-verso (Annexe 5 : Aide à l'évaluation des recouvrements de *Zostera noltei* de Spitéri, 2022).

Le catalogue présenté ici complète cette fiche d'aide à l'évaluation. Il offre une vue globale des types d'herbiers qui sont suivis dans le cadre de la DCE sur les façades Manche et Atlantique et permet de mettre en évidence les caractéristiques propres à chaque site. Pour chacun d'eux, plusieurs exemples de recouvrement sont présentés sur des photographies de terrain couplées des représentations schématiques pour chaque classe associée, de 1 à 25%, de 26 à 50%, de 51 à 75% et de 76 à 99%. Un accent est mis sur les cas de recouvrement en limites de classes.

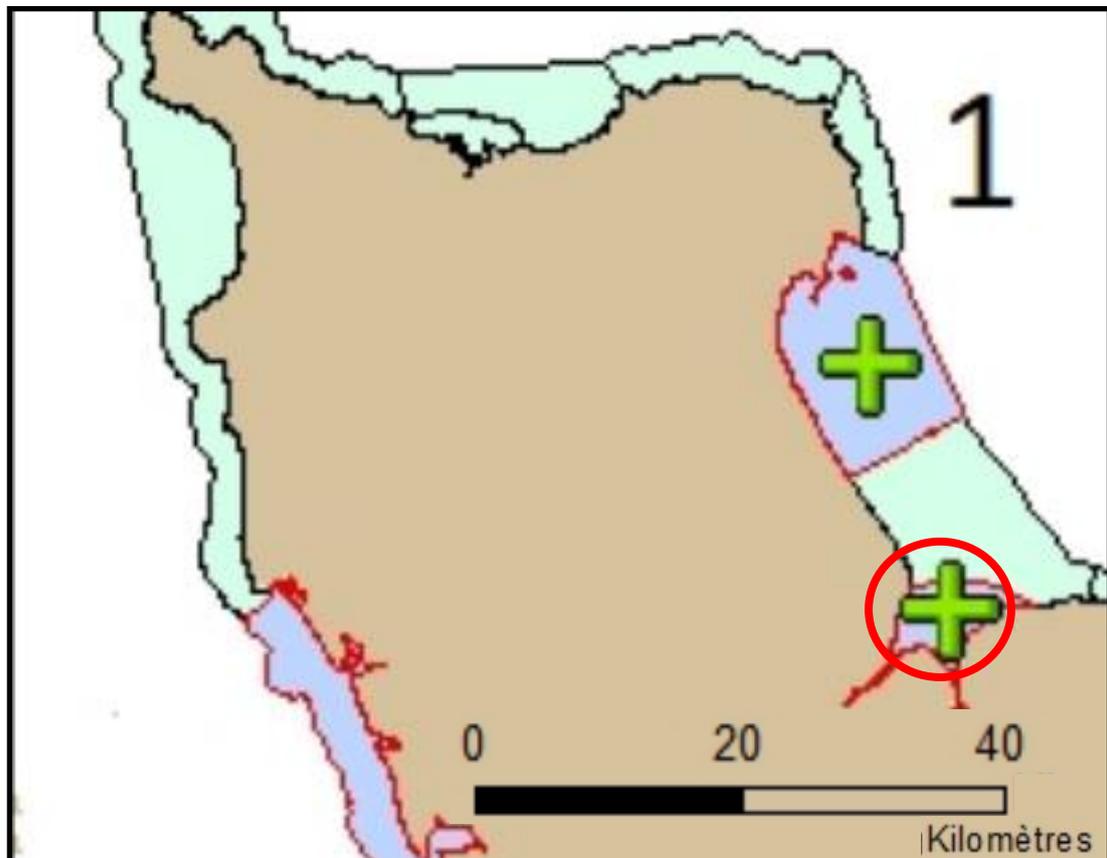
Certains sites ne sont pas illustrés car les herbiers y sont très denses avec un recouvrement supérieur à 76%. Aucune illustration n'est disponible dans leur cas pour les classes de faible recouvrement. C'est le cas pour les stations situées dans le Golfe du Morbihan (1 site) et dans le Pertuis Breton (2 sites). Il arrive également que les photographies ne soient exploitables sous ImageJ à cause de la présence d'eau.

Ce catalogue pourra être complété et adapté au fil du temps selon les besoins exprimés par les opérateurs de terrain.

Au même titre que la fiche d'aide à l'évaluation visuelle du recouvrement de *Zostera noltei*, ce catalogue contribue à la consolidation du protocole DCE pour le suivi de l'état écologique de *Zostera noltei*.

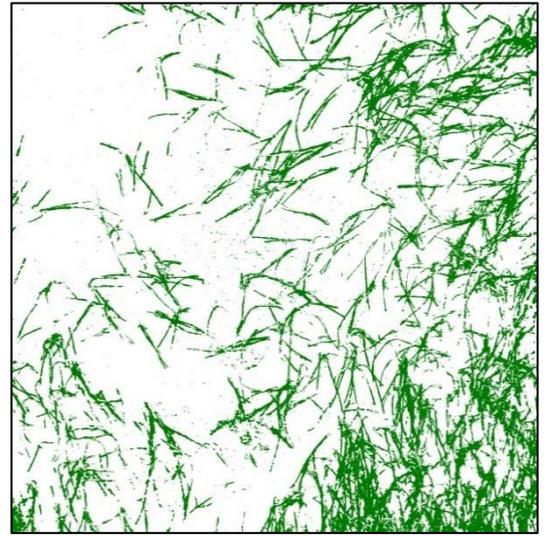
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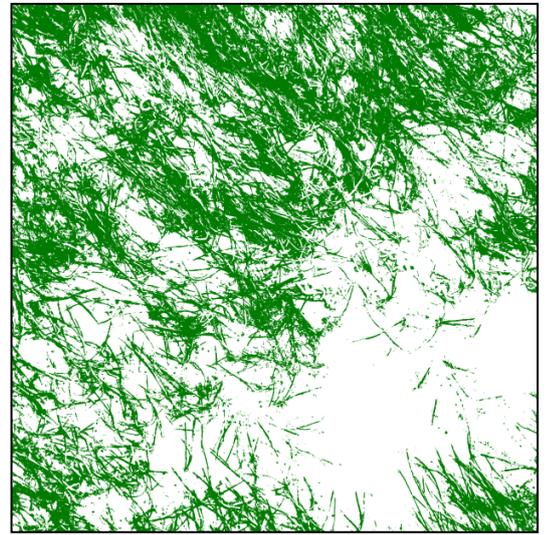
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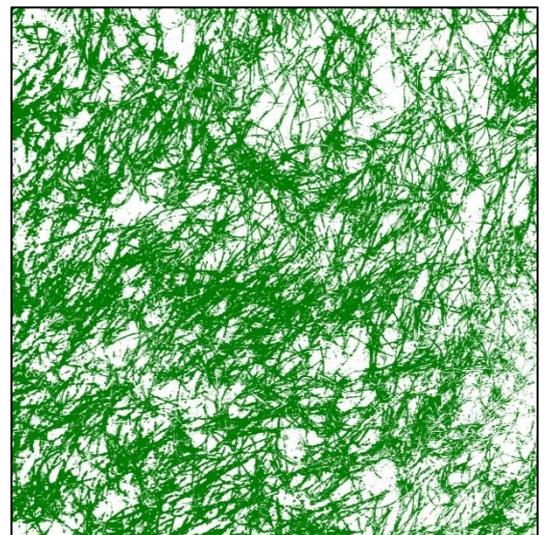
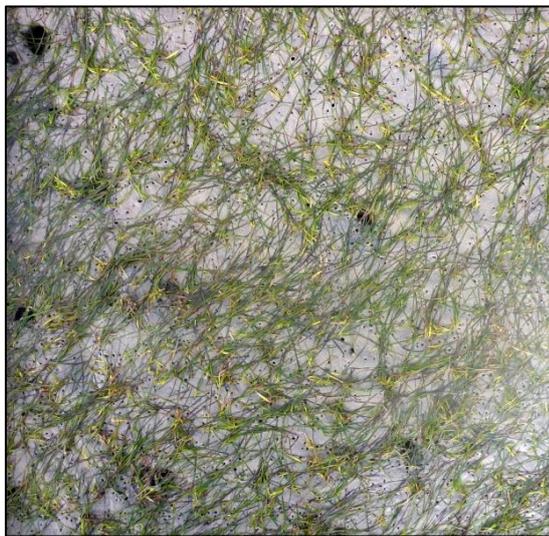


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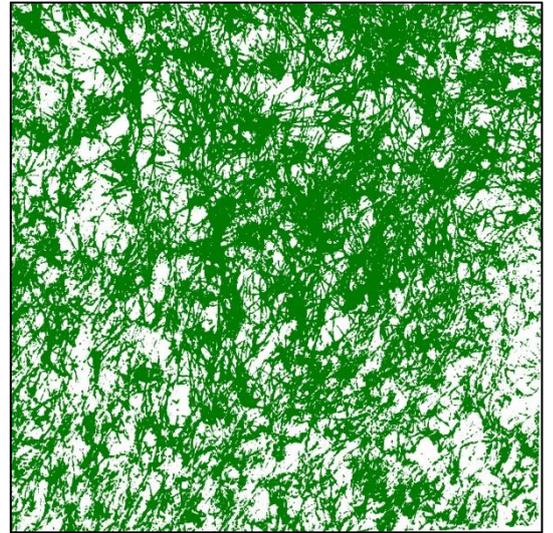
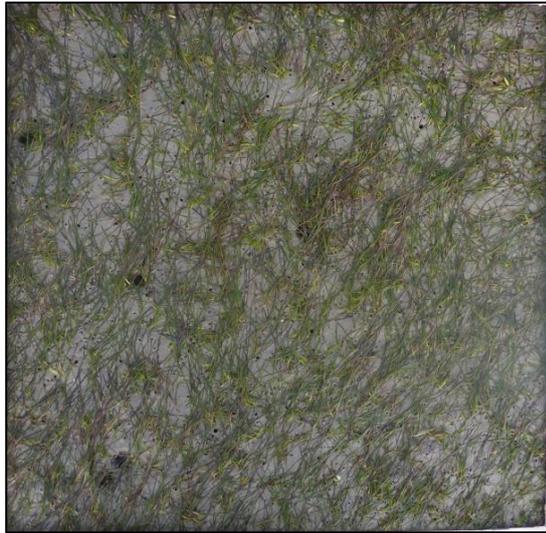


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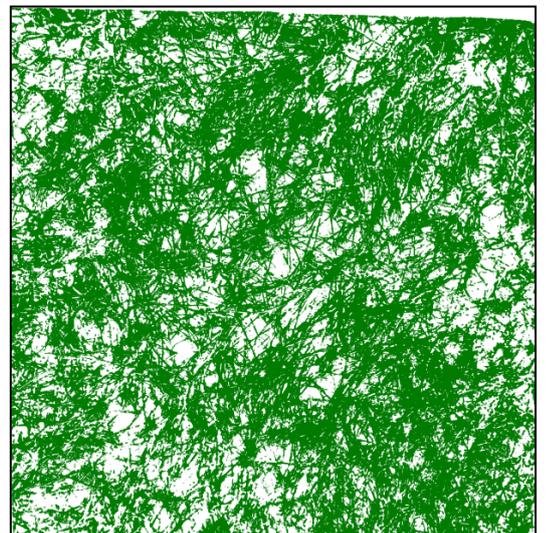
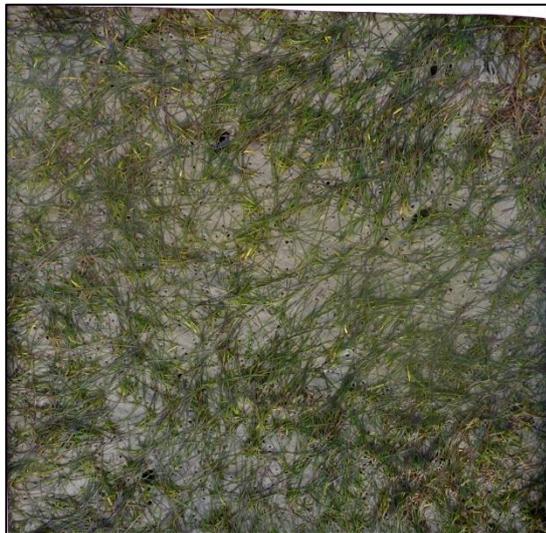


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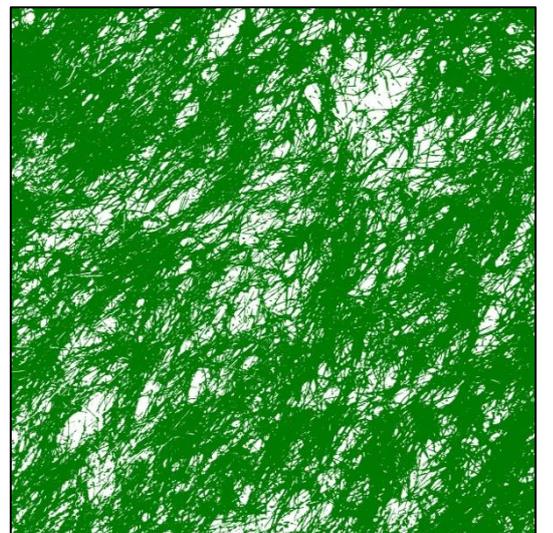
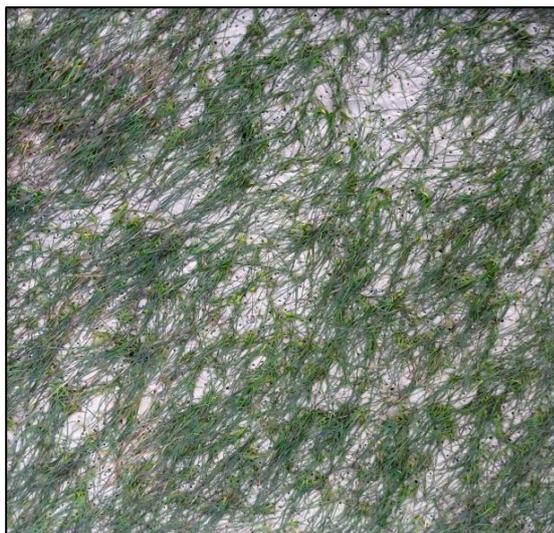
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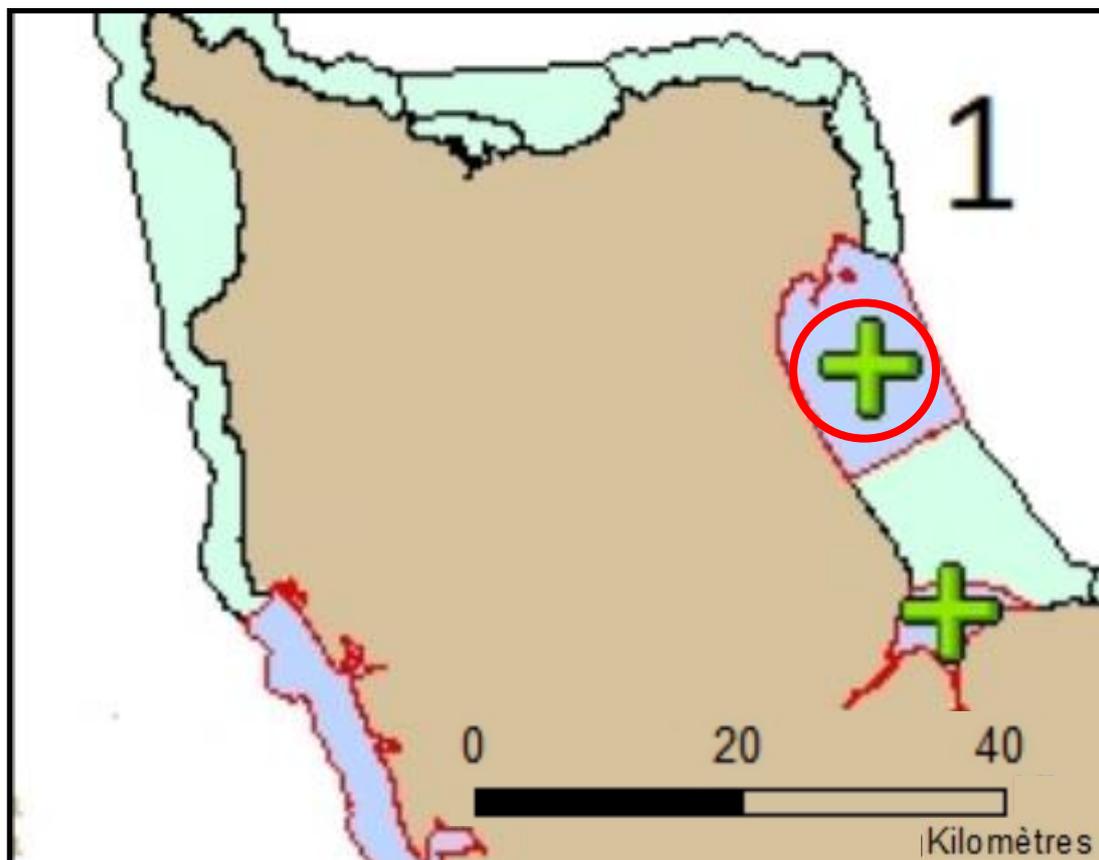
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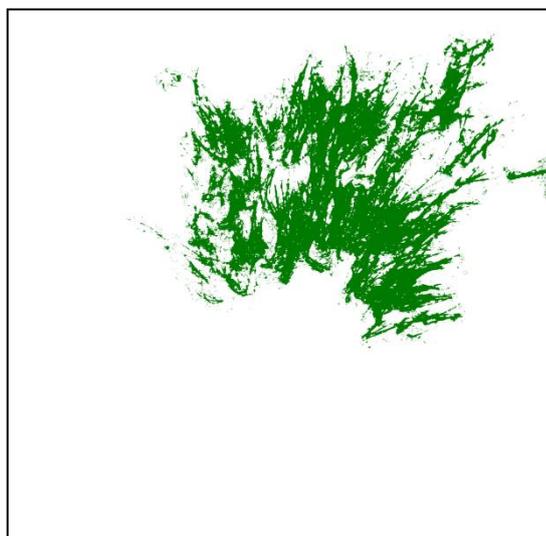


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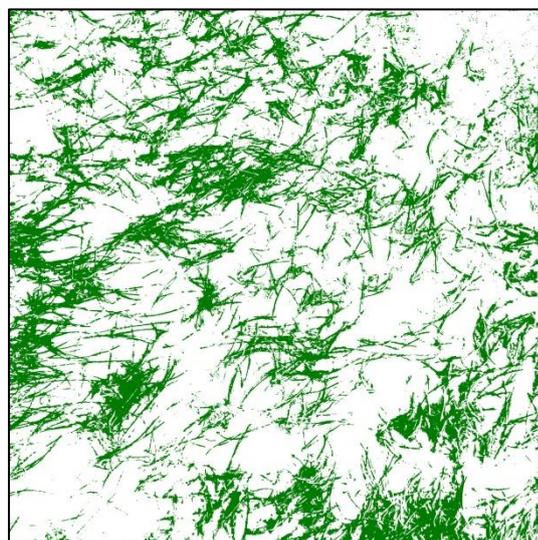


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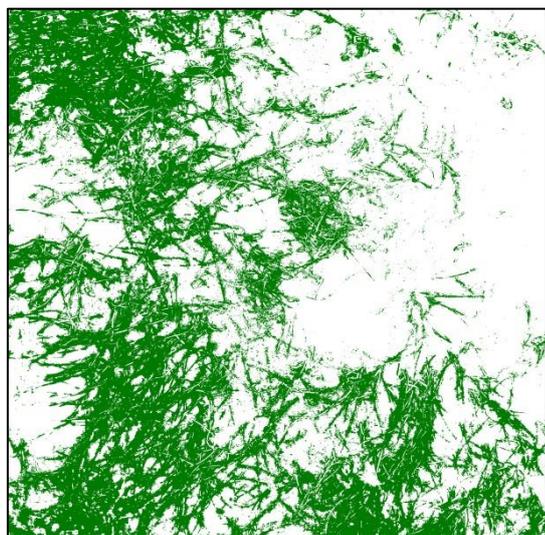


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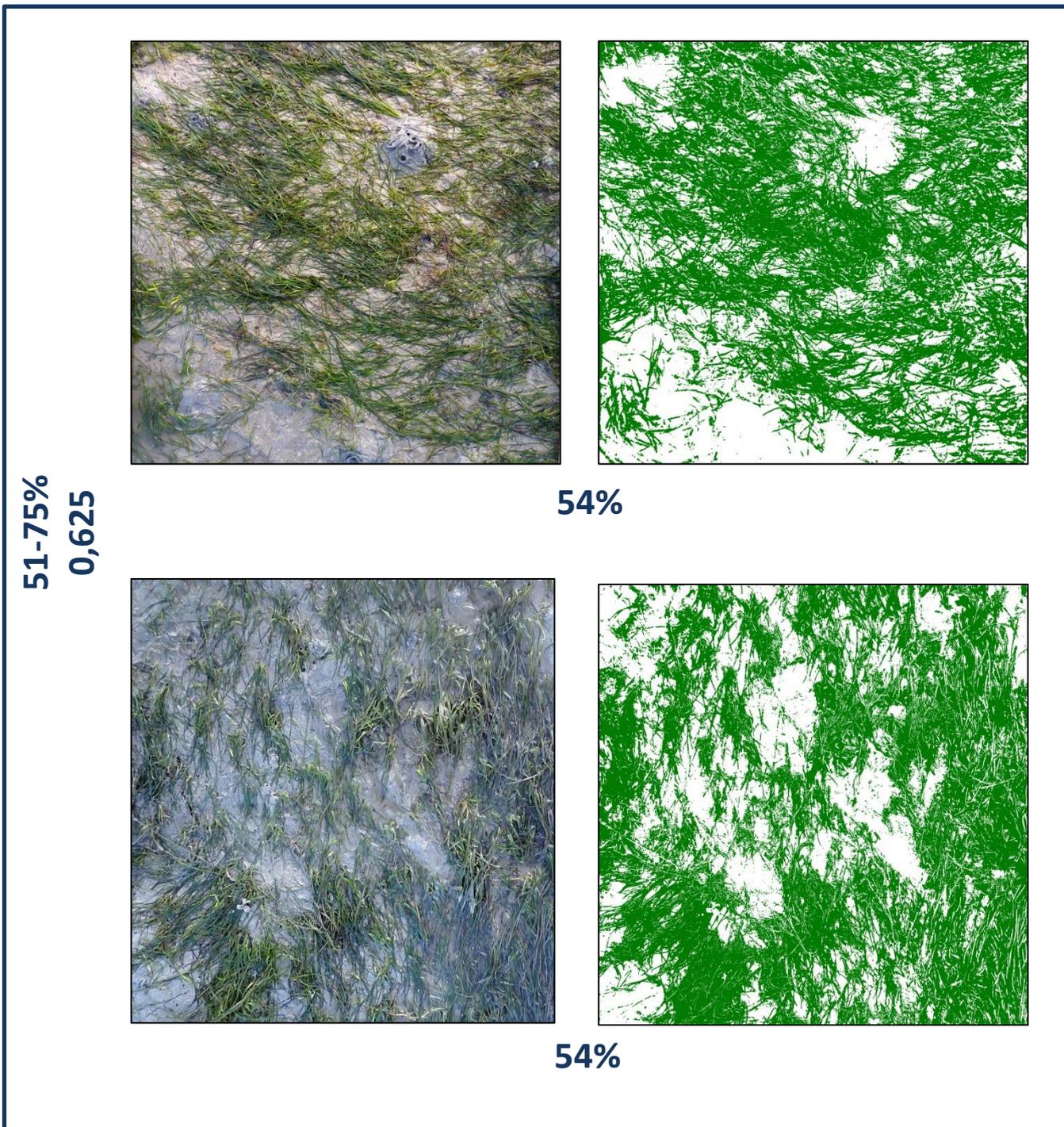


