

Overview current mass bleaching event on the GBR 10 April 2020

CoralWatch database

<https://coralwatch.org/index.php/data/surveys/>

CoralWatch data uploaded onto the global CoralWatch database will be automatically tested against certain criteria. Based on the outcome, a survey can show potential bleaching. If this is the case, an auto-generated email will be sent to the data uploader asking to keep an eye on their local reefs and if needed contact local management groups about the occurring bleaching. These surveys are recorded in the bleaching risk database which is also publicly available (<https://coralwatch.org/index.php/data/bleaching-risk/>). So far, CoralWatch surveys conducted in 2020 and showing a potential bleaching event have been recorded in:

Country	Reef	Date
Australia	Rose Bay, Bowen	7/04/2020
Australia	Hardy Reef, GBR	6/03/2020
Australia	Sloping Island, Keppels	2/03/2020
Australia	Saxon Reef, GBR	28/02/2020
Australia	Fitzroy Island, GBR	7/02/2020
Madagascar	Near shore Cocobeach	3/02/2020

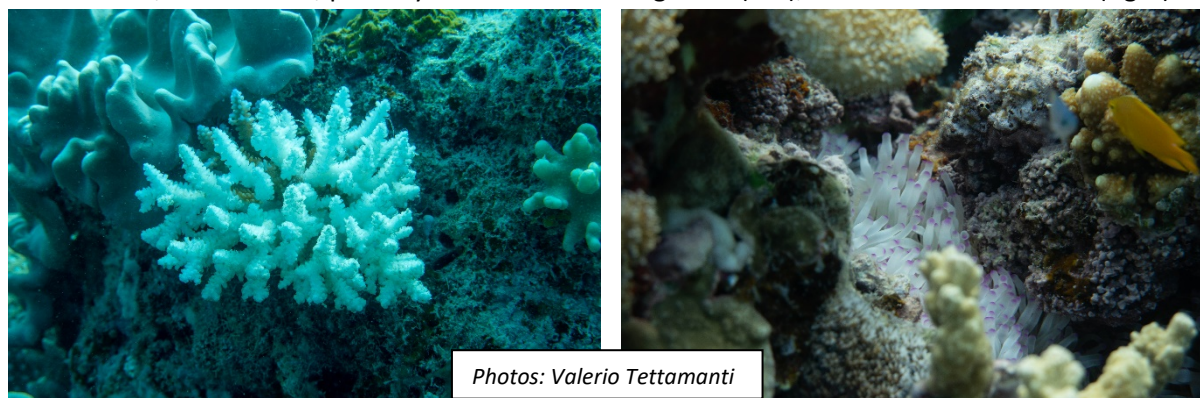
CoralWatch received photos from bleached corals on the reef from Bowen and Lizard Island.

Quote from our CoralWatcher in Bowen: *"We have suffered mass bleaching in Bowen, it is heart breaking. I will make sure I visit the areas and upload data at least once a week from now on. In the 5 years I have been in Bowen I have never seen anything like this."*

Bowen, 7 April 2020, bleached soft and plate coral (left), and partially bleached boulder coral (right).



Lizard Island, 20 Feb 2020, partially bleached branching coral (left), and bleached anemone (right).



ARC Centre of Excellence Coral Reef Studies (7 April 2020)

https://www.coralcoe.org.au/media-releases/climate-change-triggers-great-barrier-reef-bleaching?fbclid=IwAR0Uf6OZKYISWV0GVck87xnG5NKdvE3WxXIs6a3zc_-D_1XMqyRv5ABsuo4

- Aerial surveys of 1036 reefs in late March
- Severe bleaching struck all 3 regions
- Mass bleaching in 1998, 2002, 2016, 2017, and now in 2020
- February had the highest monthly temperatures ever recorded on the Great Barrier Reef since 1900 when recording started
- Later this year they will conduct underwater surveys to assess the loss of corals
- 2016 north hit hardest, 2017 central part and 2020 further to the south.
- Only 1998 and 2016 occurred during El Nino conditions.

