Multi-factor coral disease activity sheet

Web tool link: http://coraldisease.com/

Coral diseases arise due a suite of interacting factors, including ocean temperatures, water quality, and coral community composition. This is a chance to explore the NOAA Coral Reef Watch Multi-factor Coral Disease Monitoring tool to investigate current coral disease risk and assess potential intervention strategies.

Activity 1: exploring recent trends in disease risk and seasonal disease forecasts.

Choose one of the following regions for Activity 1:
- American Samoa
- Guam & the Commonwealth of the Mariana Islands
- Great Barrier Reef, Australia
- Hawaii
- Pacific Remote Island Areas

1a. On the *Coral disease predictions* tab, in the left hand panel labeled *Risk nowcast (region, disease)*, locate your region in the risk gauges and report the percent of pixels in each risk category for each disease in the table below.

Region: _____

Percent pixels in each risk category:

	No stress	Watch	Warning	Alert Level 1	Alert level 2
Growth anomalies					
White syndromes					

1b. The values you reported in the table above correspond with the most recent disease risk predictions. Look at the bottom of the page and record the last update date: _____.
We call these predictions a *nowcast* because the disease risk is predicted using observed (satellite) data and the prediction is for something happening to the corals now (or very soon). In contrast, we call disease risk predictions that use modeled future conditions *forecasts* and the prediction is for something that will happen to the corals in the future.

1c. Click on the *About* tab and scroll down to the section labeled *Disease risk warning levels*. Report the region- and disease-specific thresholds that differentiate the different disease risk levels that you recorded in the table above.

Region- and disease-specific thresholds for each risk category

	No stress	Watch	Warning	Alert Level 1	Alert level 2
Growth anomalies					
White syndromes					

1d. Go back to the *Coral disease predictions* tab and look at the main panel labeled *Risk map (total disease)*. This map shows the variation in disease risk across space; each location is colored by the highest current alert level across the two diseases (i.e., growth anomalies and white syndromes). Zoom into your region and click on a single 5-km pixel. Now look at the right hand panel labeled *Risk forecast,* which shows the time series of near-real time nowcast predictions and seasonal forecasts for each disease corresponding with the pixel you selected. What, if any, are the differences in trends between the two diseases? Do these predictions match your expectations given the current and upcoming season?

1e. In the *Risk map* panel, zoom out within your region and use the legend in the bottom right to toggle between the 5-km Nowcast and the Management area nowcast (or GBRMPA nowcast for the Great Barrier Reef if desired). Look at the time series plots in the *Risk forecast* for a 5-km pixel within the management area and then for the management area polygon. How do the time series plots change between the Nowcast predictions and Management area nowcast predictions?

1f. In the *Risk forecast* panel, hover your mouse over the growth anomalies time series plot and report the following information for a single time point in the plot:

Date: _____
Disease risk 90th percentile prediction: _____
Disease risk 75th percentile prediction: _____

Disease risk 50th percentile prediction: _____
Activity 2: refining forecasts based on local conditions and exploring intervention scenarios.

2a. Click on the *Investigating scenarios* tab. In the left hand panel, select the region as U.S. Pacific and select the disease type as Growth anomalies. Below these selections you will see sliders for four risk factors that influence the risk of growth anomalies in the Pacific Ocean. Click on any 5-km pixel on the map (we recommend selecting a pixel with a risk category of Watch or higher) and record the location-specific values for the risk factors (indicated above each slider). Hover your mouse over the sliders for Median coral colony size to find out more details about how they are measured.

Median coral colony size: _____ cm

Porites coral cover: _____ %

Herbivorous fish density: _____ fish/m^2

Coastal development index: _____

2b. Suppose that a reef within your selected 5-km pixel has many large corals. Move the slider to refine the predictions for a reef with Median coral colony size of 45 cm. What is the baseline disease risk in that pixel and does that risk change as a result of changing the median coral colony size (indicated in the title of the barplot), and if so, how? Why do you think a change in colony size would affect disease risk?

2c. Imagine a management agency is considering stricter fishing regulations for herbivorous fish. How does an increase in herbivorous fish density impact disease risk? Would this be a worthwhile intervention for protecting coral health or would efforts be better spent on a different intervention?

2d. Which risk factor has the greatest impact on disease risk?

Optional exercise 2e: Repeat the questions above for a management area nowcast (select WS Pacific management area nowcast in the legend in bottom right of the map).

Optional exercise 2f. Select a different region and disease and see how refining disease risk factors or initiating an intervention scenario changes disease risk.