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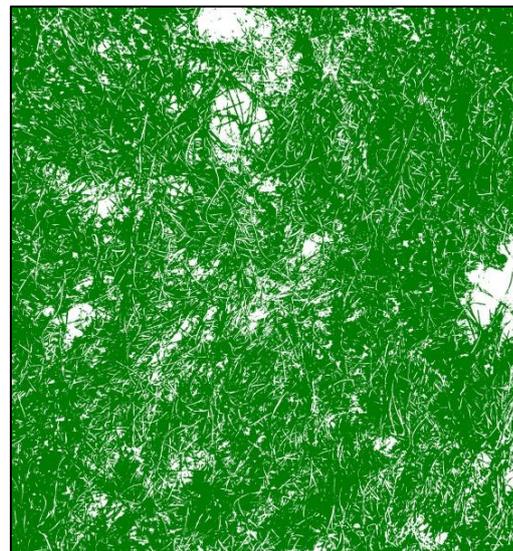
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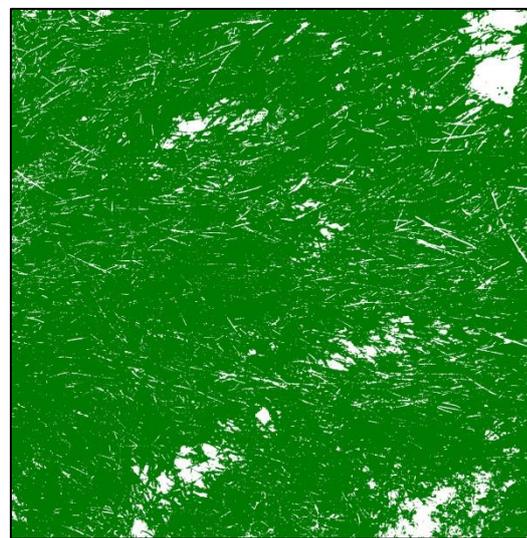
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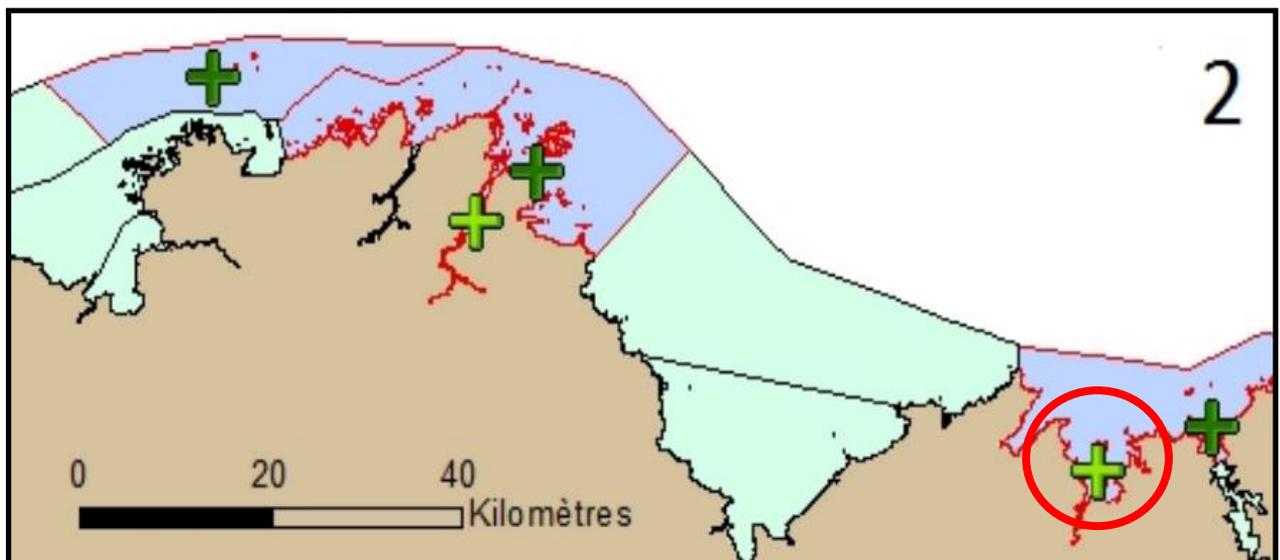


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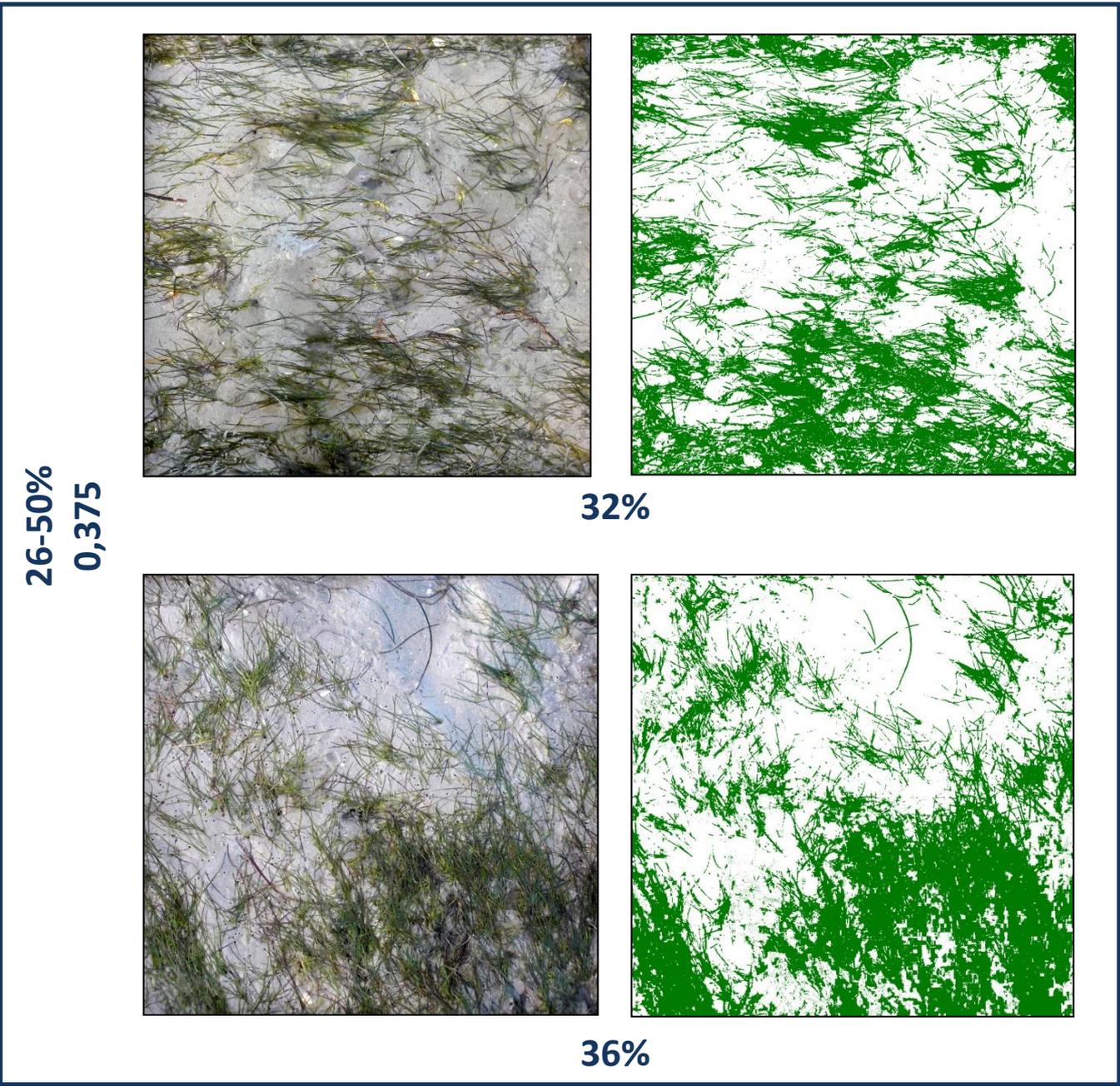
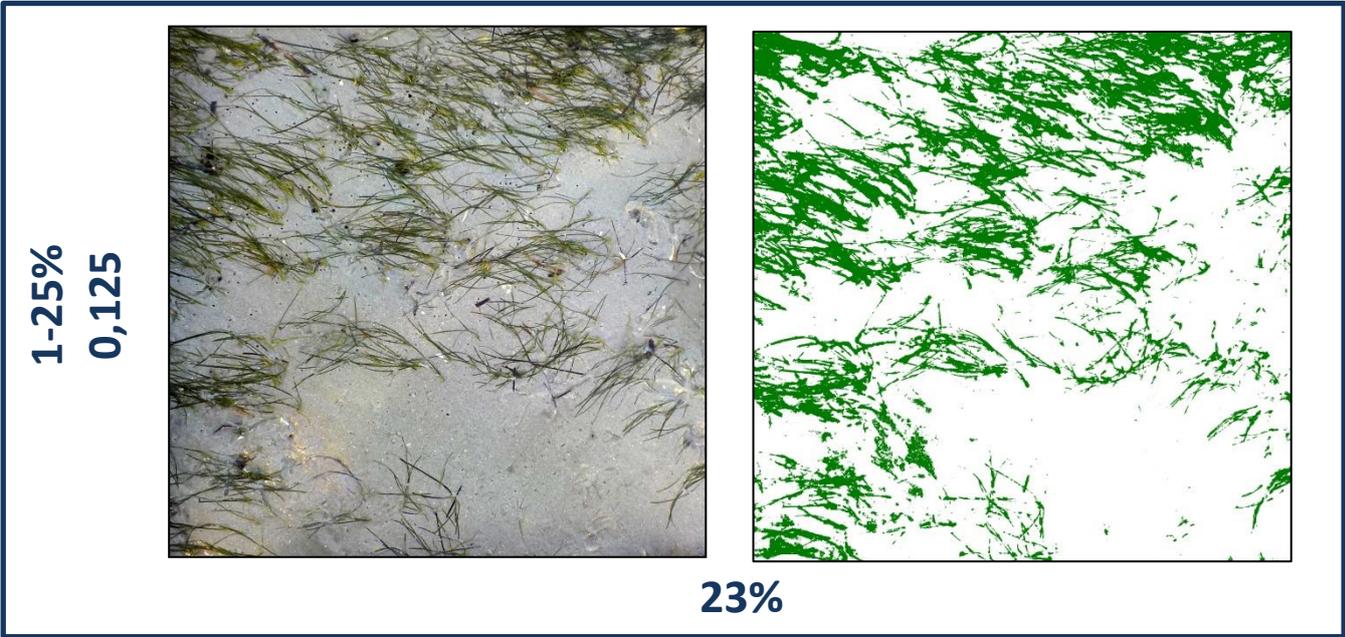


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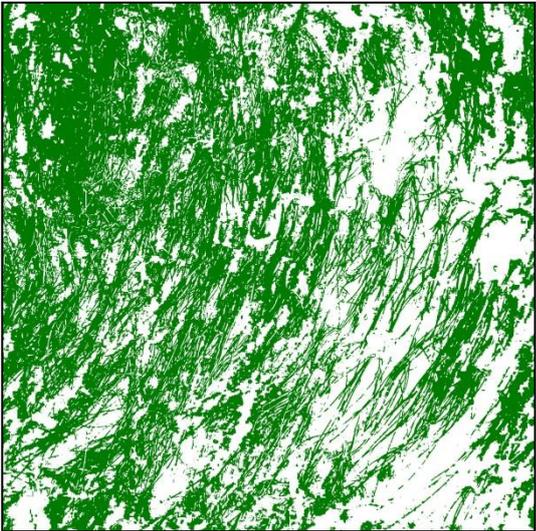




FRGC03—Saint-Jacut de la Mer int HZN

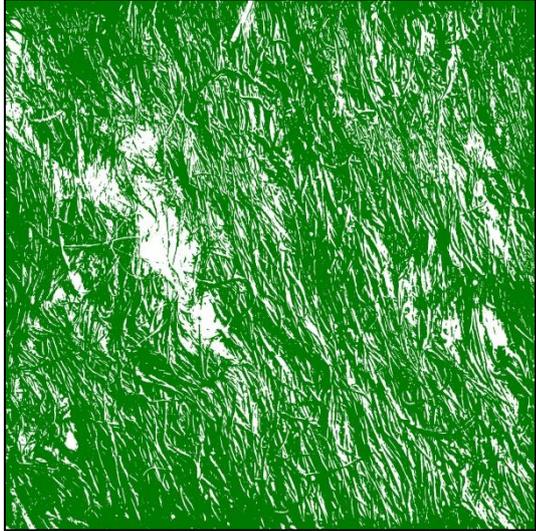


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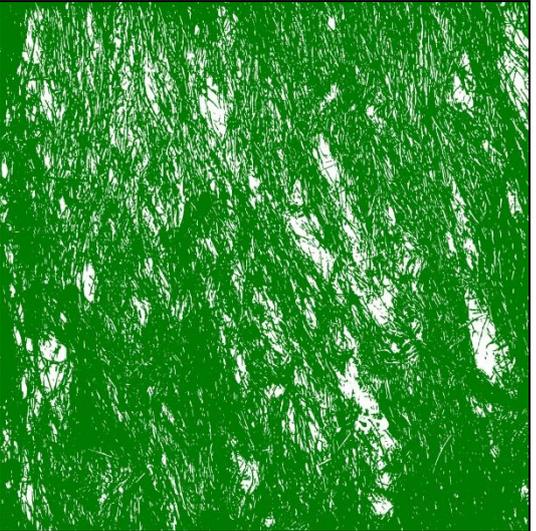
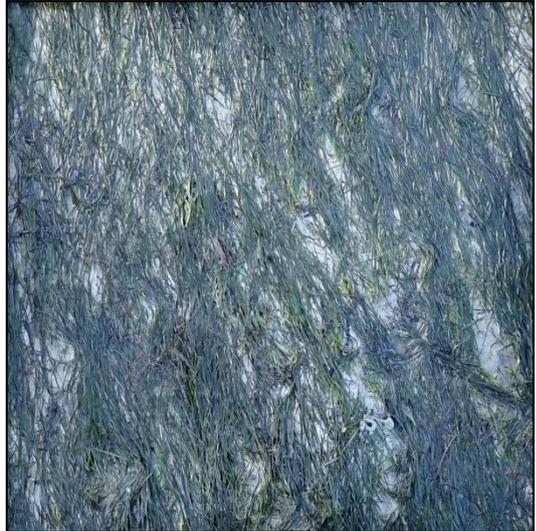
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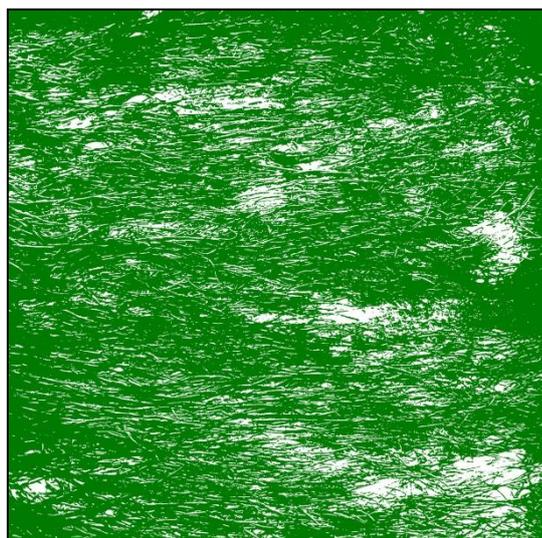
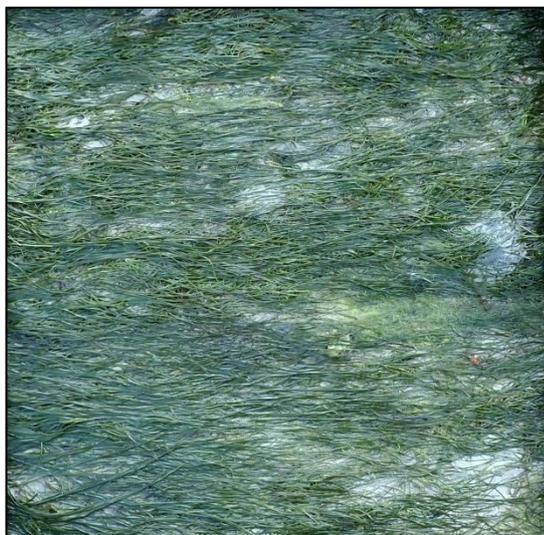


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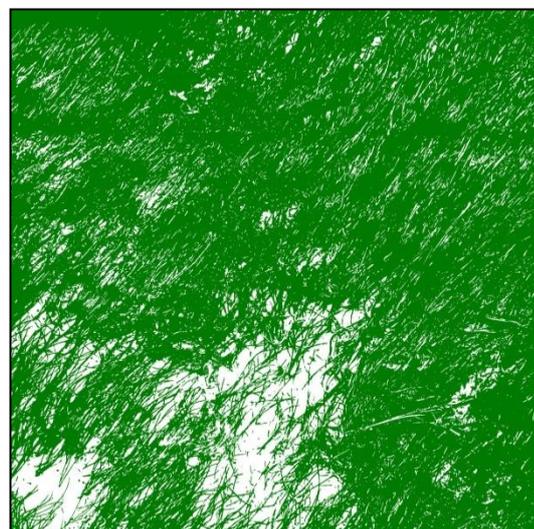
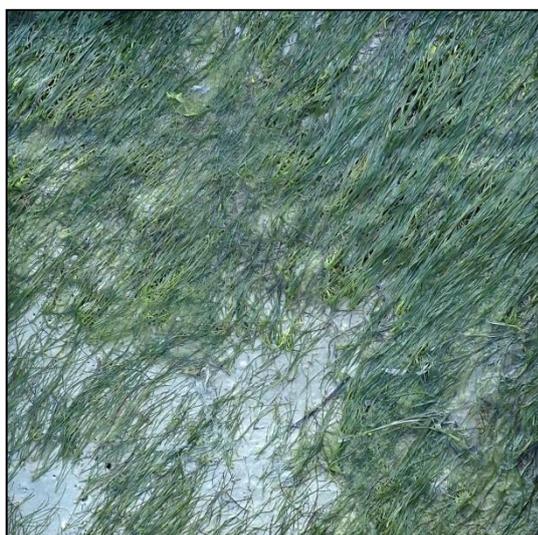


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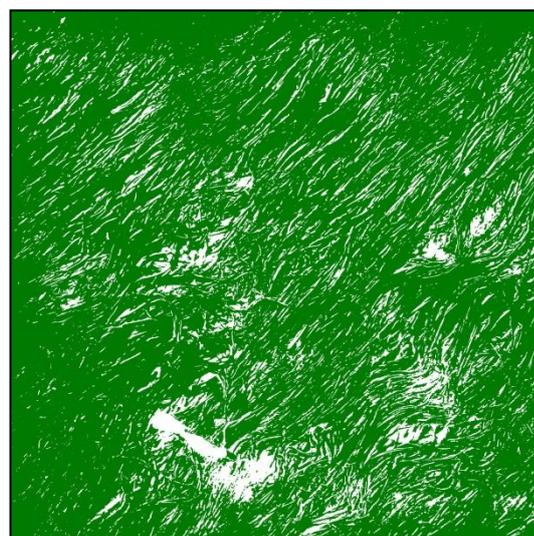
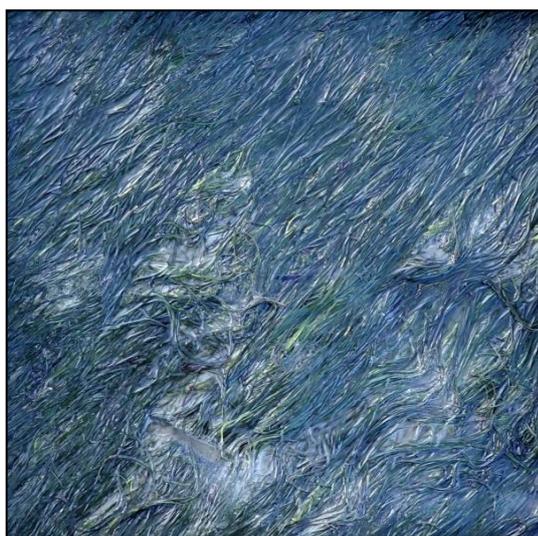


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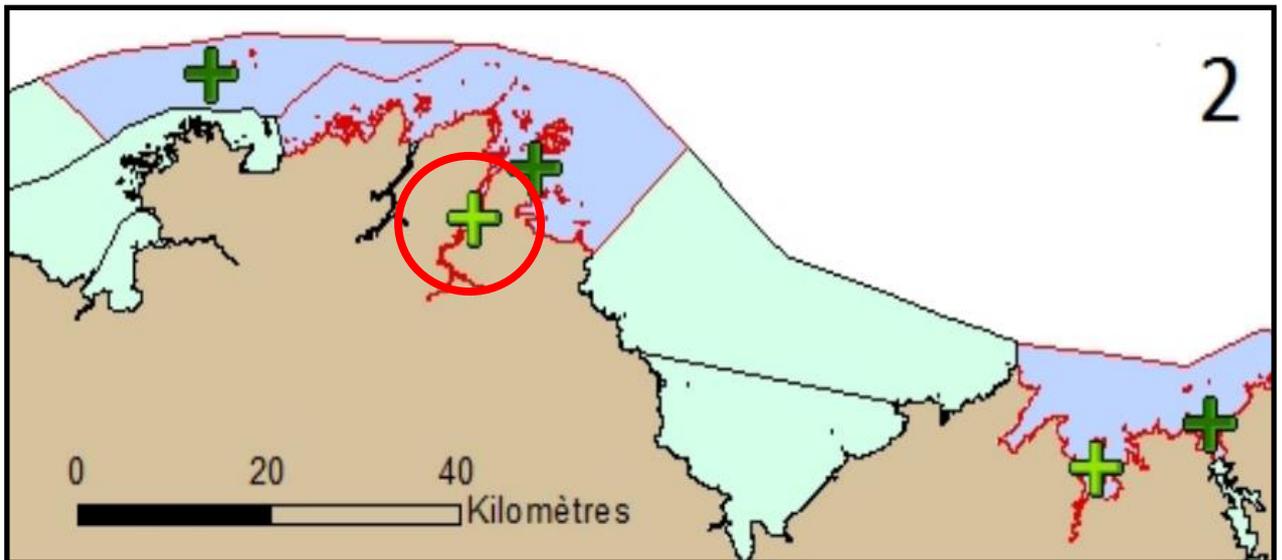
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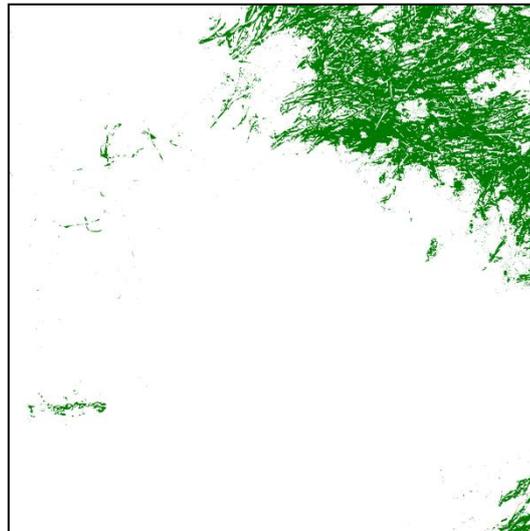
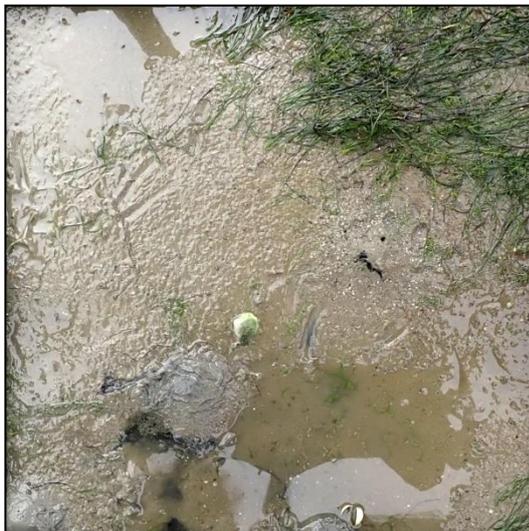