Australian academy of Science (5 April 2020) – Interview with Terry Hughes

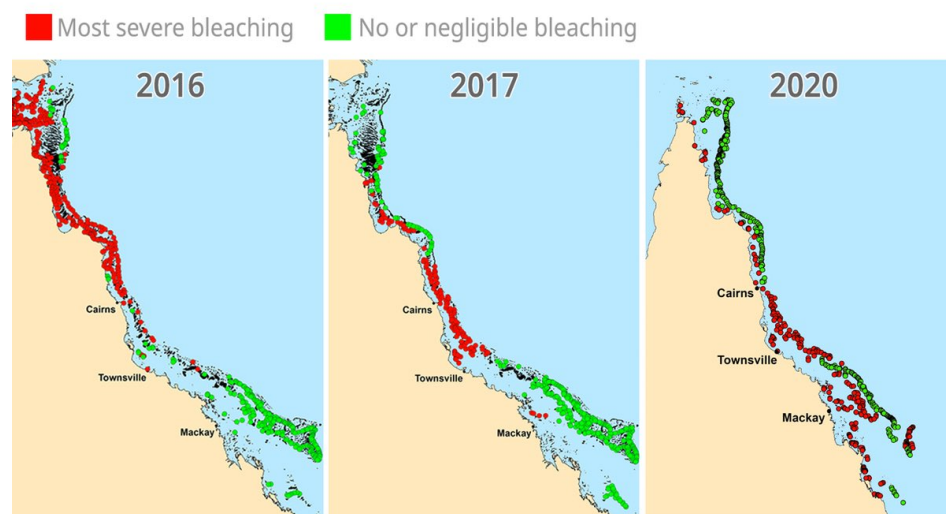
<https://vimeo.com/404223289/cca66b5b1b>

- Explanation of what surveys show
- 3 global bleaching events so far where 70% of the world's coral reefs undergo major bleaching events all at the same time – not just a problem in Australia on the GBR, but for many countries.

Aerial survey outcomes 2016, 2017 & 2020 - ARC Centre of Excellence for Coral Reef Studies

The last three mass bleaching events

The severity of the last three mass bleaching events on the Great Barrier Reef



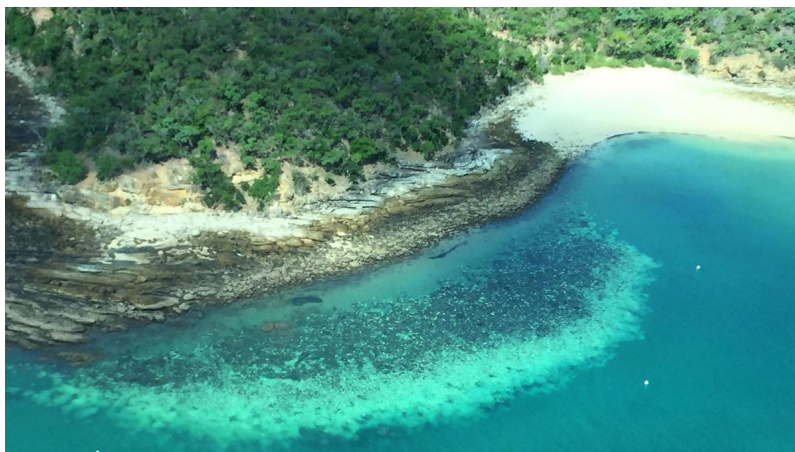
Source: ARC Centre of Excellence for Coral Reef Studies

Video coral bleaching at Magnetic Island (March 2020) - Victor Huertas (southern GBR)

[https://www.dropbox.com/sh/m9dy35mdtgyylNr/AAByEKB6NvjqHL-hagqDb1Uya/Video?dl=0&preview=Coral+bleaching+at+Magnetic+Island+\(March+2020\)+-+Victor+Huertas_VHwatermark.mp4&subfolder_nav_tracking=1](https://www.dropbox.com/sh/m9dy35mdtgyylNr/AAByEKB6NvjqHL-hagqDb1Uya/Video?dl=0&preview=Coral+bleaching+at+Magnetic+Island+(March+2020)+-+Victor+Huertas_VHwatermark.mp4&subfolder_nav_tracking=1)

