



Questions & Answers Part 2

Please type your questions in the Question Box. We will try our best to get to all your questions. If we don't, feel free to email Juan Torres-Pérez (juan.l.torres-perez@nasa.gov) or Amber McCullum (amberjean.mccullum@nasa.gov).

Question 1: Can you explain further the kelp reflectance and the weight-specific absorption graph, specifically the relation between both factors?

Answer 1: The graph (Part 2 pdf, slide 13) shows the typical absorption curve of the main pigment groups. The green, blue and red lines represent chlorophylls and the yellow line represents carotenoids, which absorb within the blue and green region of the spectrum). The purple lines are typical kelp reflectance curves with variation most likely associated with the variation in pigments among individuals. In parts of the reflectance curve, for example from 550-650 nm it shows that reflectance and pigment absorption is somewhat inverse; reflectance peaks coincide with absorption peaks of some major groups.

Question 2: Can we use NDWI as a landmark?

Answer 2: It is probably easier to just use a readily available landmark or to do one yourself. Here's a recent paper with a global landmark in this case created for VIIRS: <https://www.sciencedirect.com/science/article/pii/S0034425721000742>

Useful but a bit more coarse spatial resolution.

Question 3: On slide 24 - just to check, the varying colors of lines have been estimated using MESMA?

Answer 3: That is correct. Although these are shown for illustrative purposes and may vary from site to site. They are meant to show especially how the reflectance is diminished in the NIR region due to the influence of water on the pixel contents.

Question 4: Do you recommend any of these sensors over the others?

Answer 4: The use of a particular sensor depends on many factors. For instance, the size of your study site (smaller sites may require imagery with a much finer spatial resolution than other larger sites). Also, multispectral imagery has the limitation of just a small number of bands. Spectral resolution is also another factor to consider especially if you want to classify sites more specifically. Because of its long record, Landsat is a good starting point, particularly if you want to follow the presence or absence of kelps



through time as we showed with the Kelp Watch demo. If you want to monitor just the water quality on a much broader scale, MODIS or VIIRS data might suffice. It all depends on the research question to be answered. If interested on how to download data from MODIS or VIIRS, we recommend our training from last year on the transition from MODIS to VIIRS:

<https://appliedsciences.nasa.gov/join-mission/training/english/aset-monitoring-coastal-and-estuarine-water-quality-transitioning>

Question 5: Regarding the "Classify" questions, do we need an account to answer those? Are they a part of the homework? Finally, what is the purpose of "Done & Talk?"

Answer 5: Floating Forests will give you the option of basically showing whether there is kelp or no kelps in a specific image or to mark the extension of kelps depending on whether you choose the urban forest of New Zealand. Again, the site is currently under reconstruction so it will be much more improved in the near future.

This is not part of the homework, just a demo to show the tool and encourage all of you to participate in citizen science.

With the Done and Talk button you can submit an inquiry or just comment on a specific image. The analysis team from Floating Forests may look at it and then submit a response (or not depending on the comment).

Question 6: How do I extract the classified area from the zooniverse's classification?

Answer 6: I don't think the citizens can extract the data. This is more for the developers and managers of the tool to use. With these citizen science tools the data eventually goes through a process to be sure it is valuable data.

Question 7: Regarding Floating Forests, are the training data vector files also shared when one has an account?

Answer 7: I don't think so. You can always submit a comment to their contact account and find if that is possible.

Question 8: Can you suggest some papers to go through to analyze the implication of citizen science tools regarding Environmental Monitoring?

Answer 8: In the case of NASA, a good starting point is to go to the NASA Citizen Science website (<https://science.nasa.gov/citizenscience>). This will show all the



projects now funded through this Program and many have links to papers already published by the researchers.

Question 9: Can these tools work with eelgrass beside Kelps?

Answer 9: Floating Forests and Kelp Watch were designed for kelp in particular. The other techniques shown on this webinar can be applied to eel grass particularly those that we covered in the previous session (Part 1 of this series) on seagrasses.

Question 10: Is there a good example of differences between kelp and algae blooms when visually classifying? I figure they might be quite similar.

Answer 10: Good question! That would depend on the type of algal bloom which depending on the organism causing it its color may vary. In terms of kelps ecology at least, there is extensive geographical data on the sites where there is or was kelp at any given time (like what we showed with Kelp Watch). Those maps can be used as background information when analyzing images from those areas to define whether what is shown in the image is kelp or other algae. The spectral signal from the pixels can also vary depending on the type of algal bloom and that can also be used to separate these.

Question 11: The site gives us images that we no longer need to correct with an NDVI calculation combining the possible results obtained from this manipulation. I would like to know the reliability of these results when compared to what we can obtain when manual corrections

Answer 11: True. The site only contains true color images with no other calculation of any index. Nonetheless, these are meant for the public to interact with the project and help at least detect kelp presence along the coastlines. Therefore, it also works as an educational tool for everyone.

Question 12: In the example from kelpwatch.org in Monterey you can see a change in the trend in area values from 2013. Does this have to do with the change in the sensor (OLI) used in the calculations?

Answer 12: I believe this is not necessarily caused by the change in sensor but more because of the heavy heat wave around that time that affected kelps along the west coast of the US.

Question 13: I'm curious if there is a reason why some of these recent marine studies don't pansharpen/resolve the Landsat bands to a finer resolution?

Answer 13: Panchromatic bands are not particularly useful in this case.



Monitoring Aquatic Vegetation with Remote Sensing
July 12-19, 2022

Question 14: What is the resolution taken for remote sensing of canopy cover?

Answer 14: In what we showed (SPOT is 10m). Landsat is 30m (as in Kelp Watch).