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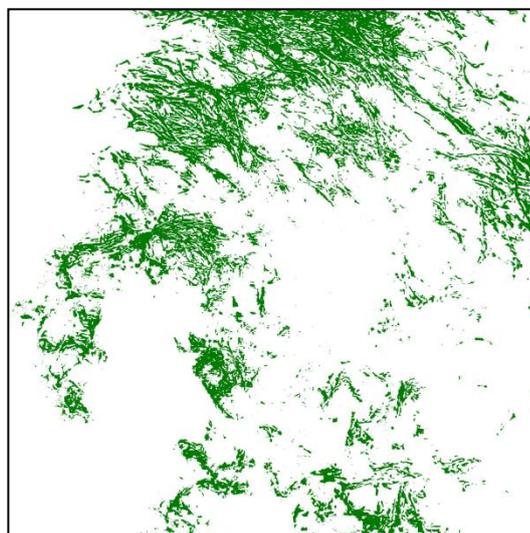
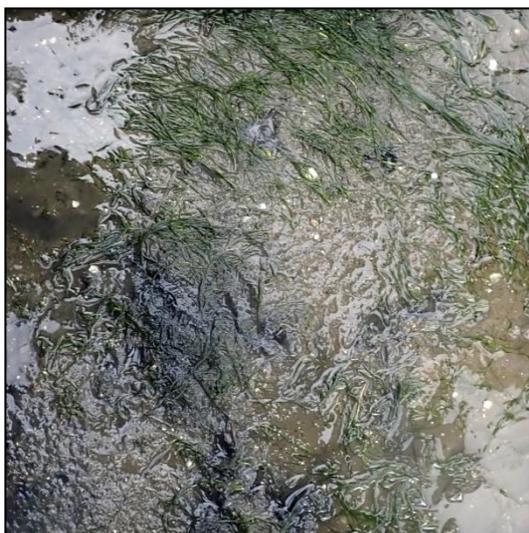


FRGT03—Le Trieux Kergrist HZN

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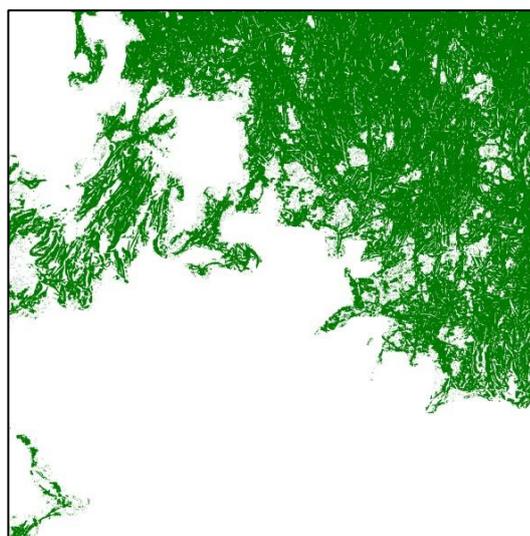


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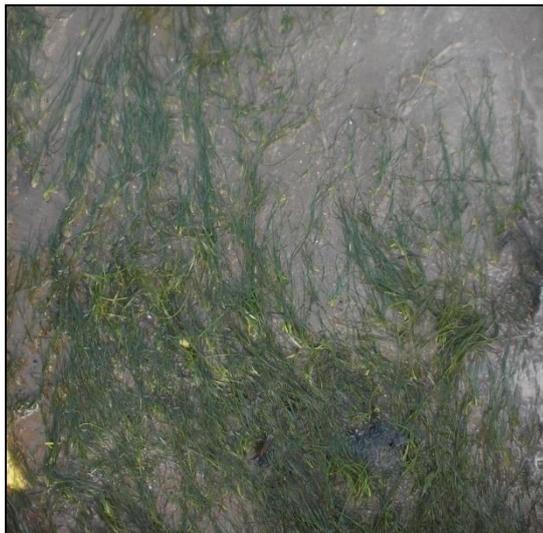
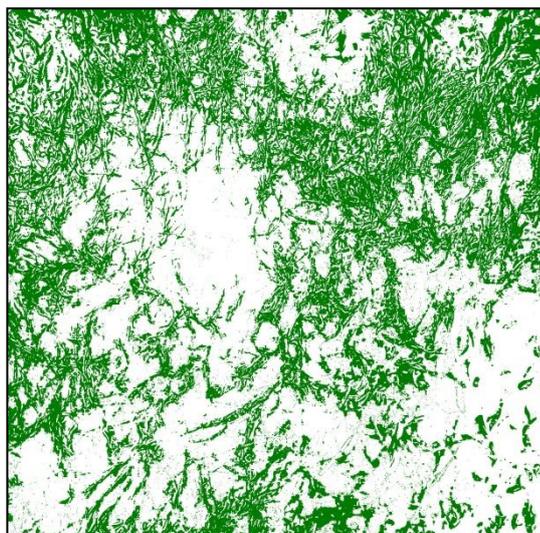


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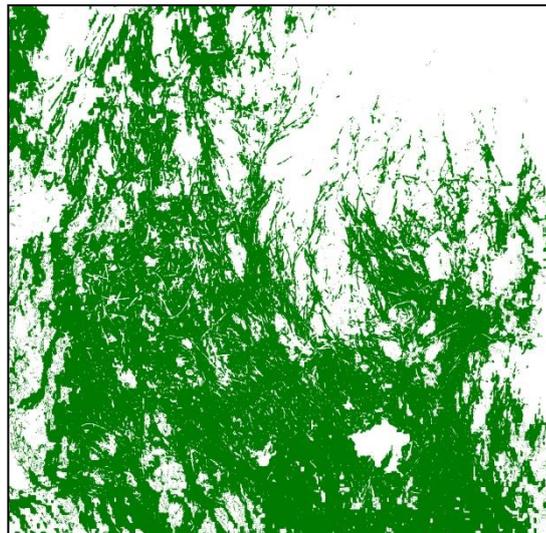
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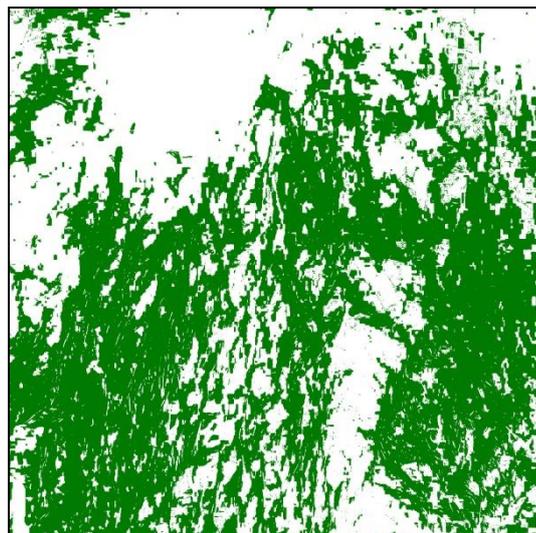
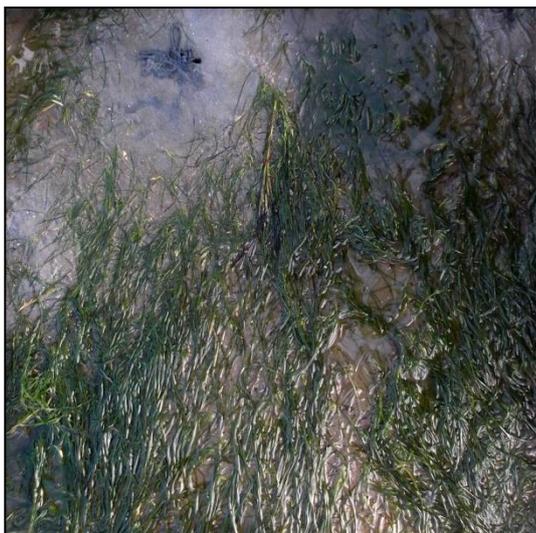


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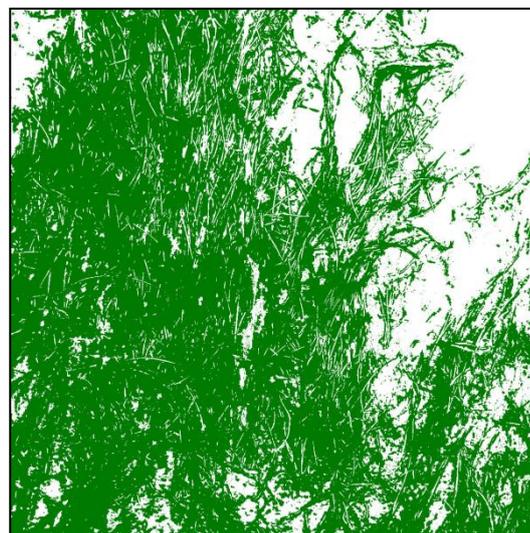
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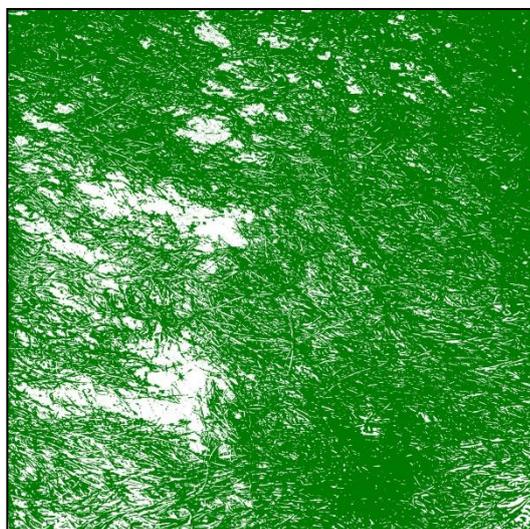


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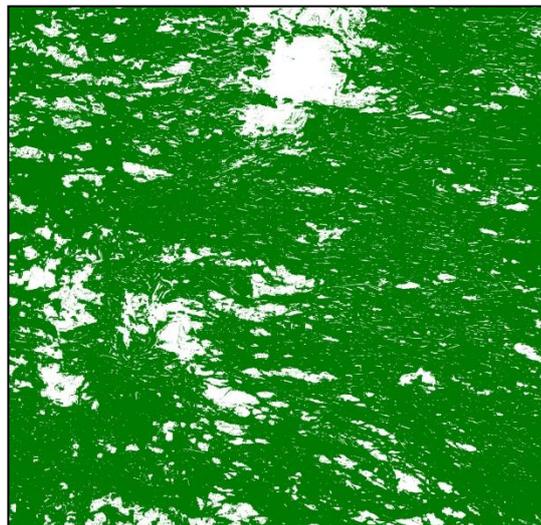
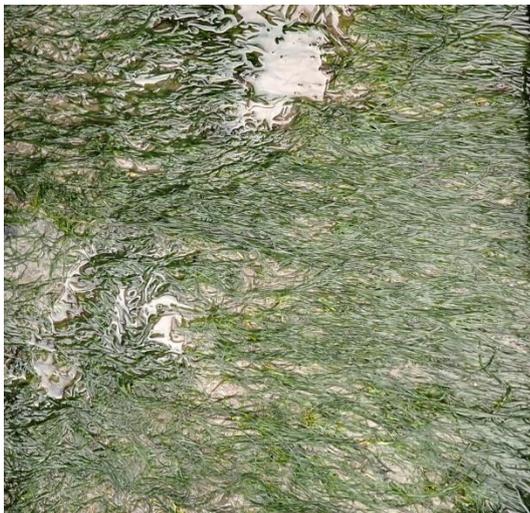


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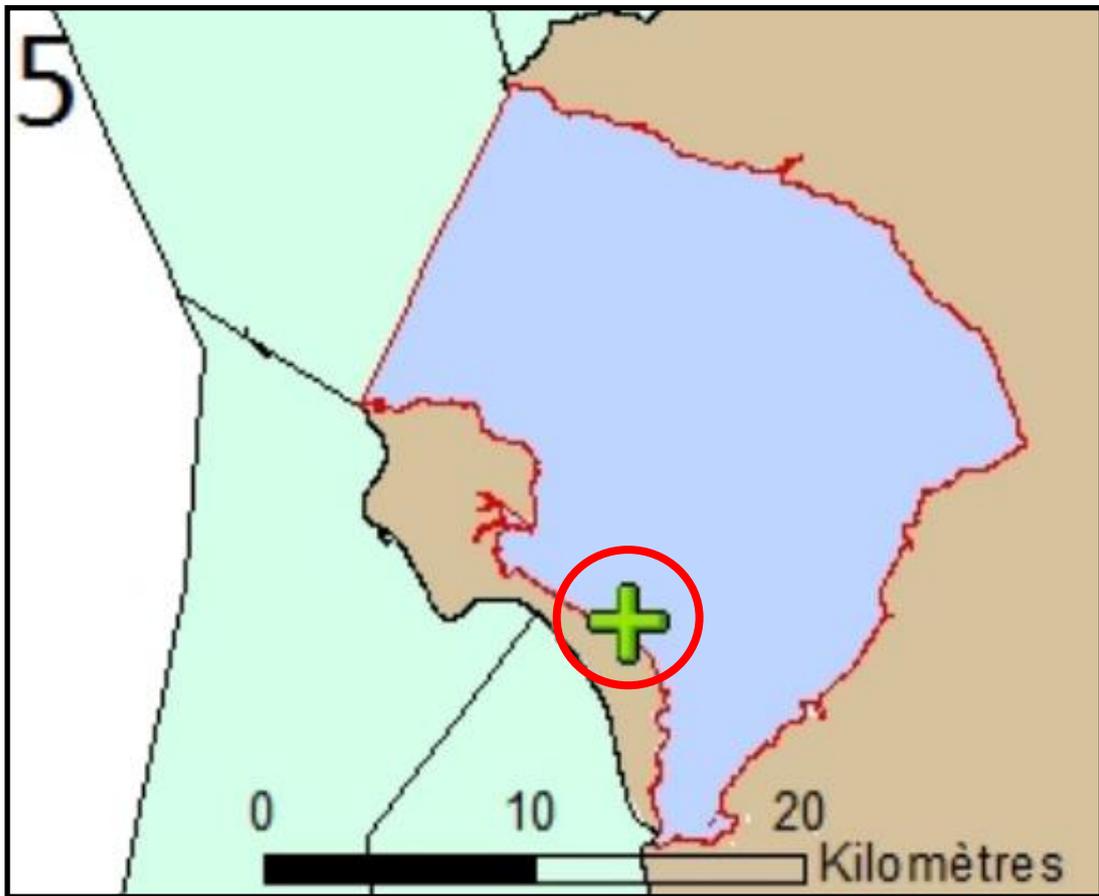


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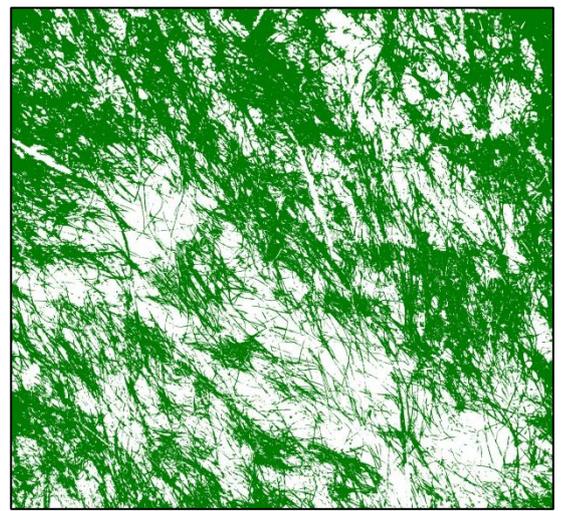
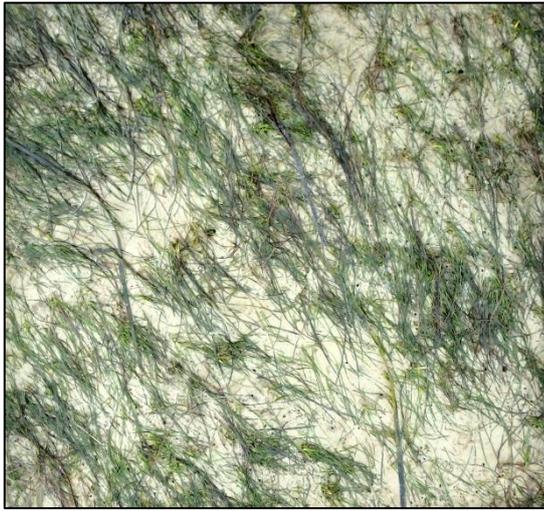
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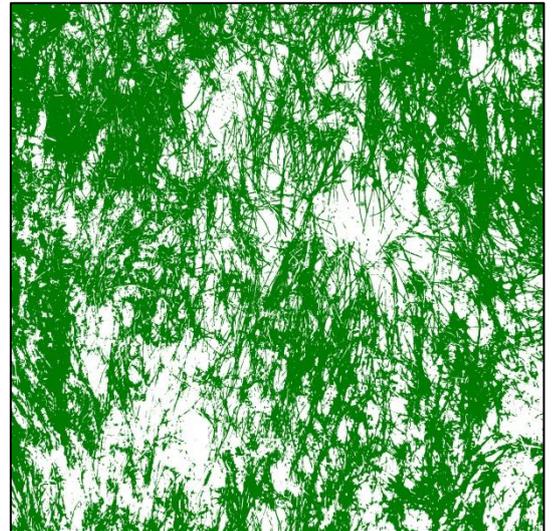


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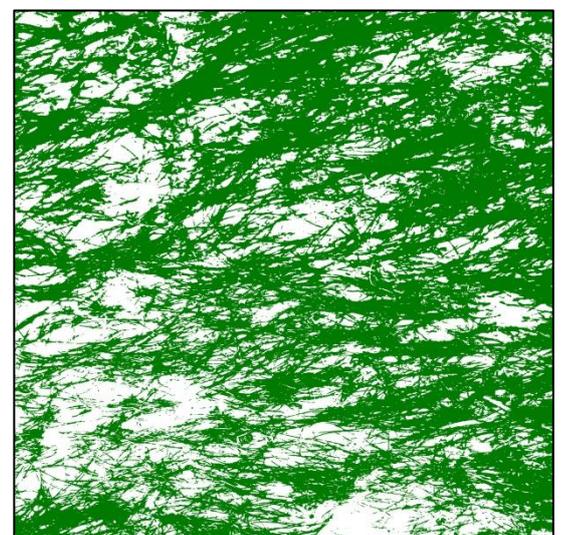
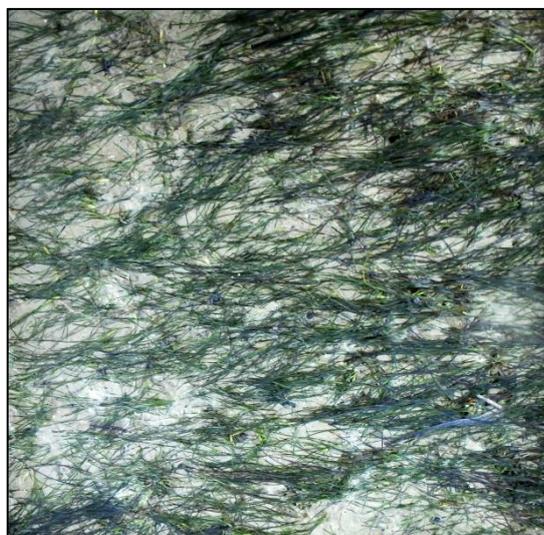