Video aerial survey Keppel Islands - ARC Centre of Excellence for Coral Reef Studies (southern GBR)

https://www.dropbox.com/sh/m9dy35mdtgyylnr/AABYKb6NvjgHL-hagqDb1Uya/Video?dl=0&preview=AerialSurvey_Kepples_26_3_2020.mp4&subfolder=nav_tracking
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Webinar with Morgan Prachett through AMCS (9 April 2020)

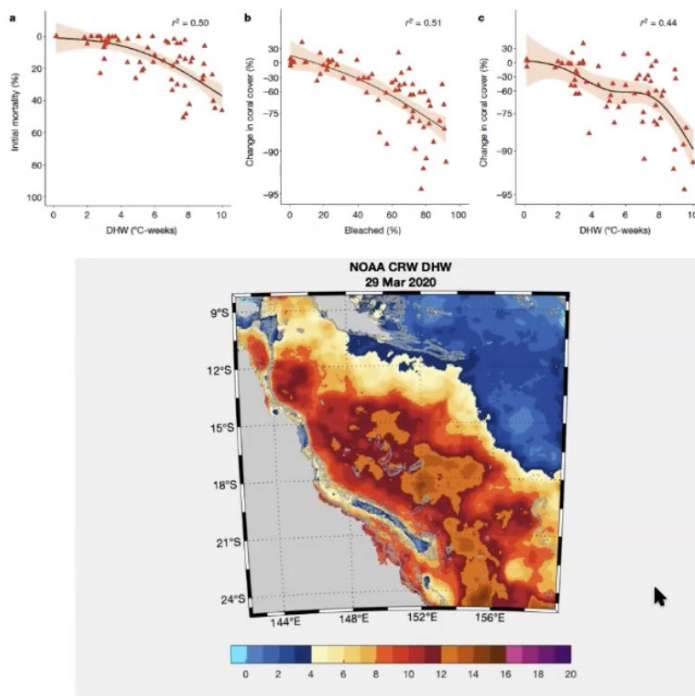
<https://www.facebook.com/australianmarine/videos/234796027897772/>

- February 2020 hottest on record since 1900
- NOAA shows GBR bleaching alert mid February to mid-March 2020
- Central and Southern part hit hardest
- 26 March 2020 – underwater survey mid-shelf reef north of Townsville by Morgan Prachett

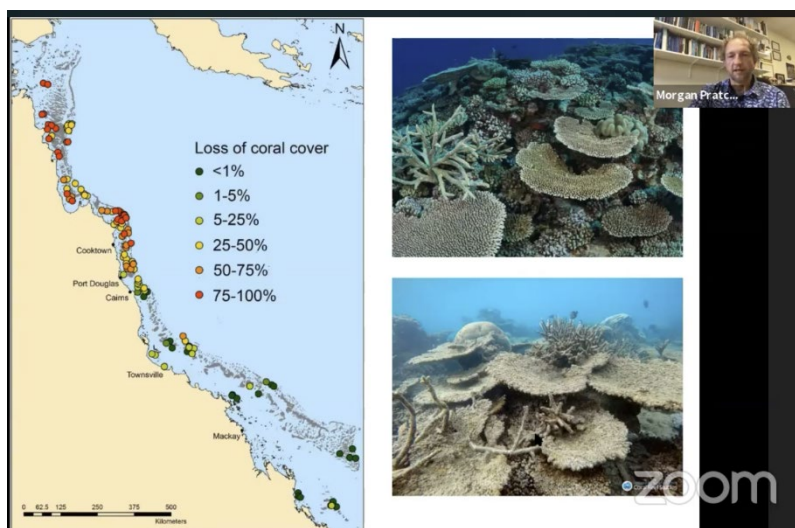


- No further underwater surveys could be done further to the south due to closure of JCU

- Based on previous research published in Nature Research and the NOAA predictions it is to be expected a level of coral mortality on the affected reefs (based on degree heating weeks of 6 or more).