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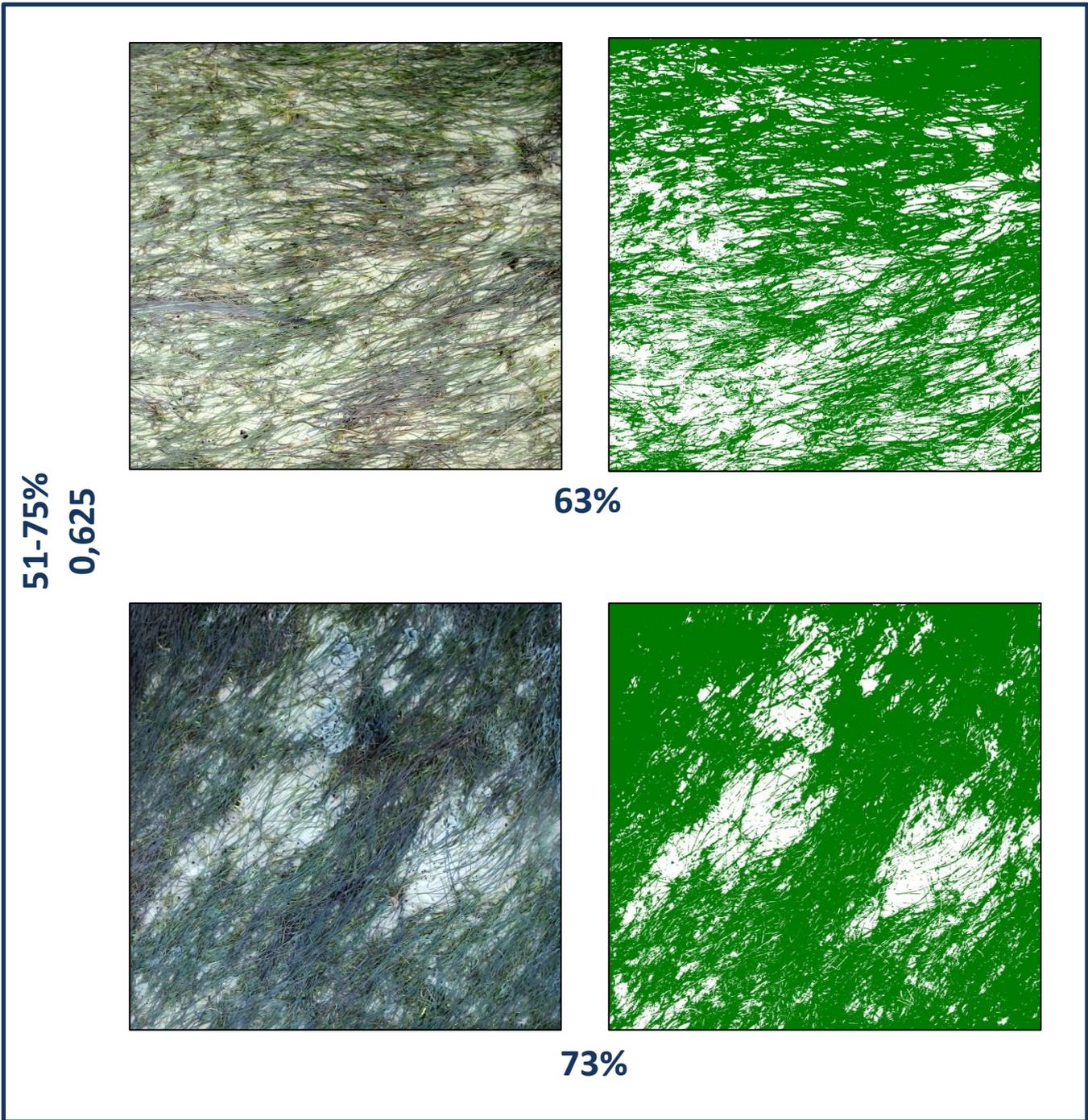
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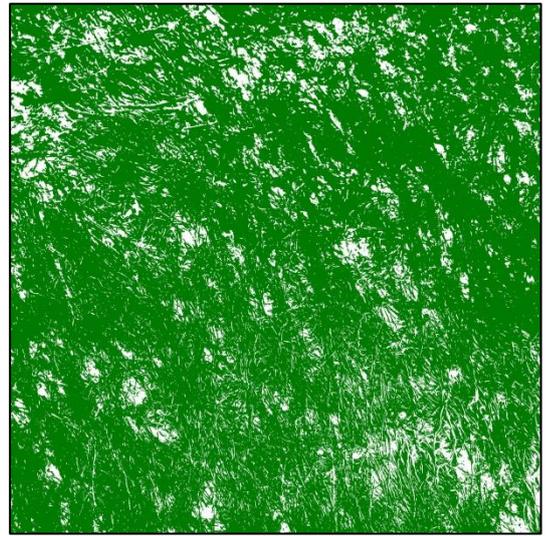
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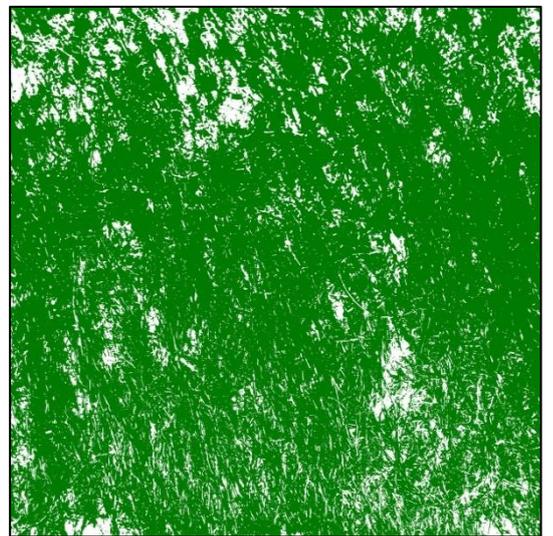
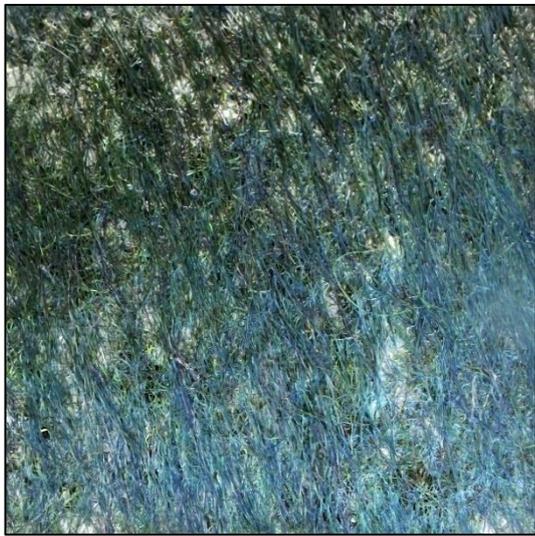
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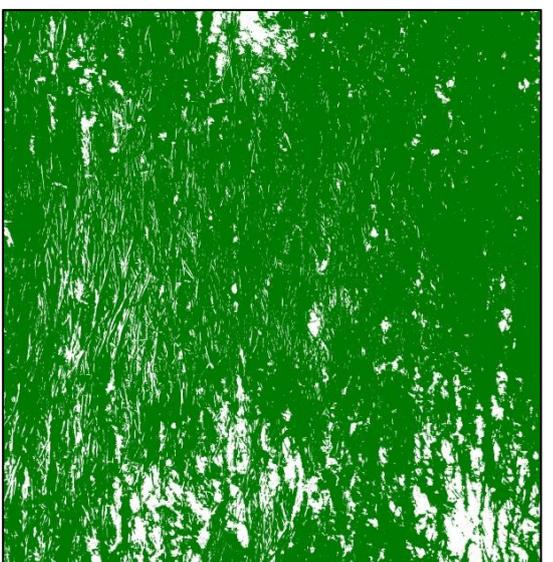
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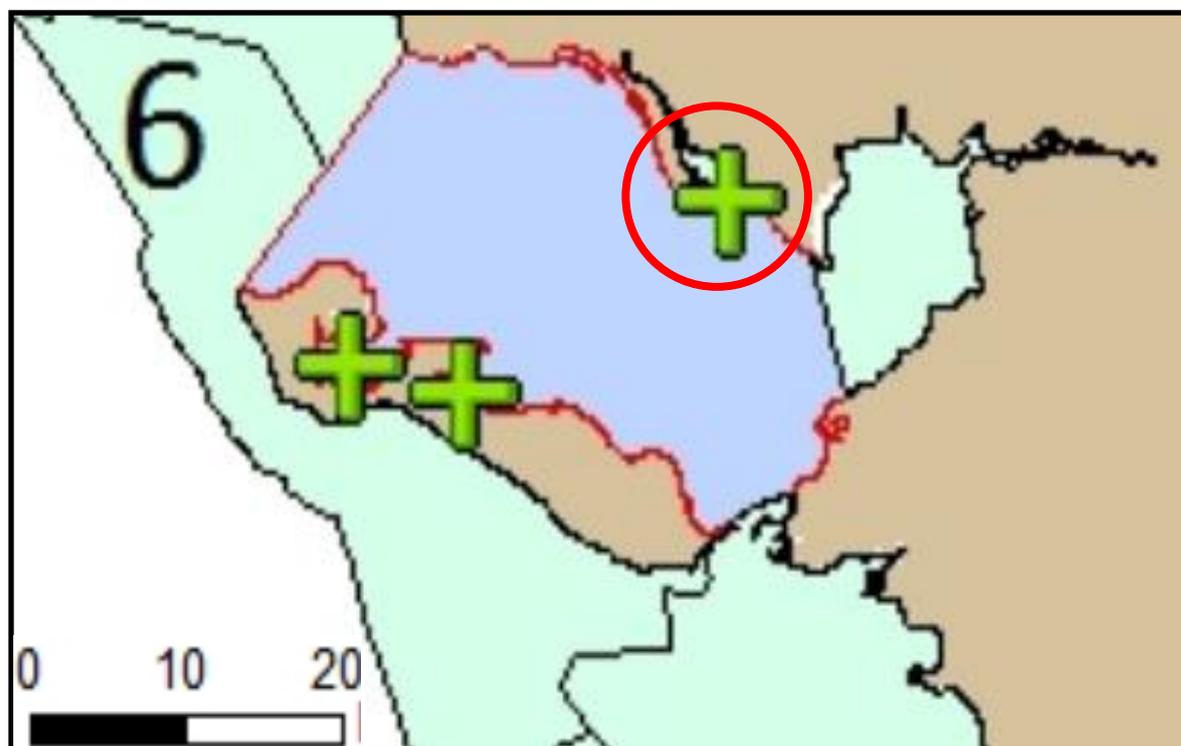
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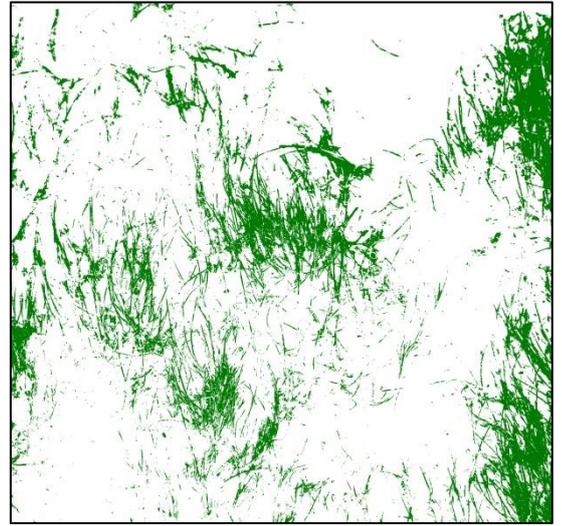
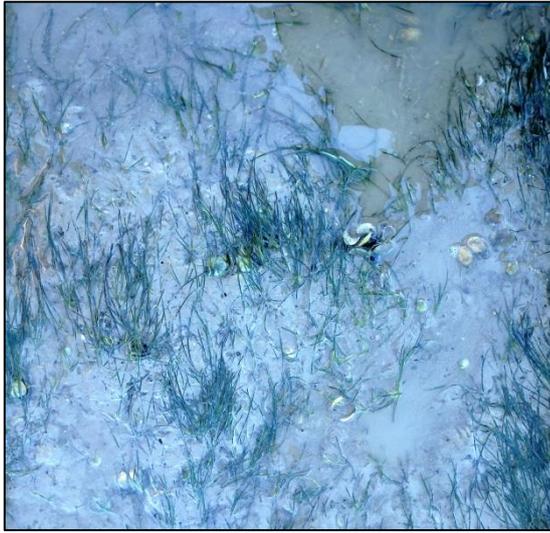


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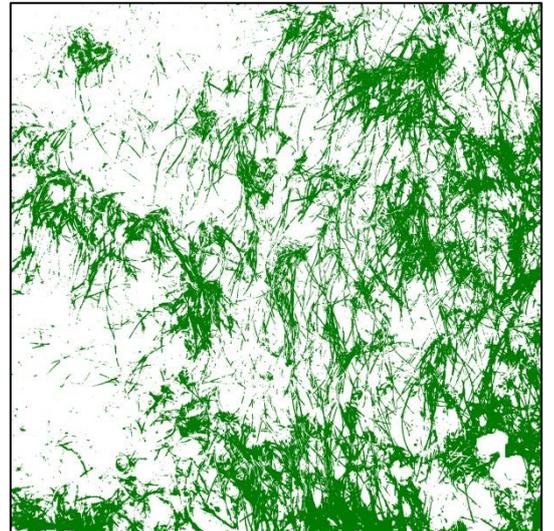
FRGT30—Lay Crochon 1982 int HZN

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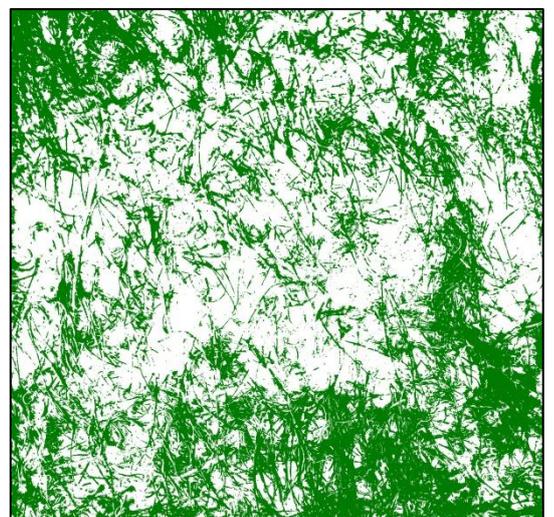
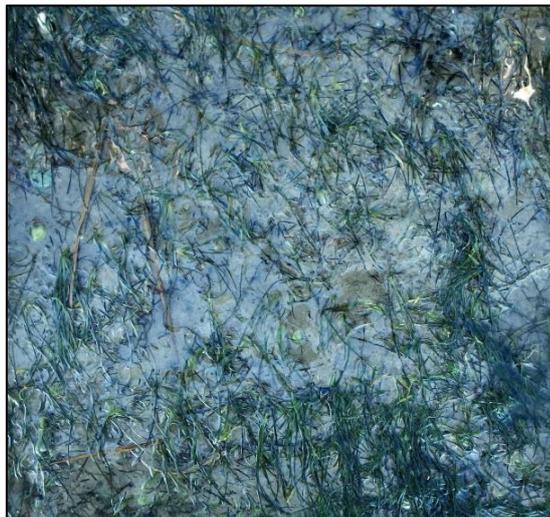


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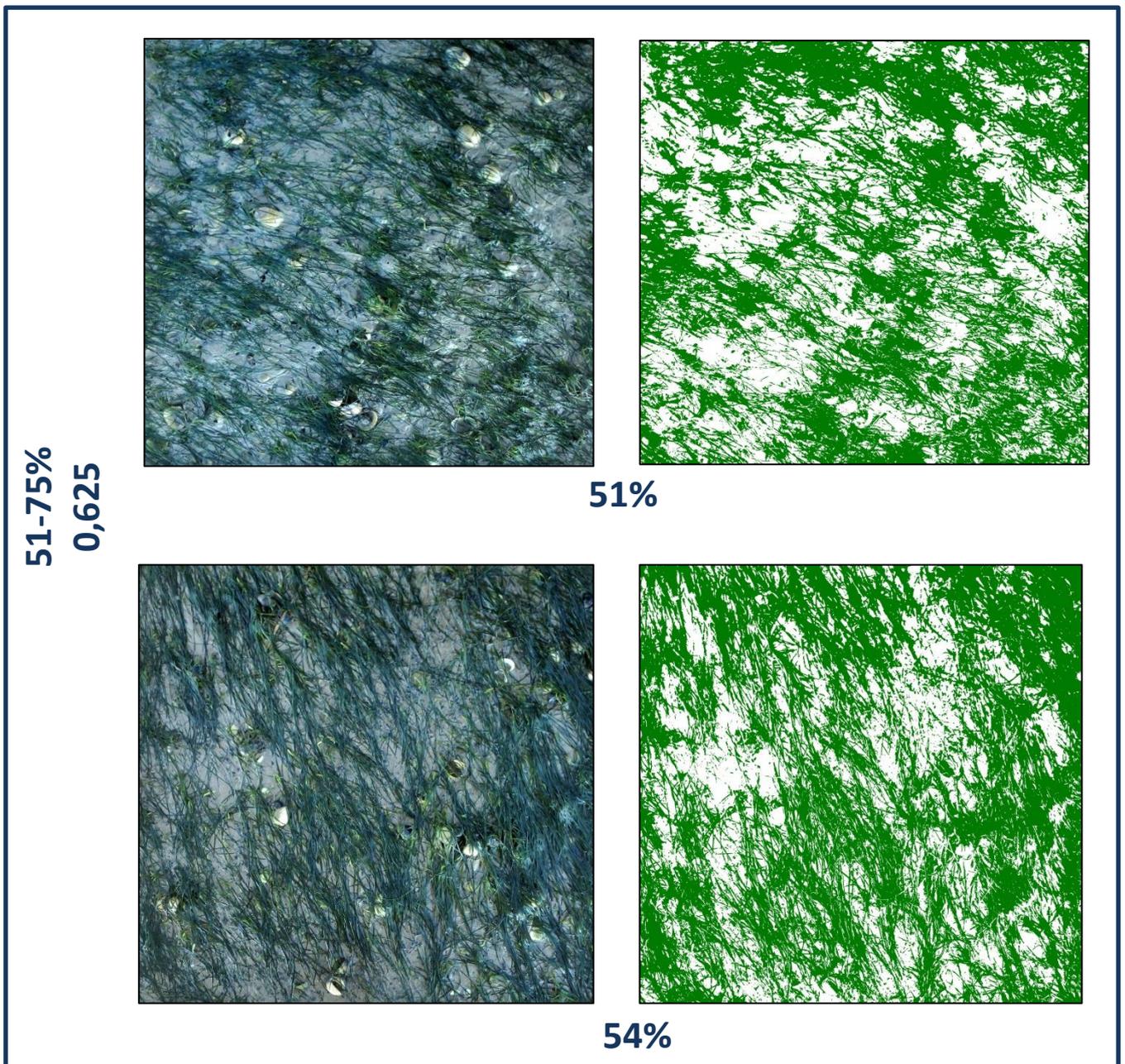
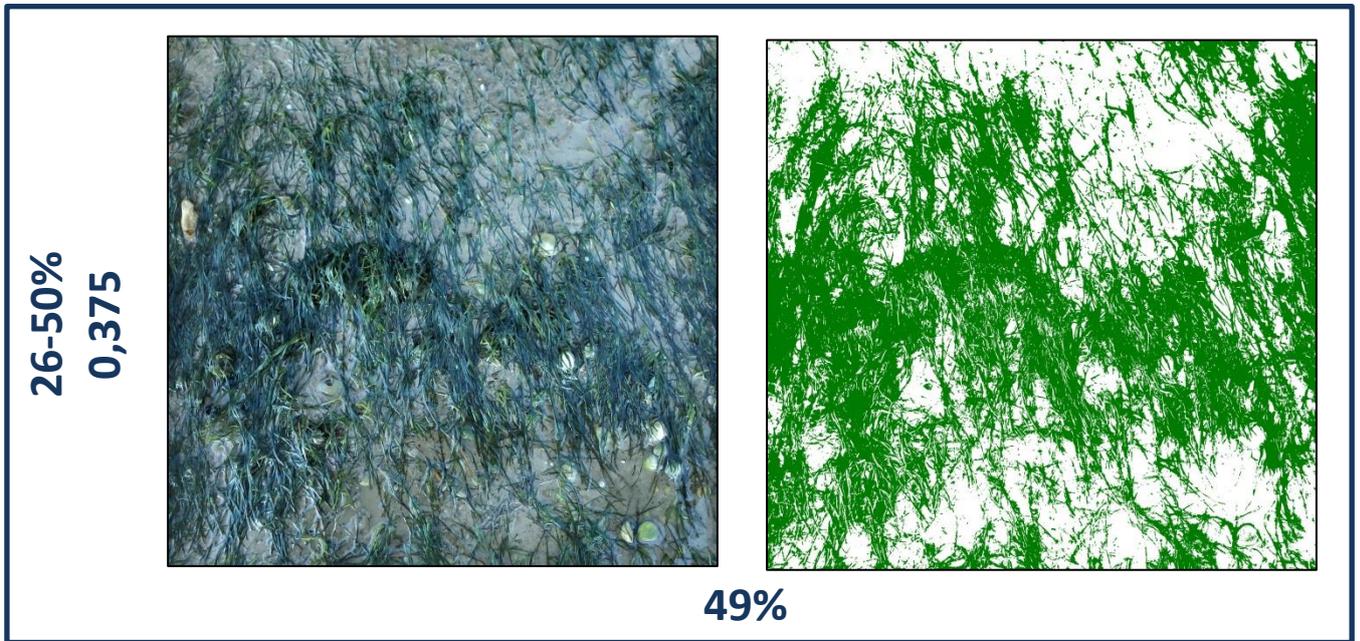
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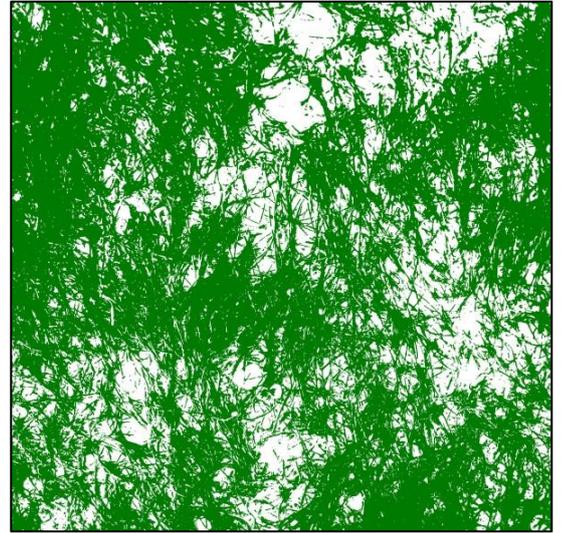
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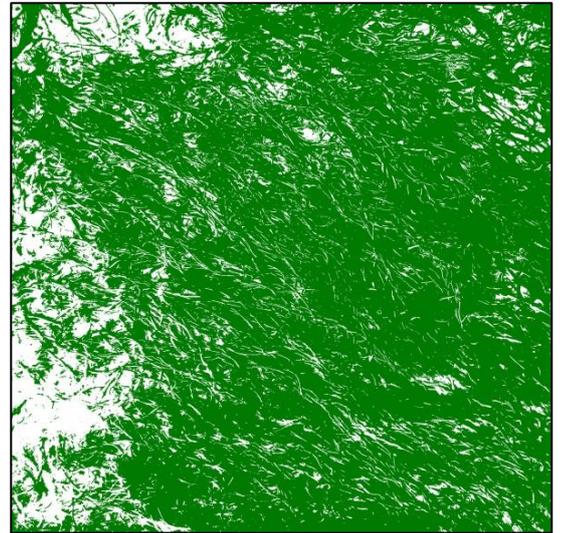
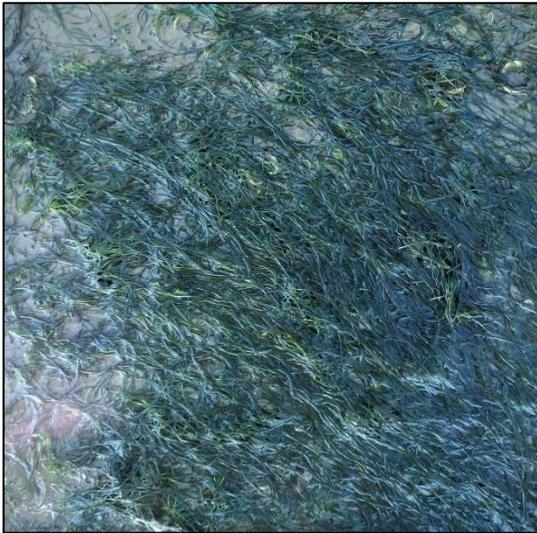


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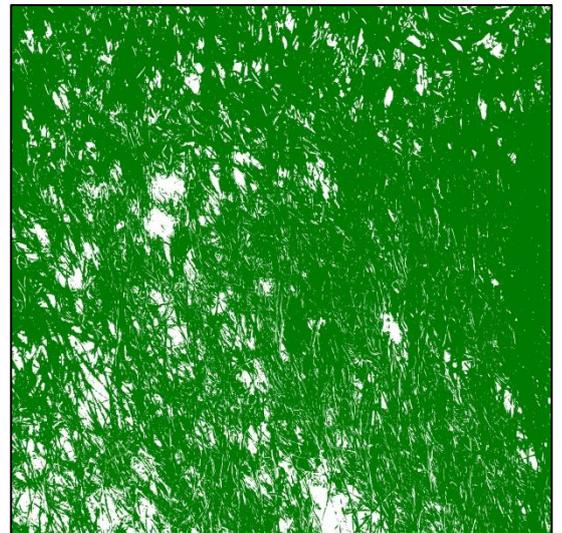
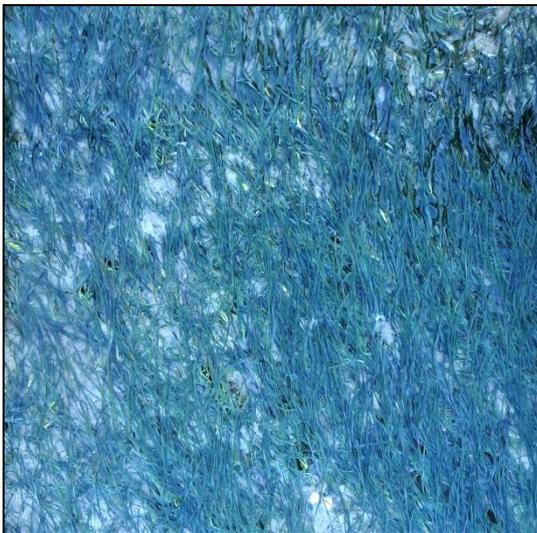


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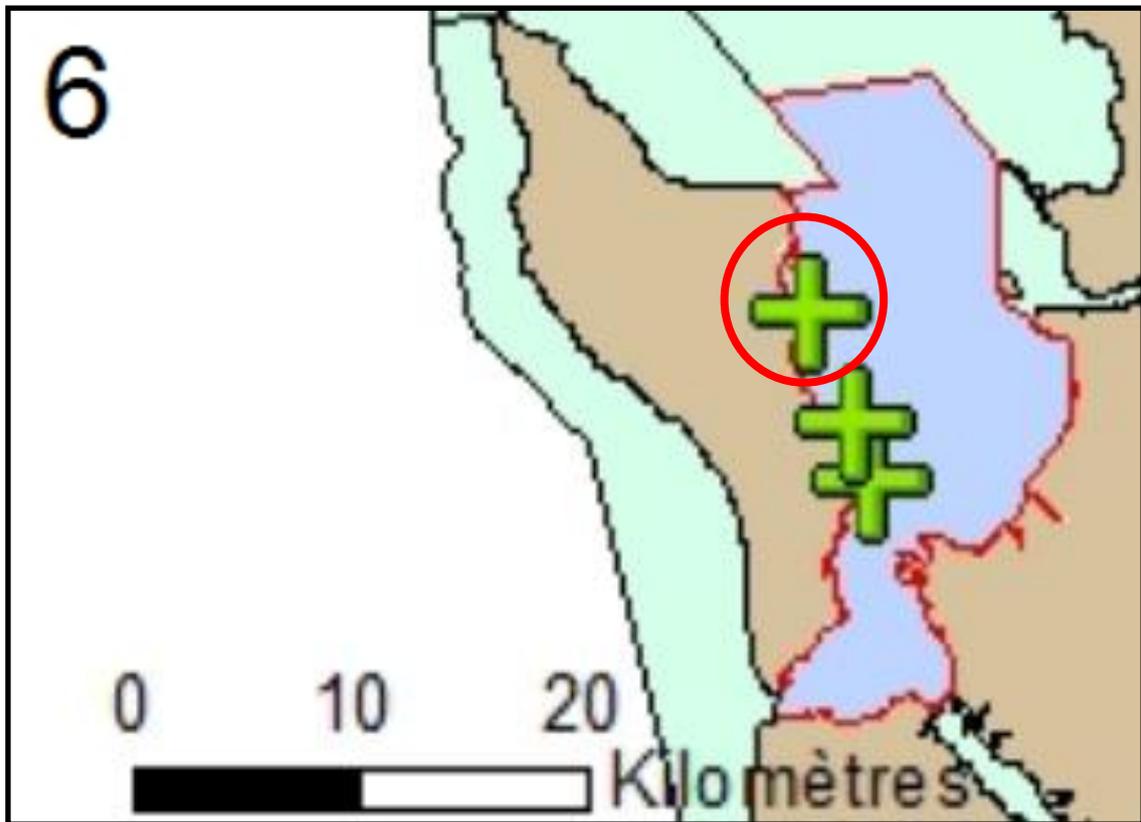
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76%

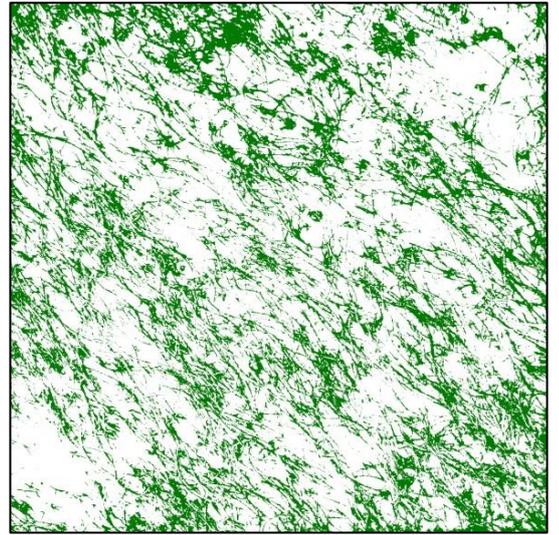
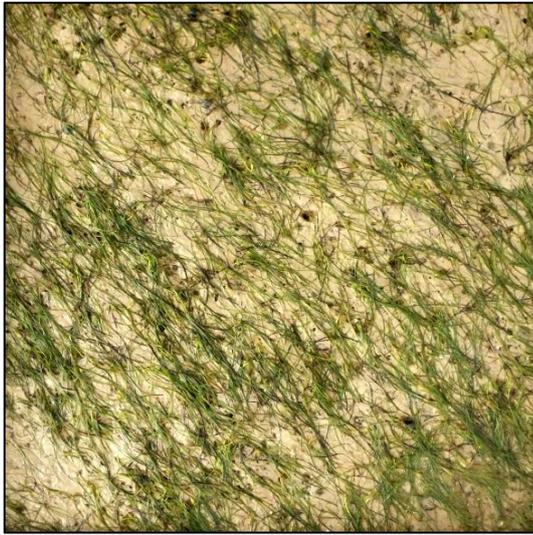


82%

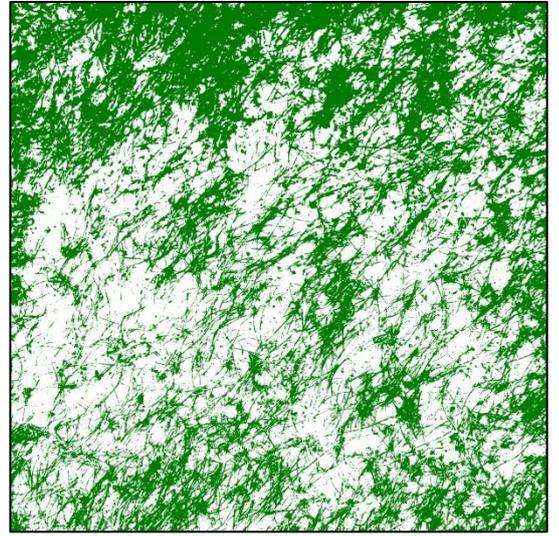
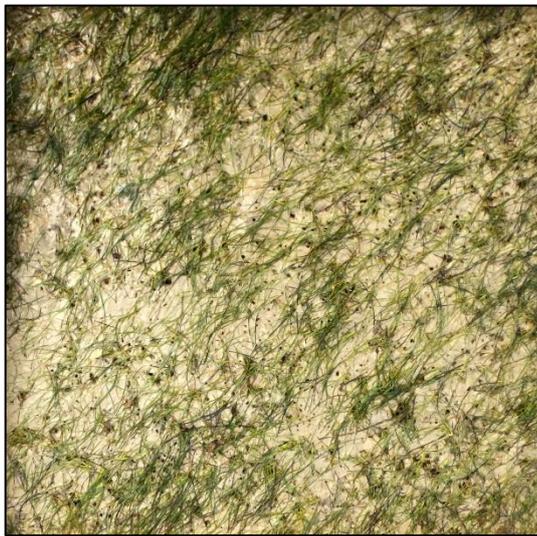


FRFC02—Les Doux int HZN

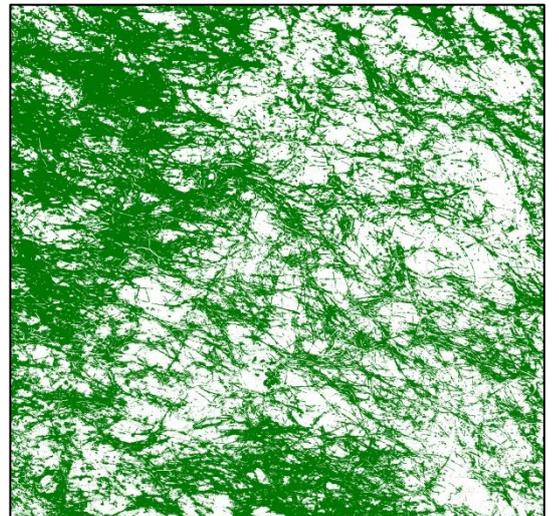
26-50%
0,375



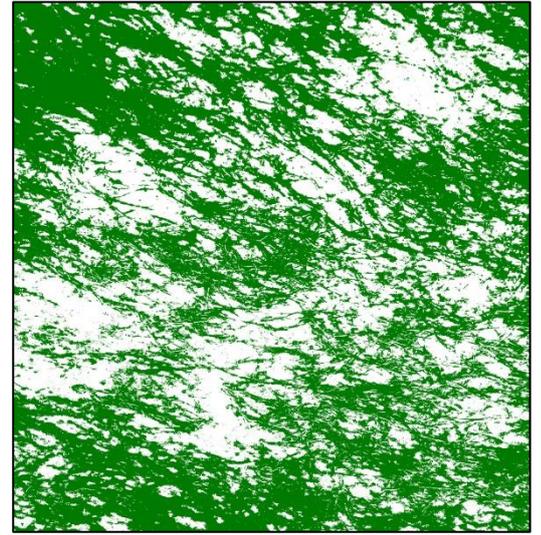
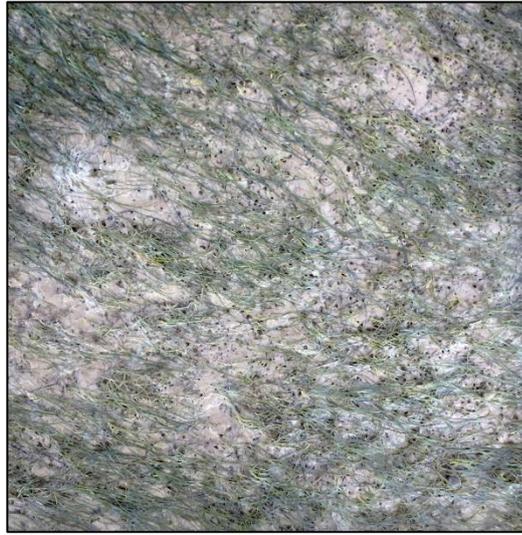
41%



43%

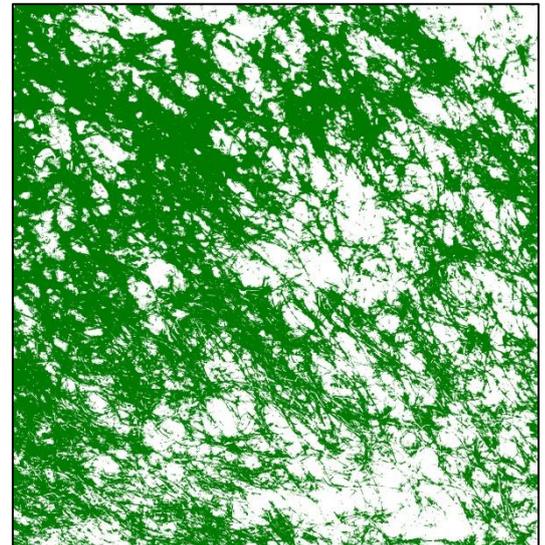


47%

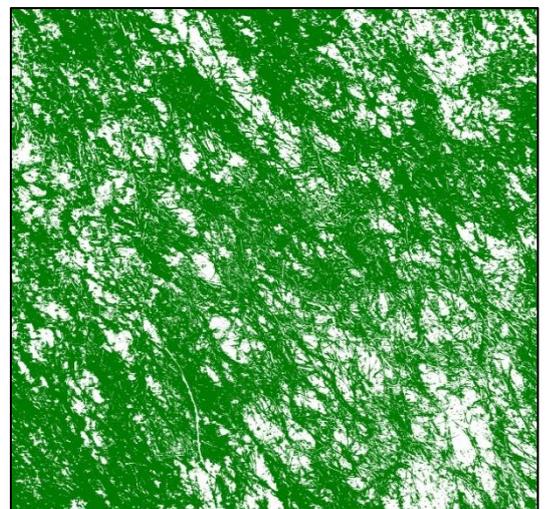


53%

**51-75%
0,625**

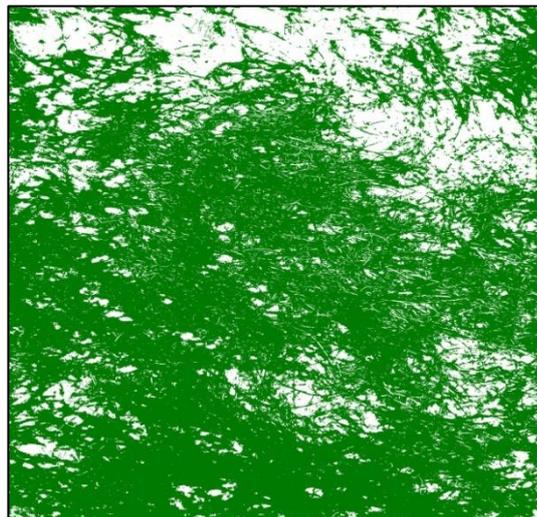


54%

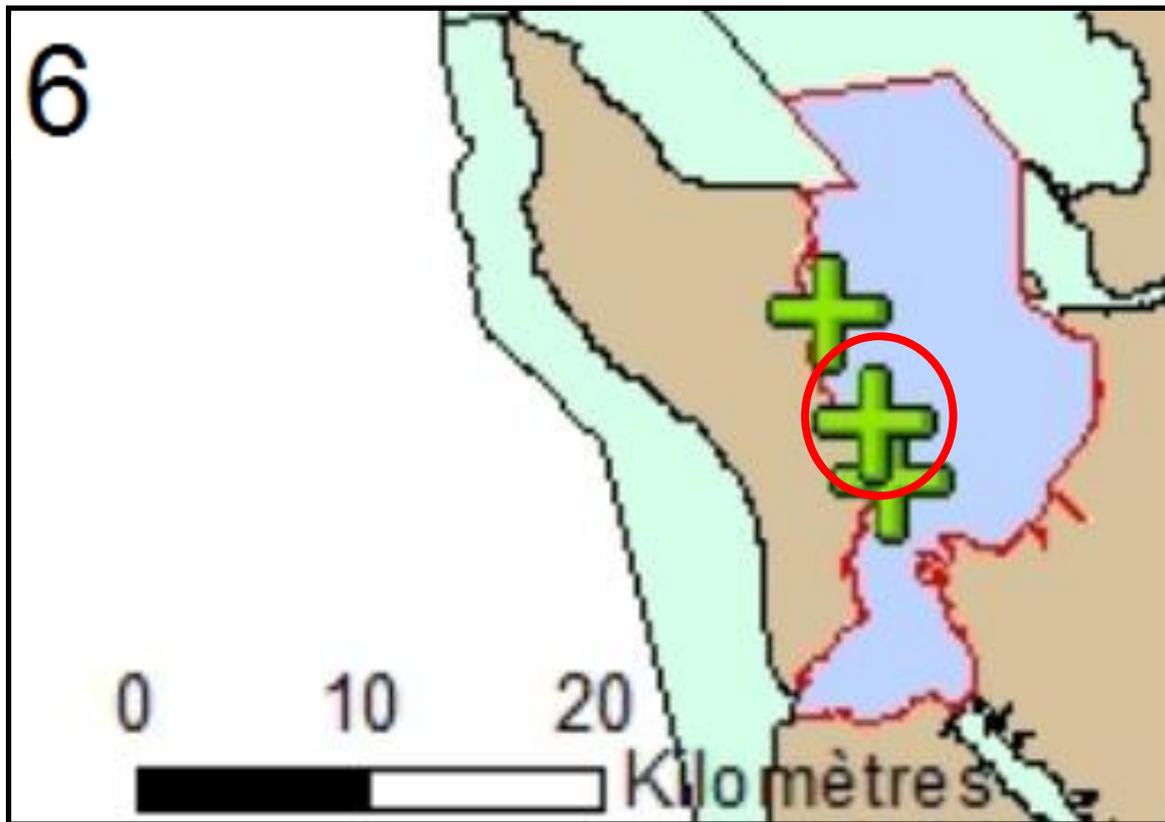


64%

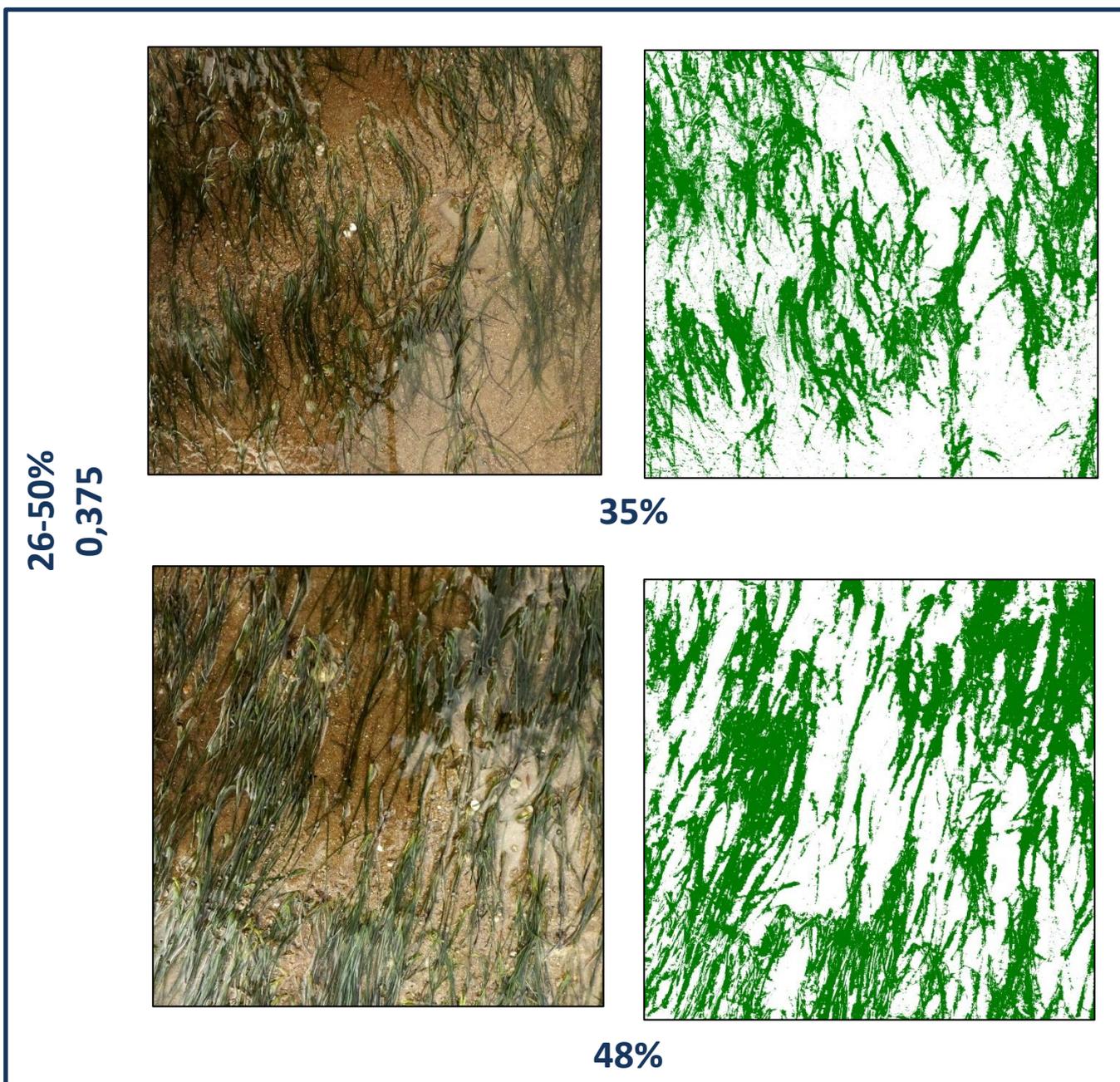
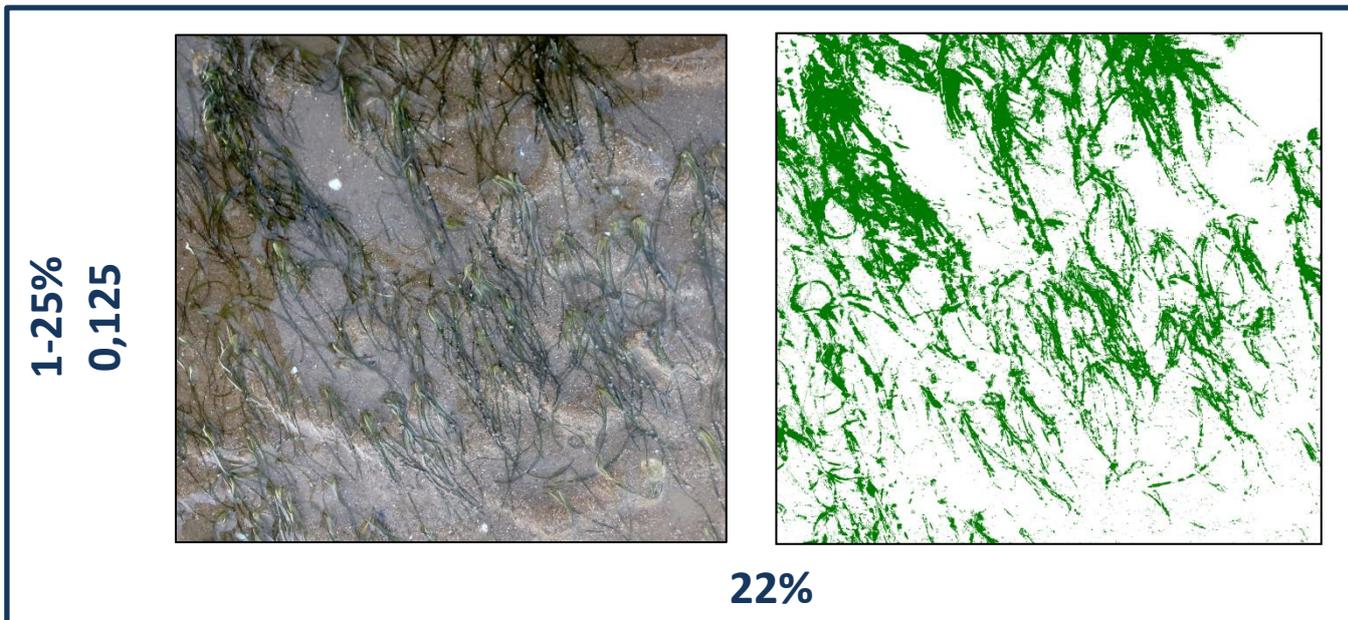
51-76%
0,625

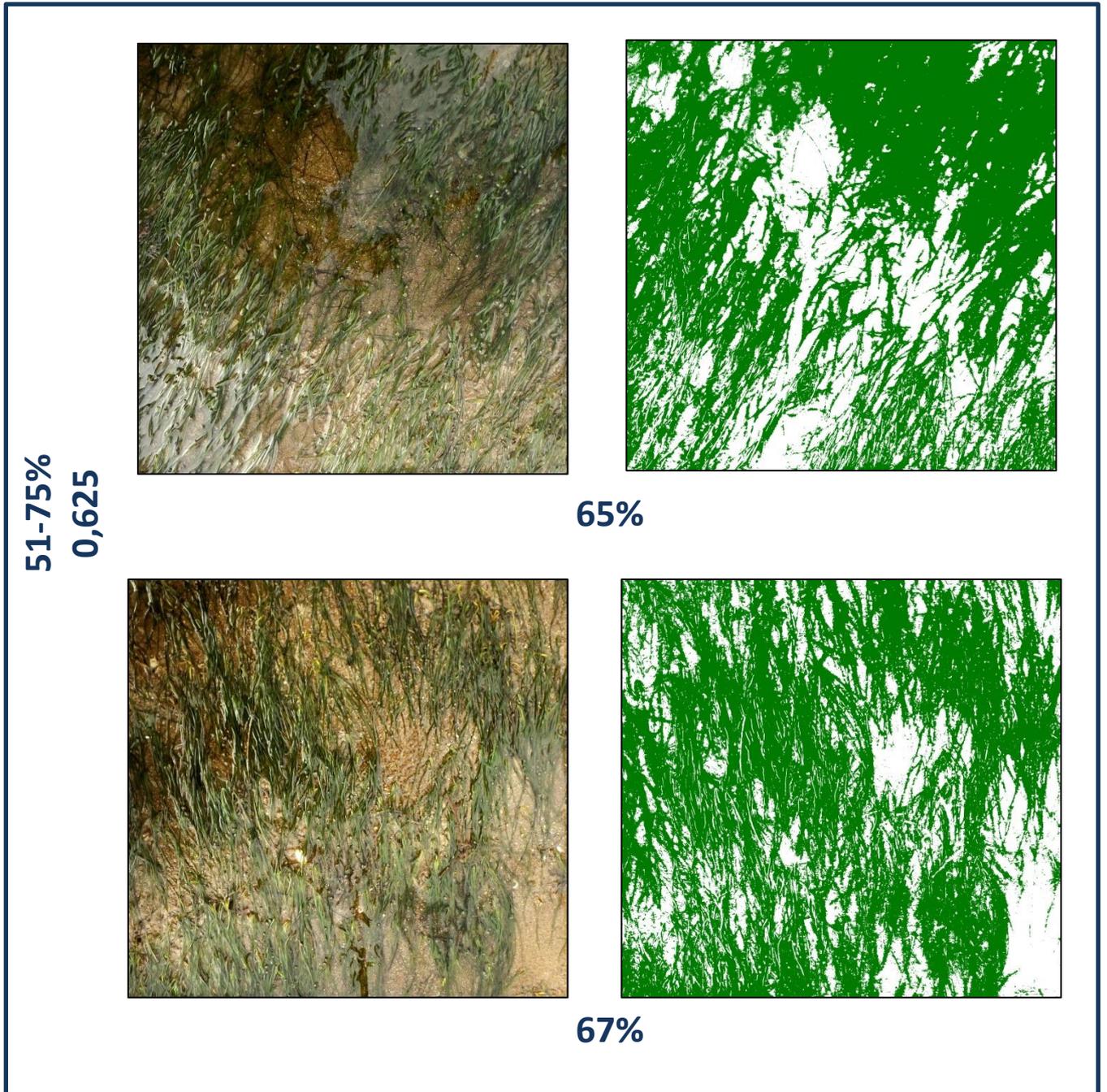


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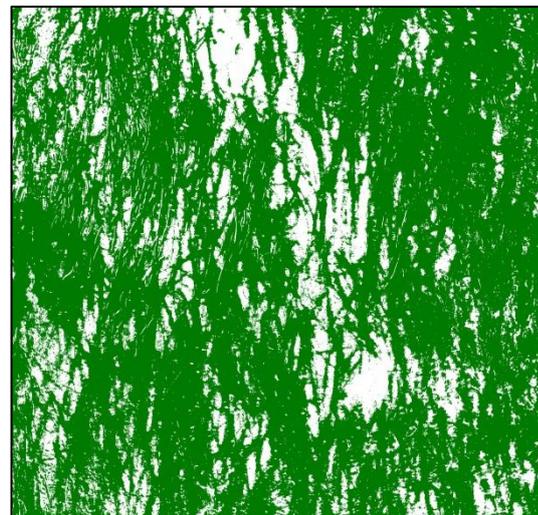
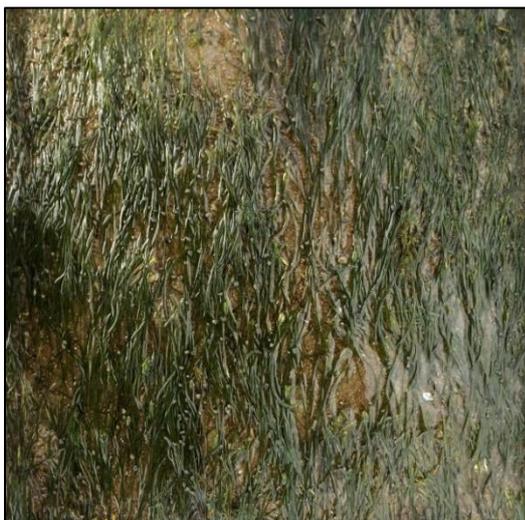


FRFC02—Perrotine-Bellevue int HZN

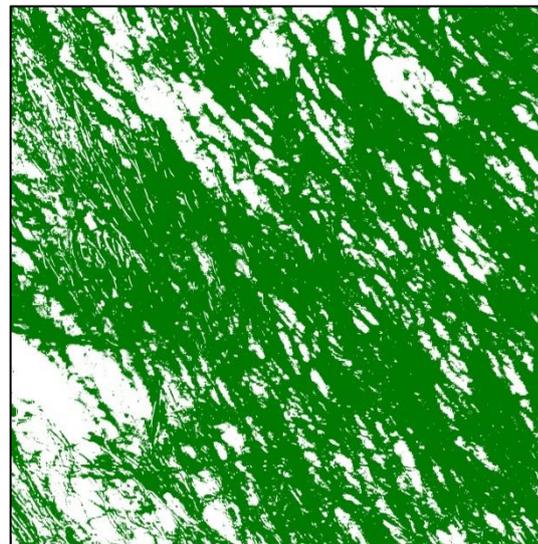




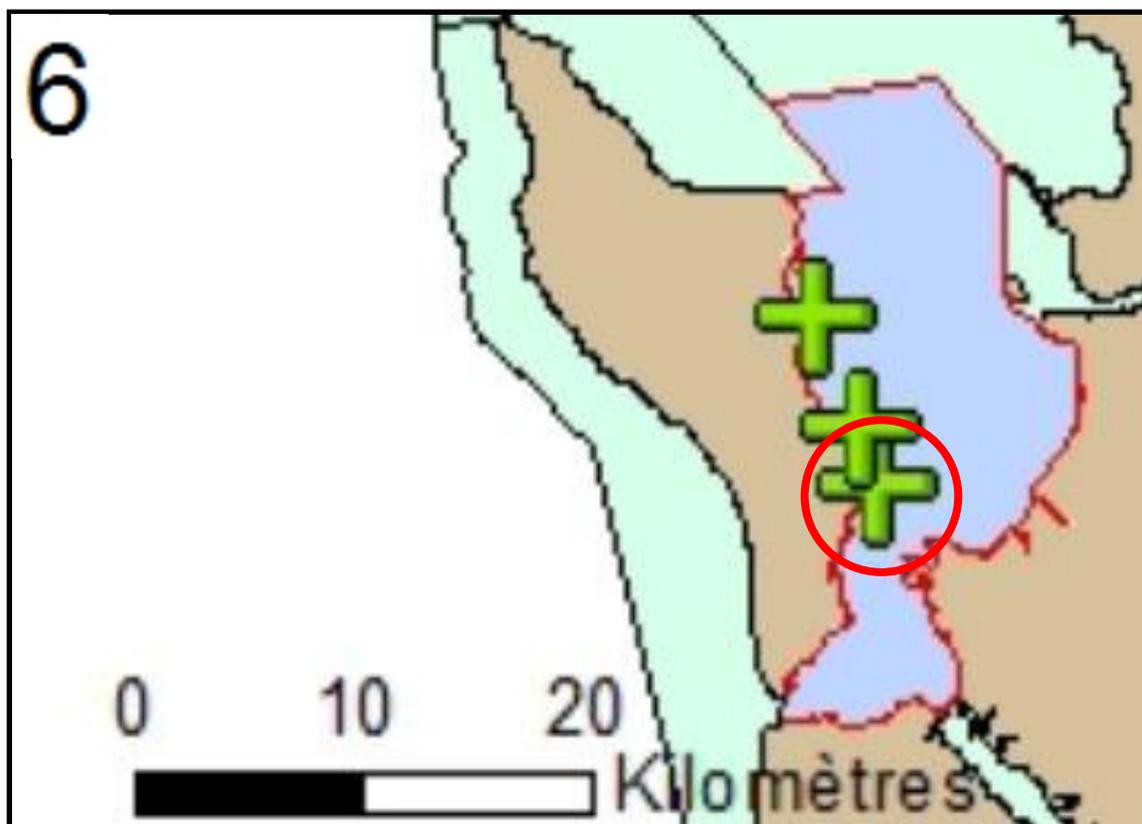
51-75%
0,625



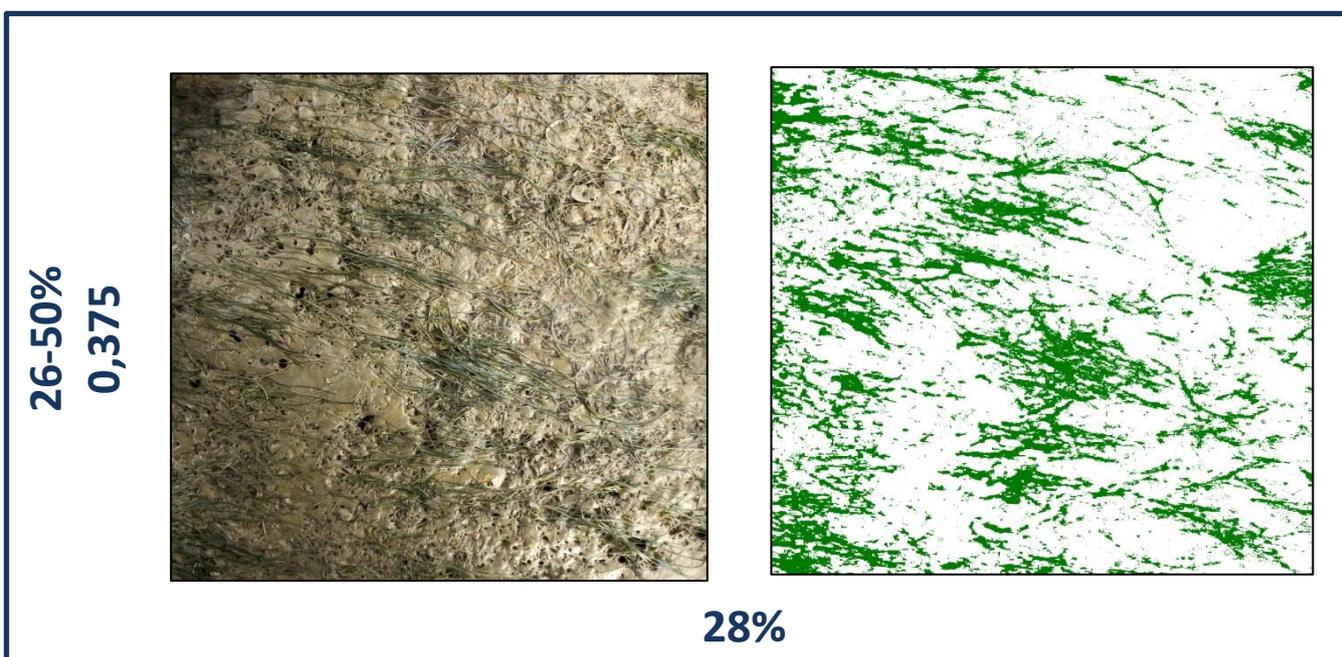
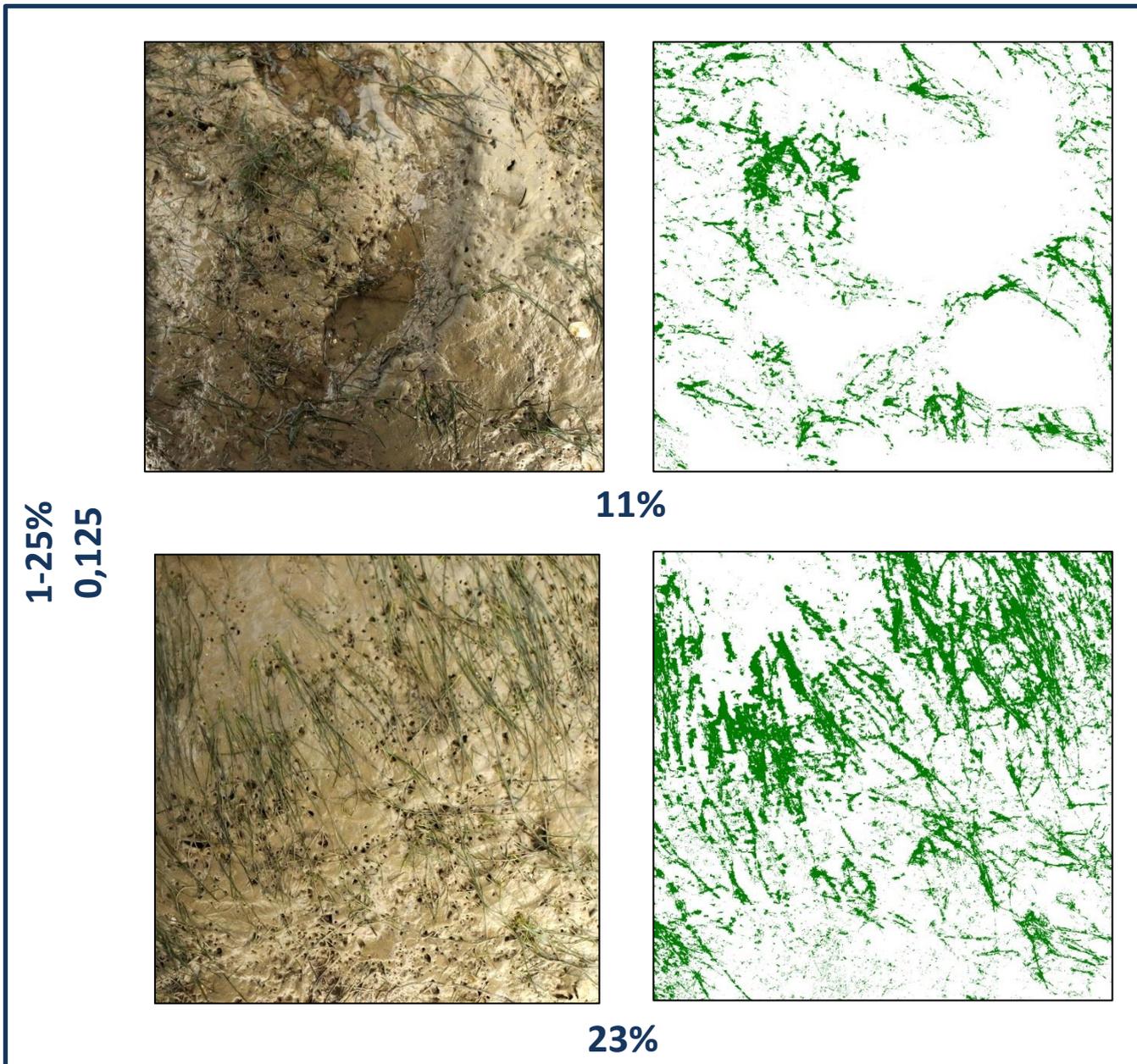
74%



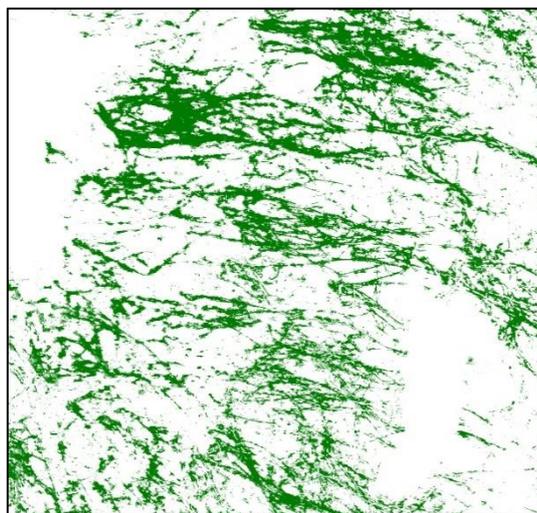
74%



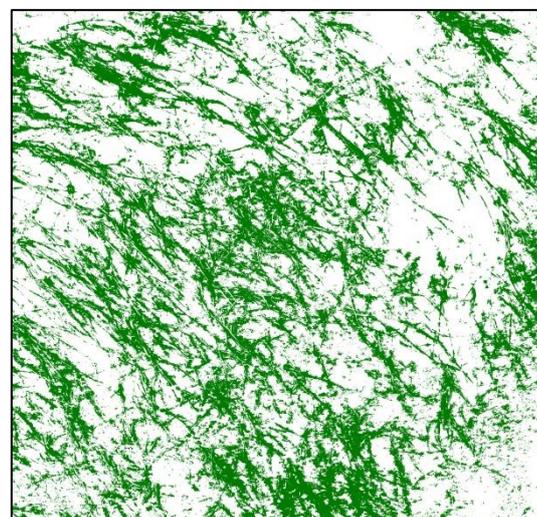
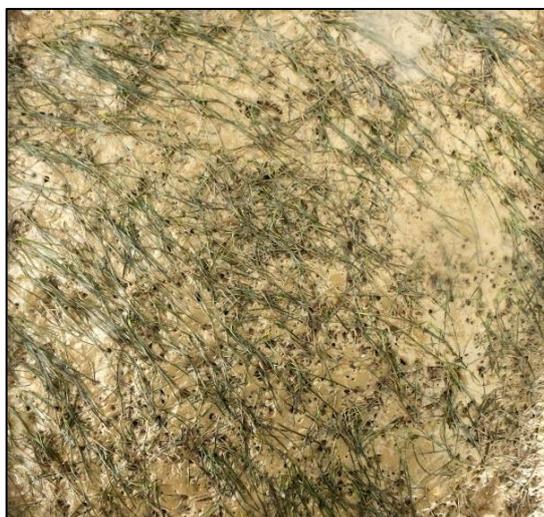
FRFC02—Le Château d'Oléron int HZN



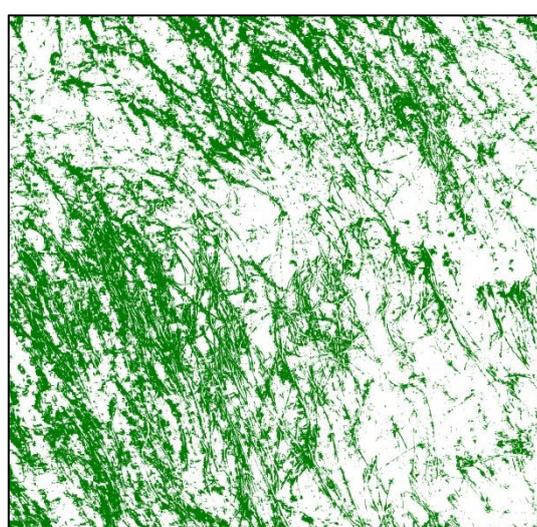
26-50%
0,375



30%



34%

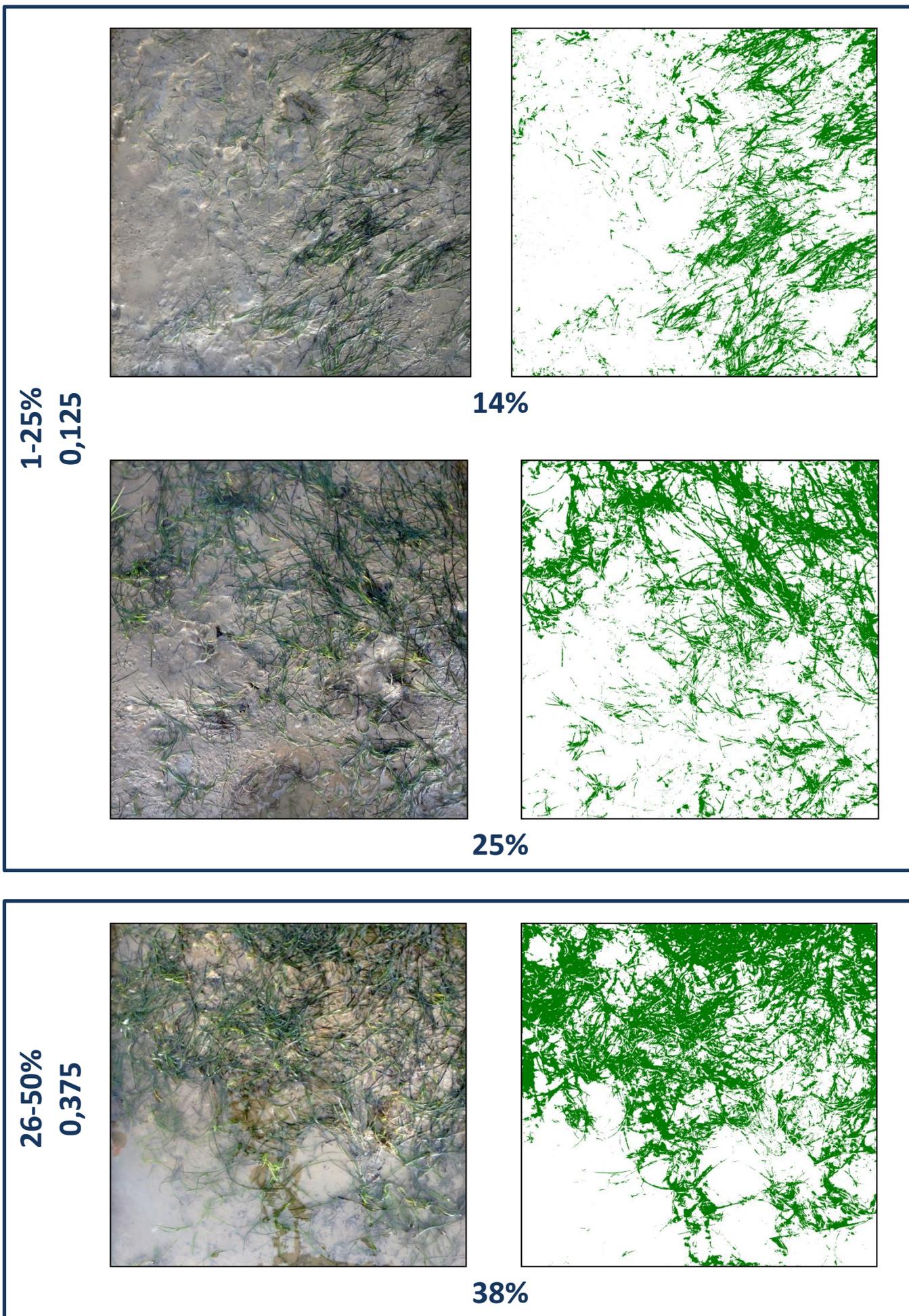


34%

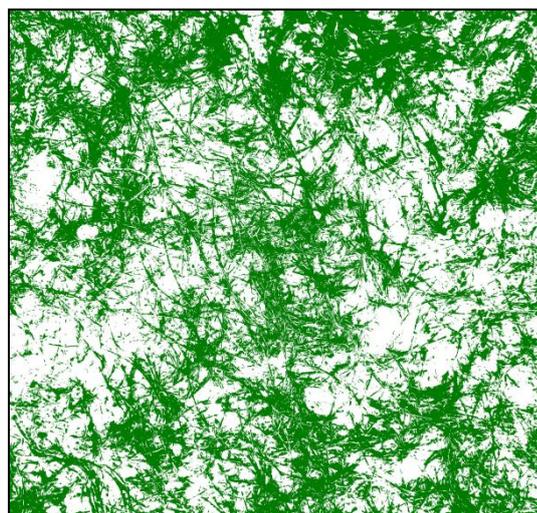


FRFT09—Bonne Anse int HZN

(Suivie depuis 2019)

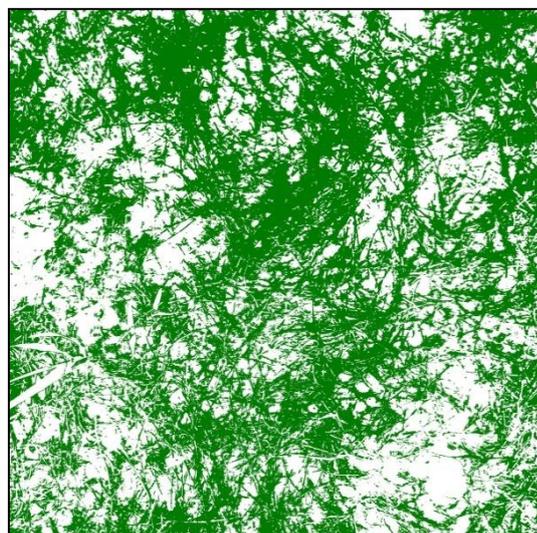
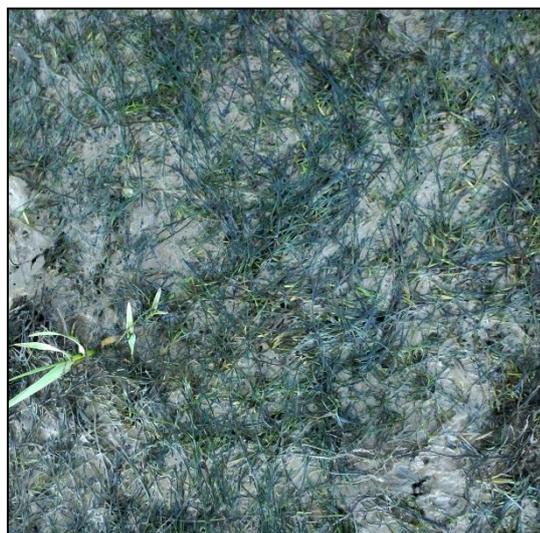


26-50%
0,375

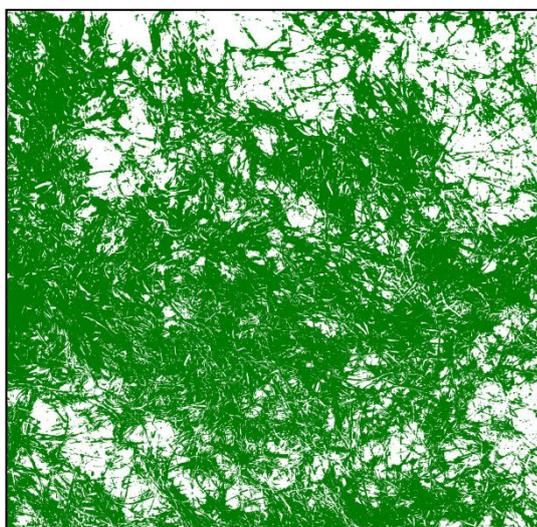


46%

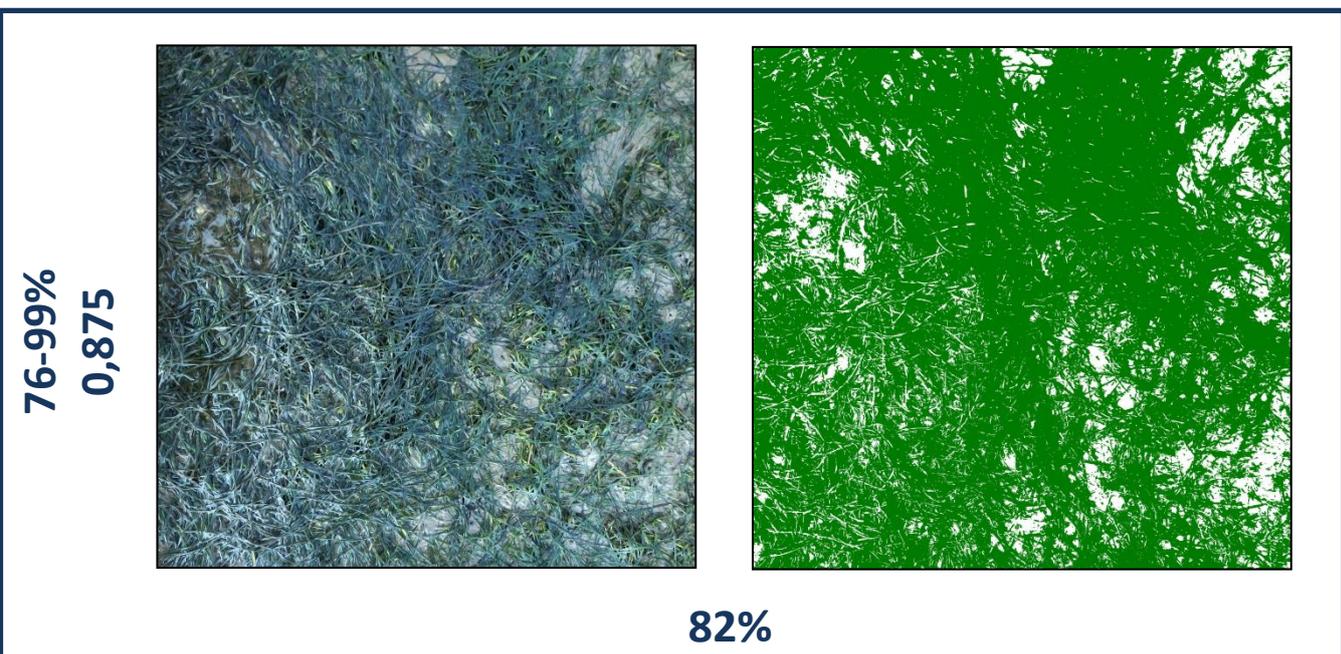
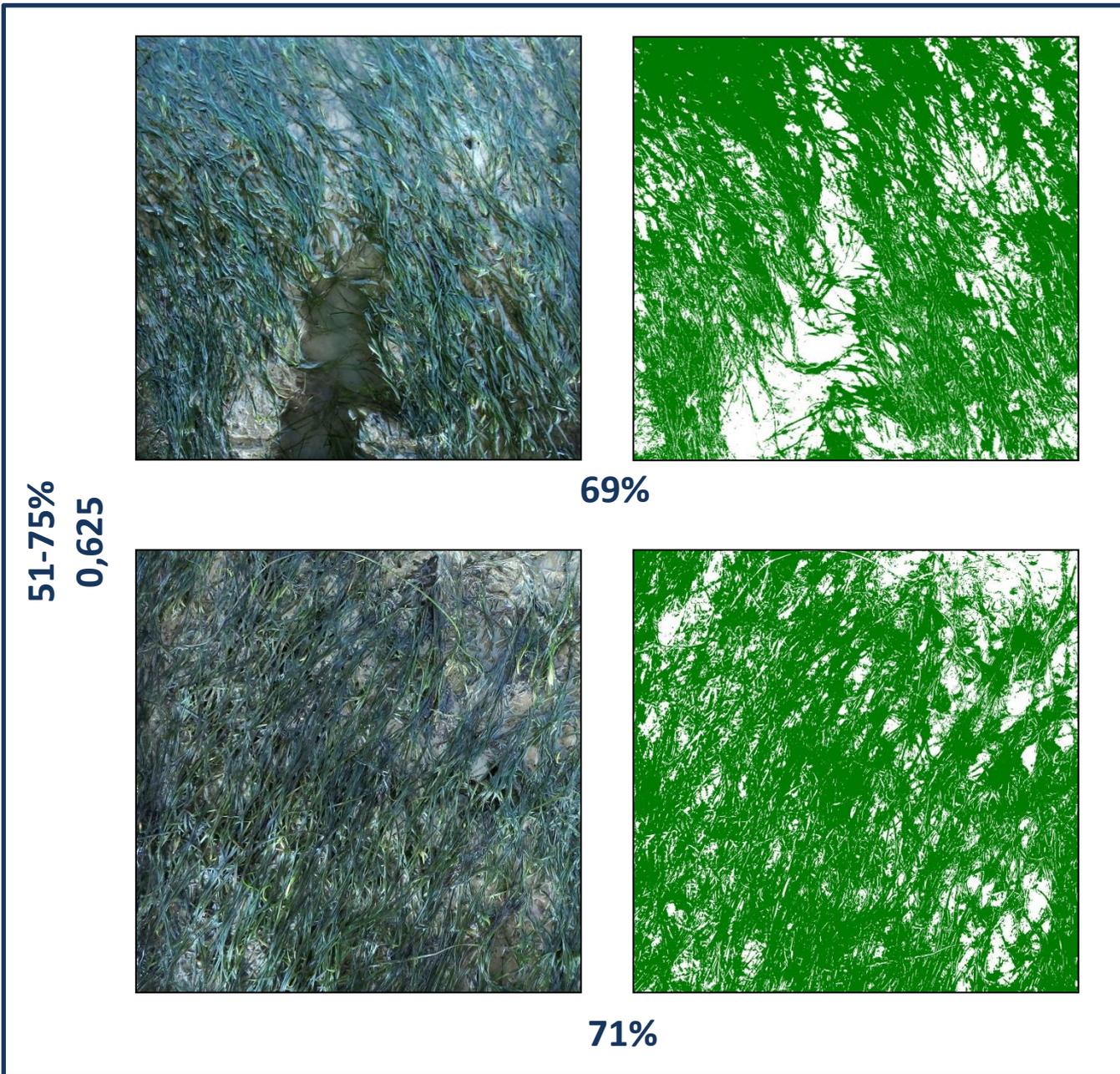
51-75%
0,625

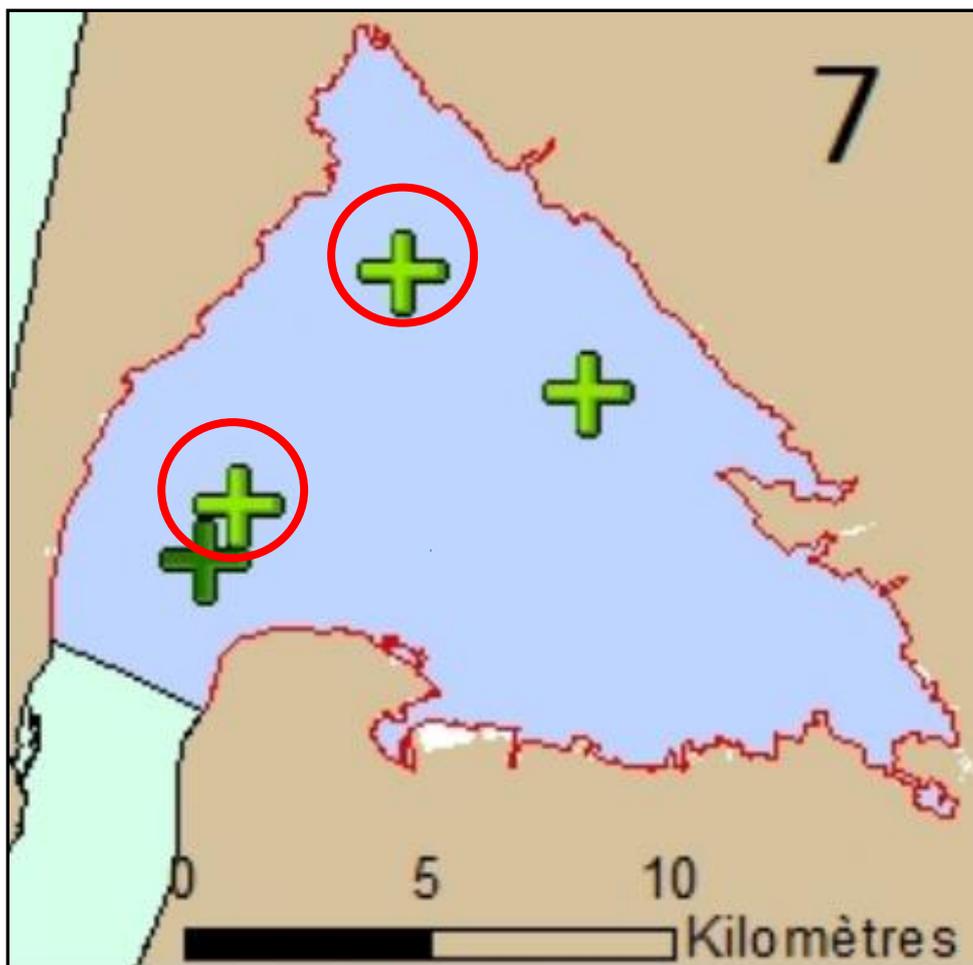


56%

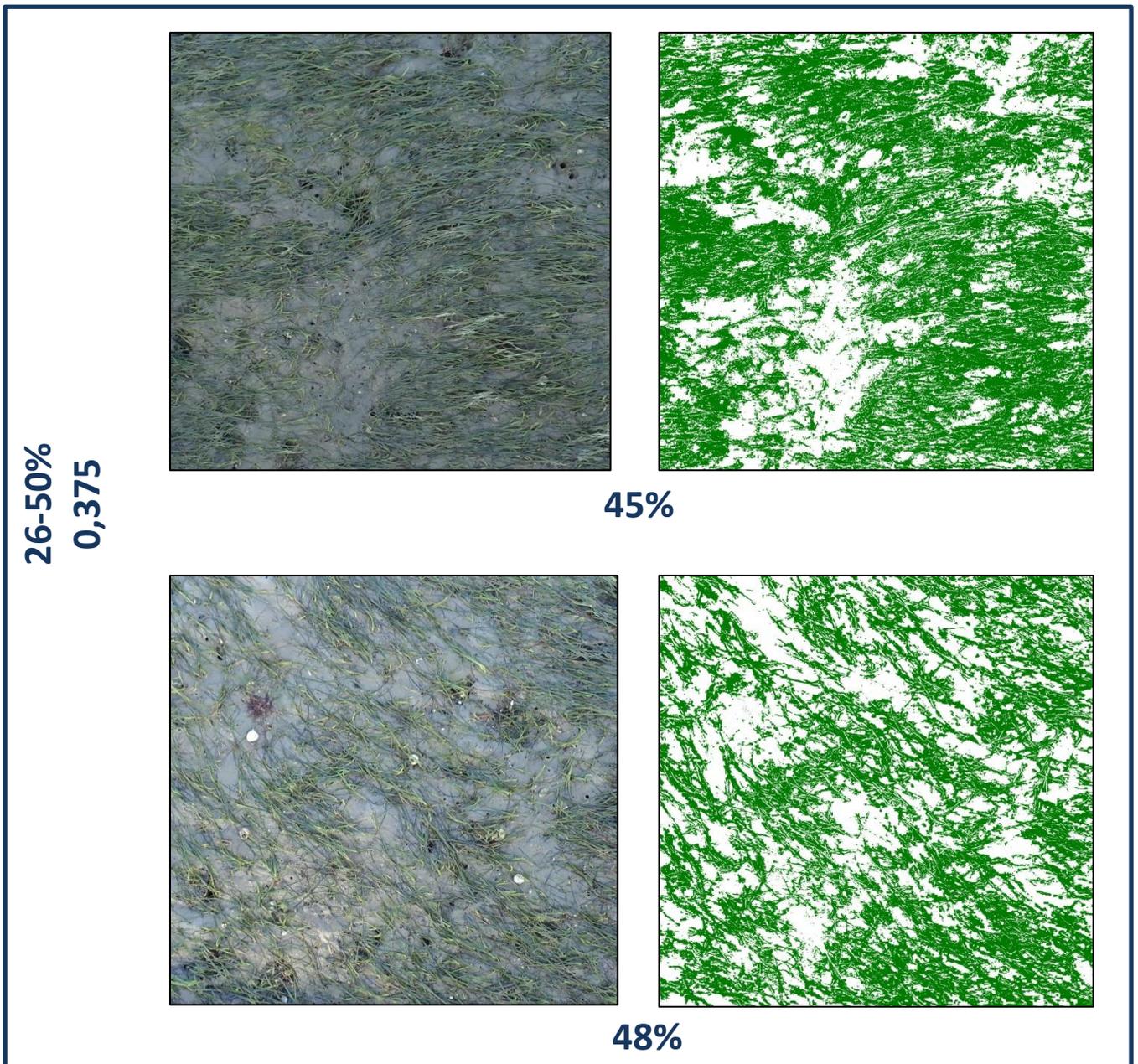
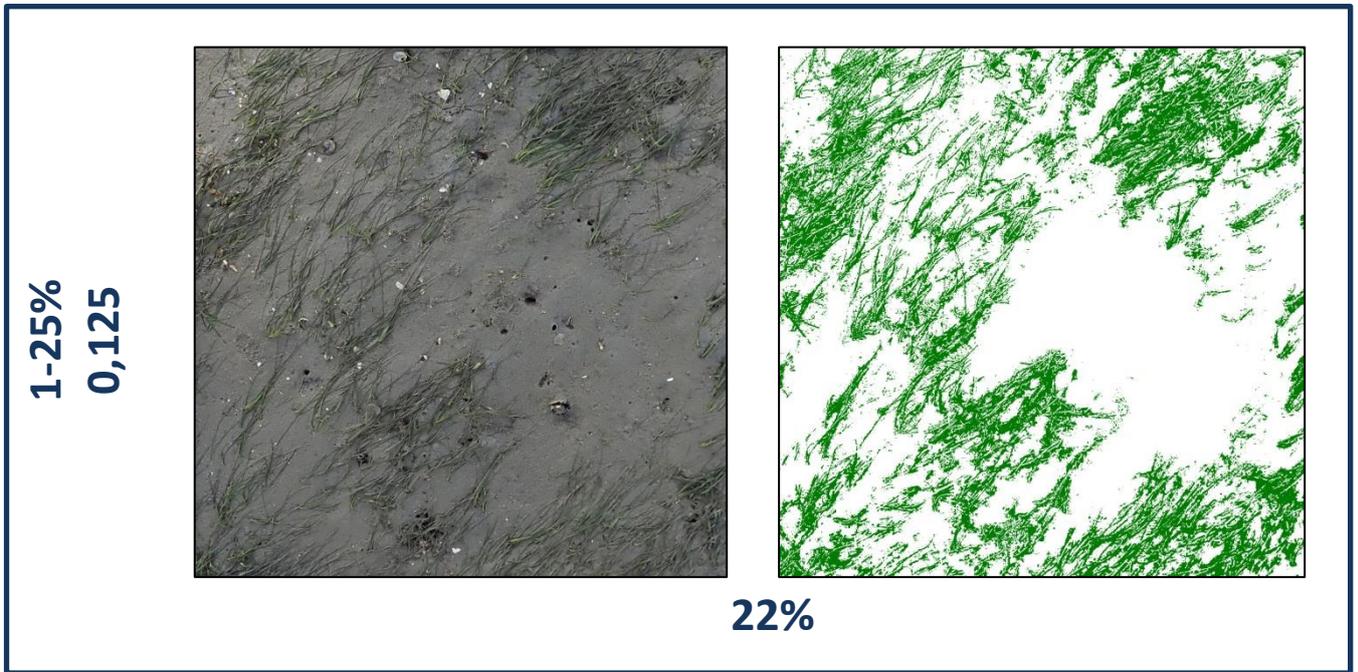


64%

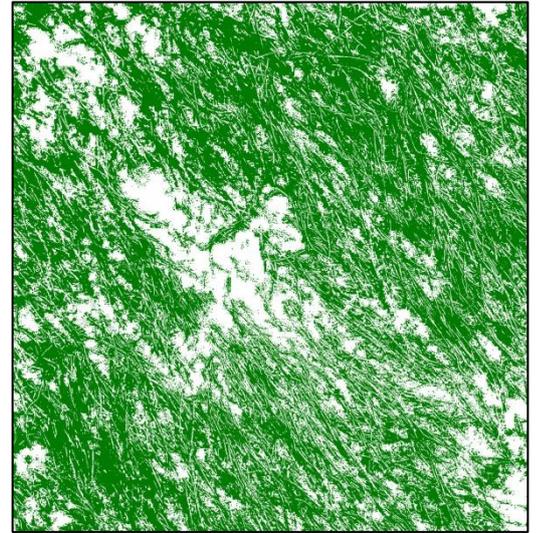
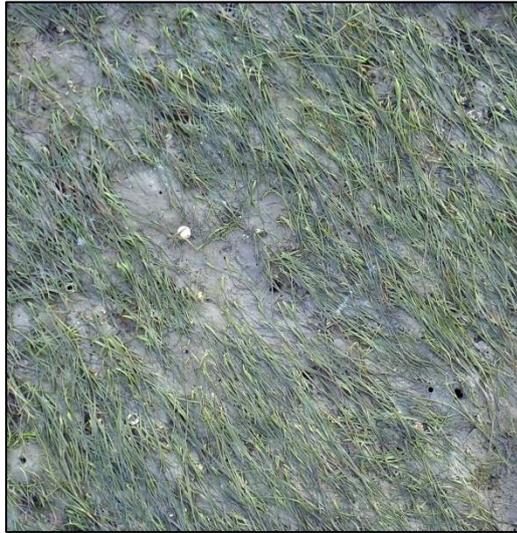




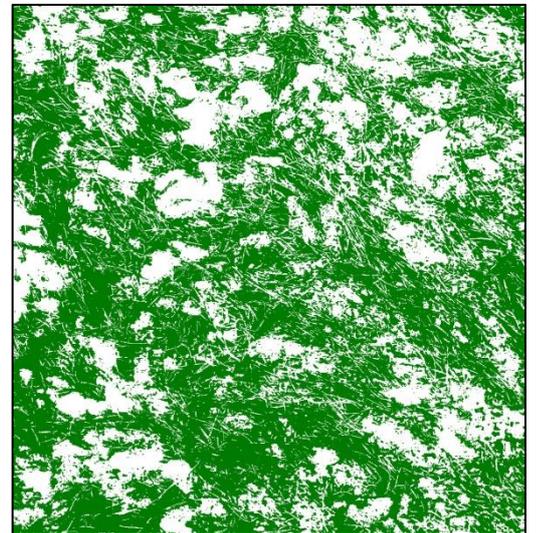
FRFC06—Arcachon amont



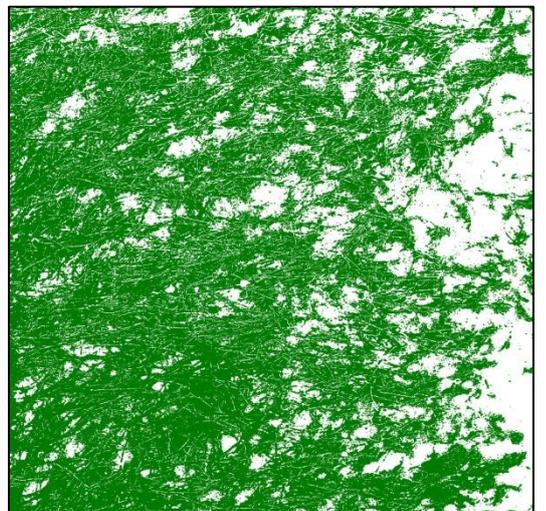
51-75%
0,625



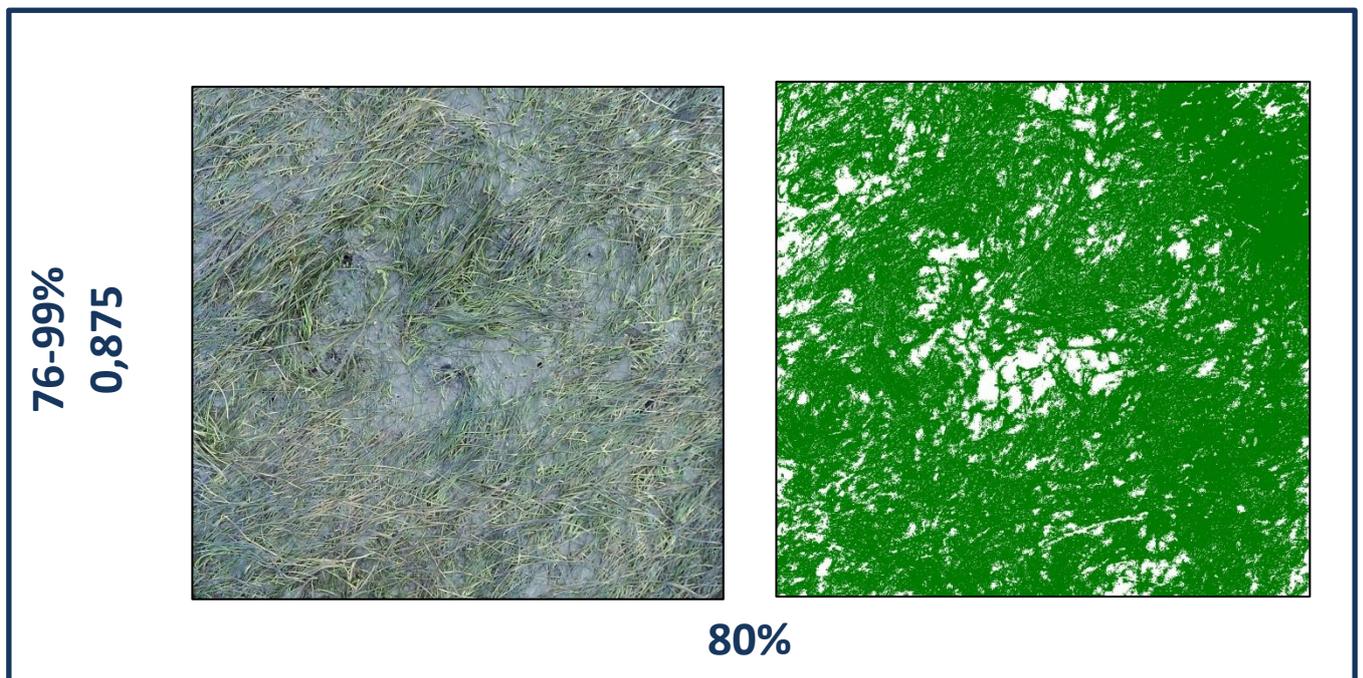
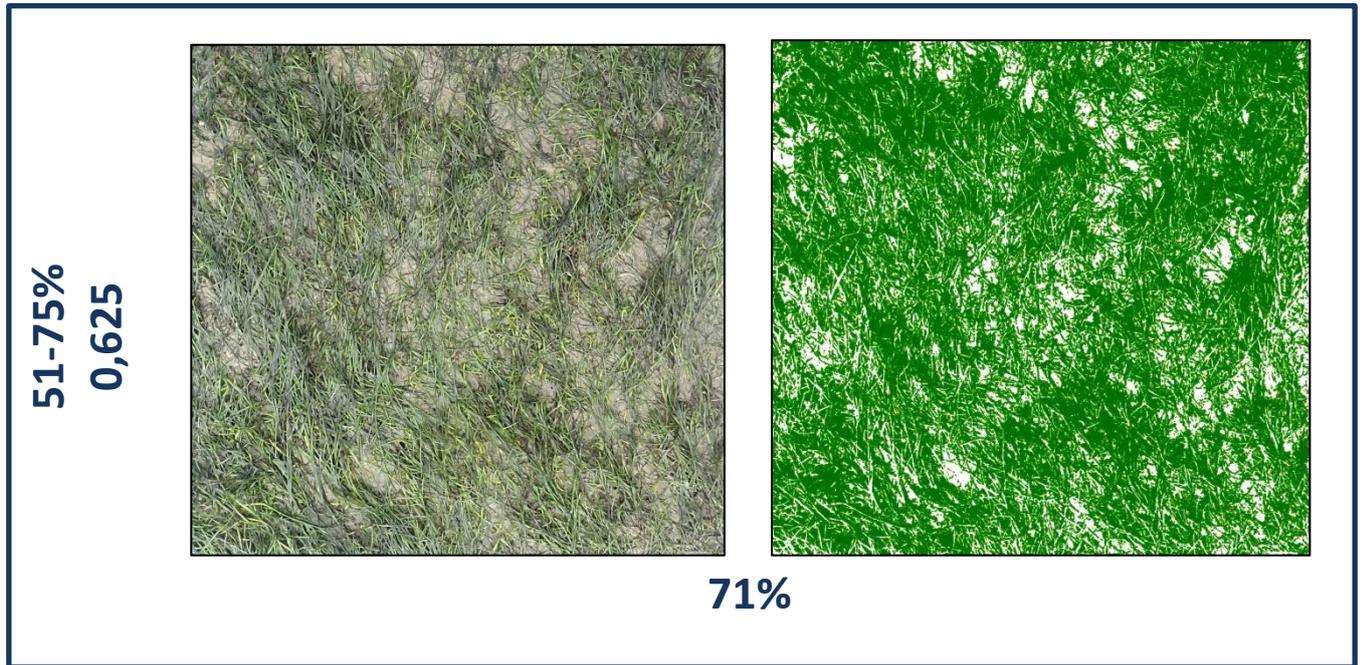
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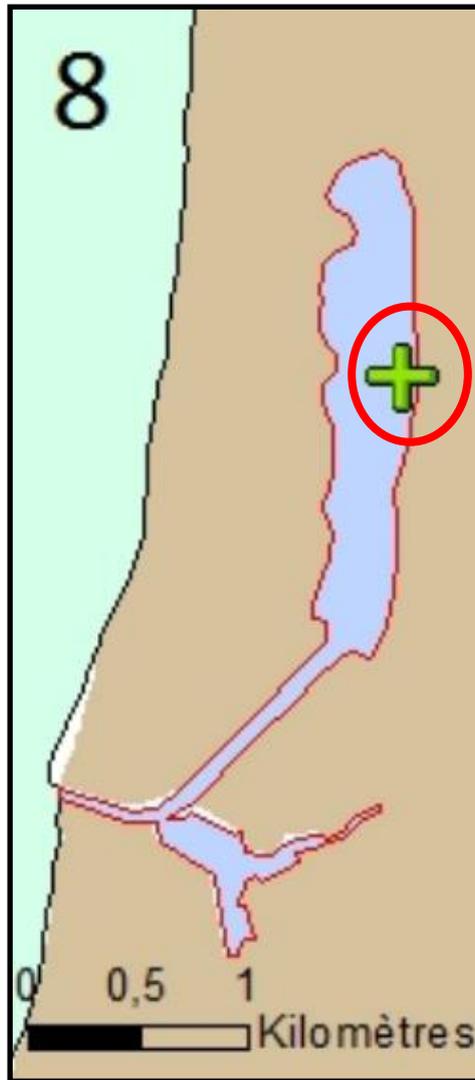


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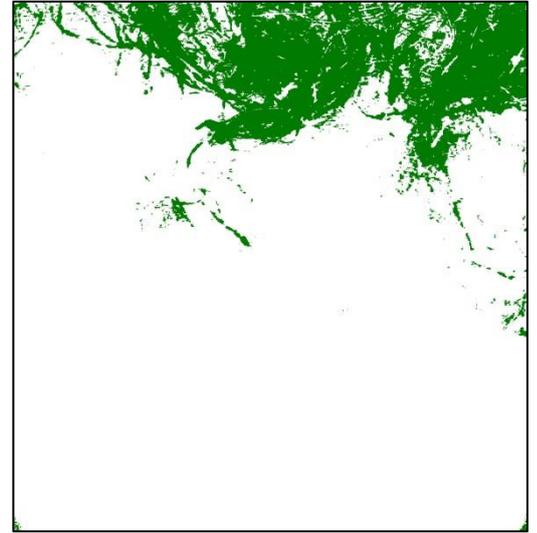
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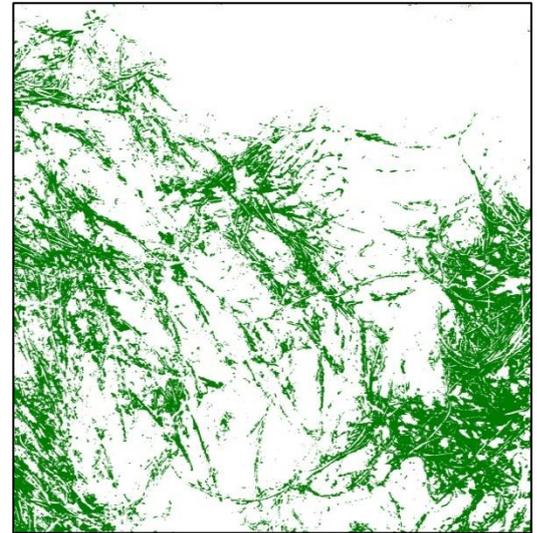
FRFC09—Hossegor int HZN

1-25%
0,125

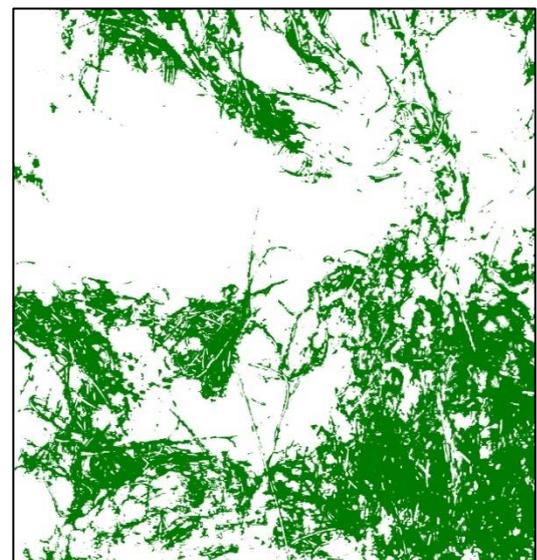


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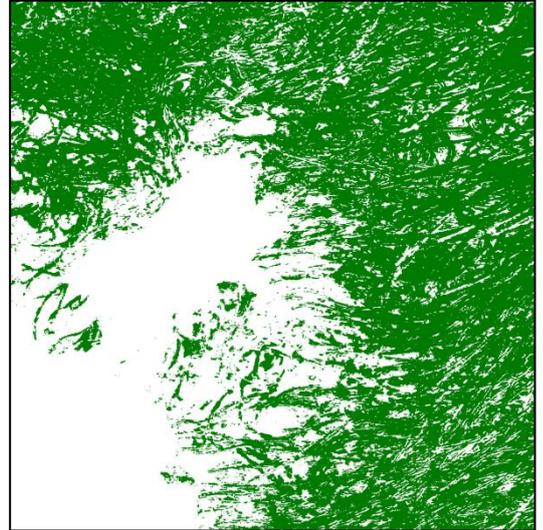
26-50%
0,375



27%

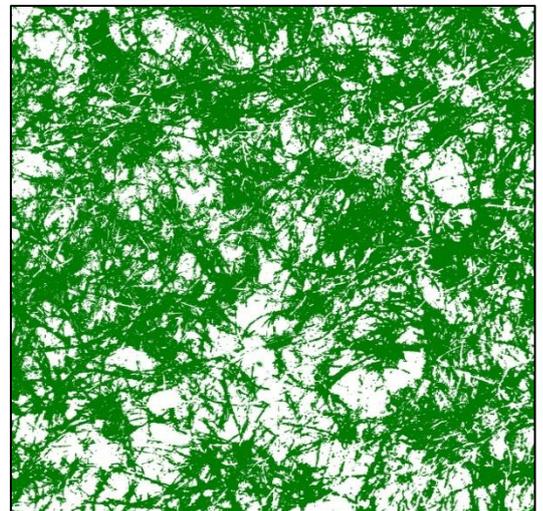


37%

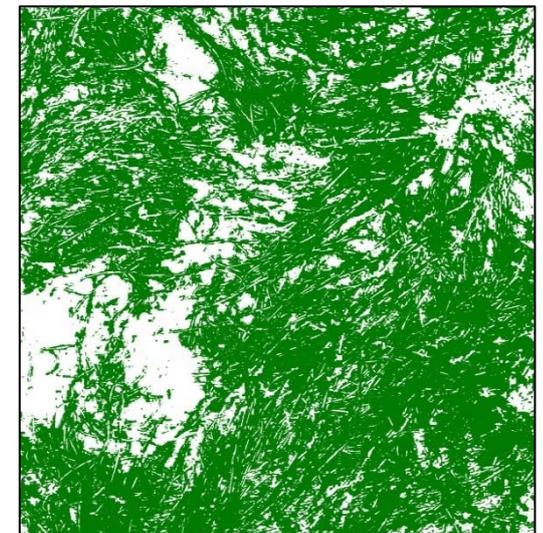


51%

**51-75%
0,625**

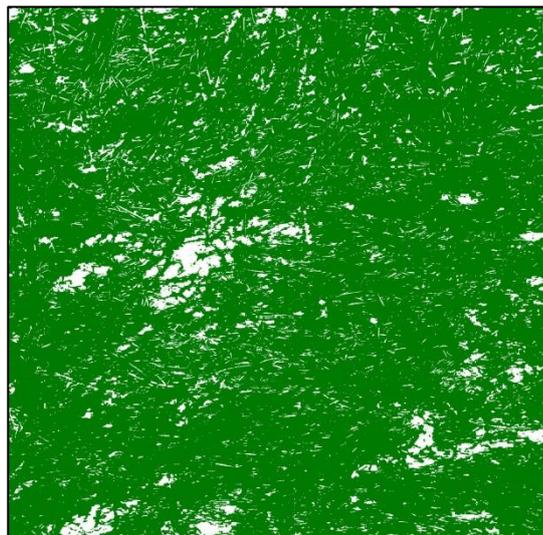


61%



73%

76-99%
0,875

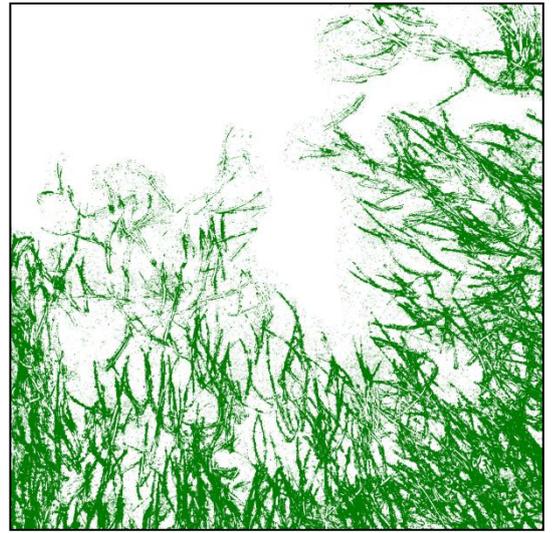


87%

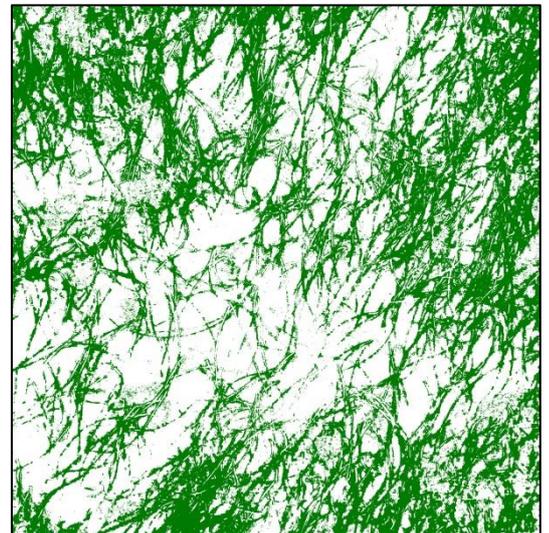
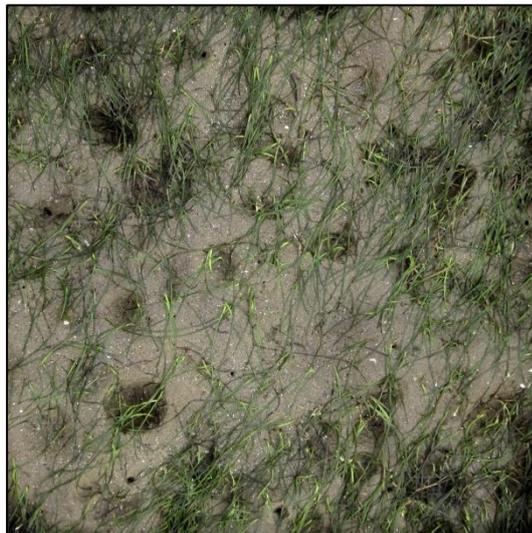


FRFT08—Bidassoa int HZN

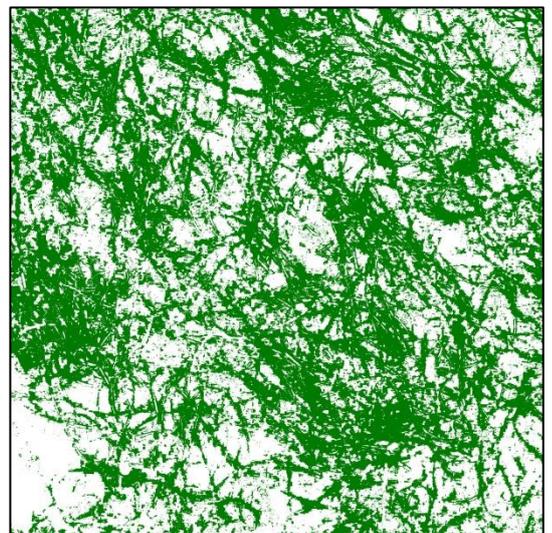
26-50%
0,375



27%

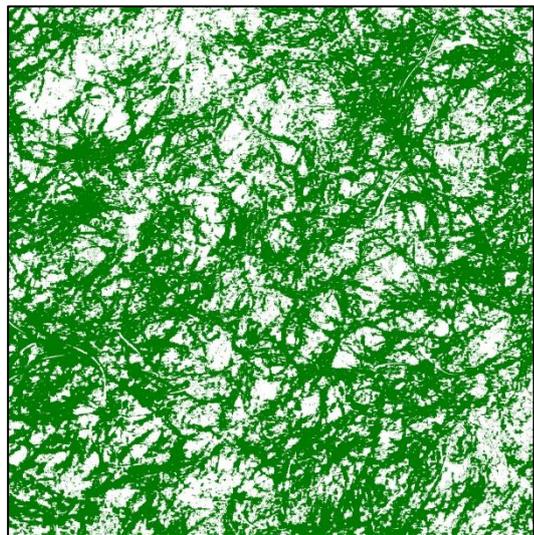
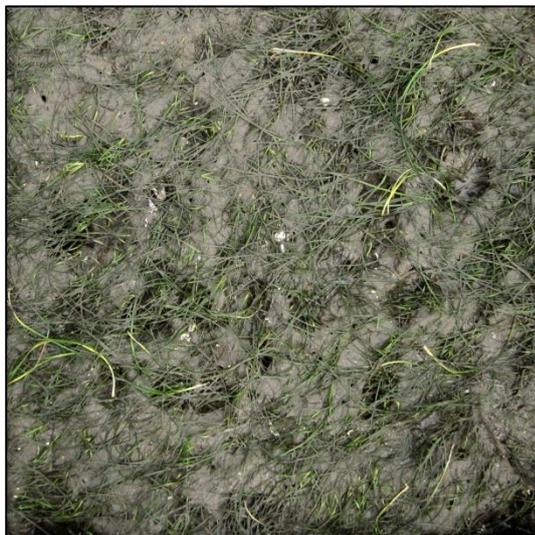


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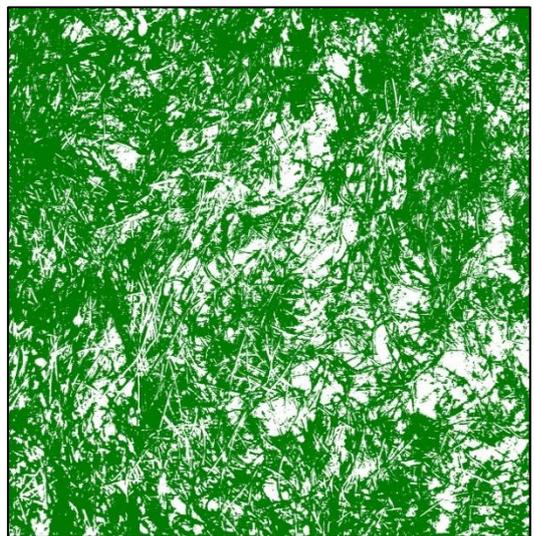
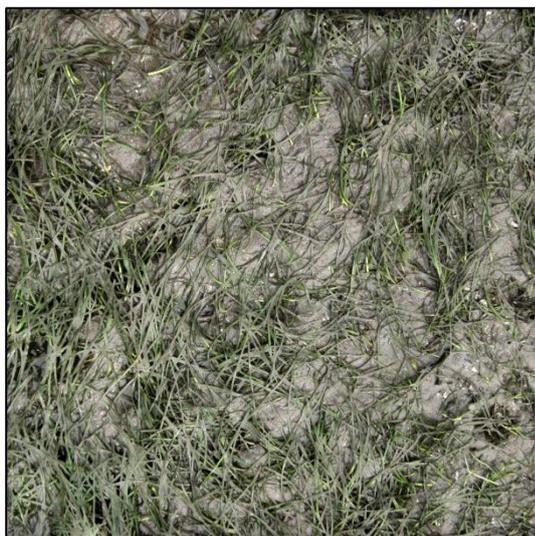


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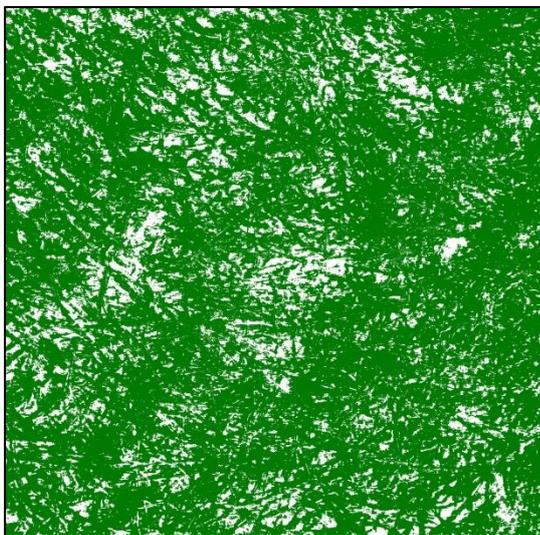
51-75%
0,625



51%



61%



75%

Références bibliographiques :

Auby I., Oger-Jeanneret H., Sauriau P.-G., Hily C., Barille L., 2010. Angiospermes des côtes françaises Manche-Atlantique. Propositions pour un indicateur DCE et premières estimations de la qualité. Ifremer, France. 72p
<http://archimer.ifremer.fr/doc/00032/14358/>

Auby I., Oger-Jeanneret H., Gouillieux B., Grall J., Janson A.-L., Maguer M., Rigouin L., Rollet C., Sauriau P.-G., Trut G., 2018a. Protocoles de suivi stationnel des herbiers à zostères pour la Directive Cadre sur l'Eau (DCE). *Zostera marina* - *Zostera noltei*. Version 3. Ifremer, France. 73p
<https://archimer.ifremer.fr/doc/00471/58250/>

Auby I., Oger-Jeanneret H., Rigouin L., Rollet C., Trut G., Grall J., Maguer M., Guigues N., Lalere B., 2018b. DCE en Manche-Atlantique : Essais inter-laboratoires sur les mesures d'abondance des zostères (*Zostera marina* et *Zostera noltei*). Validation de protocoles et recommandations. Rapport AQUAREF 2018, 74 p.
<https://archimer.ifremer.fr/doc/00483/59510>

Rollet C., Auby I., 2022. DCE en Manche-Atlantique: Essais inter-laboratoires sur les mesures d'abondance des zostères naines (*Zostera noltei*). AQUAREF, Ifremer, France. 39p. <https://archimer.ifremer.fr/doc/00751/86287/>

Spitéri M., Rollet C. (encadrante), Auby I. (encadrante), 2022. Contribution à la consolidation du protocole DCE pour le suivi de l'état écologique des herbiers à *Zostera noltei*. Création de schémas de pourcentage de recouvrement comme aide à l'évaluation de l'abondance des plantes. Stage CT2GEM, Intechmer réalisé à l'Ifremer, France. 49p.