- Coral distribution might be restricted going further north due to too warm water and restricted moving further south due to ocean acidification - further south the effect of ocean acidification is more than north on corals. This might push corals into a narrow band of occurrence.
- Lower levels of bleaching are seen which is related to the fact that the most vulnerable corals are already died off. This is a bad thing.
- Florescent corals are bleaching and have lost a large proportion of their zooxanthellae (symbiotic algae). It is not known if they will die or not. Fluorescence is a short-term response and could be a survival response or they spend a lot of energy and will die. Overall, any decline in overall level of pigmentation in corals is a sign of bleaching.
- 2016 (see image below) – similar output will be created for 2020 after underwater surveys show which reefs and to what extend have recovered, survived or died.



Chief Scientist Dr David Wachenfeld GBRMPA weekly reef health update (2 April 2020; GBRMPA)

<https://www.youtube.com/watch?v=57wLslxPbdI&feature=youtu.be&app=desktop>

http://www.gbrmpa.gov.au/the-reef/reef-health/_nocache

- Aerial reef surveys surveyed >1000 reefs
 - Very variable results
 - Major tourism areas are unaffected, except an area in the southern GBR
- Rangers are still out doing underwater surveys to compare with aerial surveys and to monitor recovery, survival and death of corals.
- Reef cooled very fast in March.
- Some initial observations from the aerial surveys:
 - Widespread moderate to severe bleaching across much of the Reef
 - Severe bleaching was more widespread than in previous bleaching events
 - Areas, mostly well offshore, had no or low level bleaching
 - Some areas have reefs with a mix of negligible, moderate and severe bleaching (the southern offshore reefs of the Marine Park)
 - There are reefs that severely bleached for the first time in 2020 and other reefs that bleached severely in 2016, 2017 and 2020
 - Major tourism areas of the Reef mostly experienced no, negligible or moderate bleaching only - the exception is one area in the southern part of the Marine Park with severe bleaching.
- Future outlook
 - From past bleaching events the Marine Park Authority anticipates corals on reefs with no or negligible bleaching will mostly recover and survive this event.
 - Moderately bleached reefs are likely to show mixed responses depending on their history of disturbance.
 - Corals on reefs with severe bleaching, however, are likely to have significantly higher, though variable, mortality rates.

Statement: coral bleaching on the Great Barrier Reef (26 Mar 2020; GBRMPA)

<http://www.gbrmpa.gov.au/news-room/latest-news/latest-news/coral-bleaching/2020/statement-coral-bleaching-on-the-great-barrier-reef>

It is important to remember bleached corals are not dead corals — on mildly or moderately bleached reefs there is a good chance most bleached corals will recover and survive this event.

So far, observations from the aerial surveys over the vast area of the Reef — some 344,000 square kilometres — are:

- Mostly confirming the worst bleaching is on reefs that suffered the highest heat stress this summer, which extended across large areas of the Reef.
- Detecting a wide variety of bleaching severity — ranging from no bleaching to the most severe category. Some southern areas of the Reef that had little or no bleaching in 2016 and 2017 have now experienced moderate or severe bleaching.
- Showing, importantly, key tourism reefs in the Northern and Central areas of the Reef experienced only moderate bleaching, from which most corals should recover.
- Detecting moderate and severe bleaching on coastal and mid-shelf reefs in the far north where the corals remaining after the 2016 and 2017 events are relatively heat-tolerant.
- Identifying pockets of the Reef that remain unaffected with healthy areas of reefs.

Over the summer the Authority was looking at in-water and aerial surveys, citizen science, and forecast and heat mapping tools from the Bureau of Meteorology and US National Oceanic and Atmospheric Administration.

Chief Scientist Dr David Wachenfeld GBRMPA weekly reef health update (26 Mar 2020; GBRMPA)

http://www.gbrmpa.gov.au/the-reef/reef-health/_nocache or https://youtu.be/Joyv_Hlyr4

- Confirmed that GBR is experiencing 3rd mass bleaching in 5 years.
- Surveys so far, >800 reefs. Very variable: reefs not bleached to reefs bleached >80%.
- Pockets of the reef remain unaffected and healthy areas of the reefs are still intact. In fact, all of the offshore reefs had little or no bleaching and there are still many reefs in the southern part of the park that saw little or no bleaching this year.
- Very varied and mixed picture about the severity of the bleaching in the GBRMPA.
- There was about one-third with no or minor bleaching, one-third with moderate bleaching and the remaining third had severe bleaching. There was no consistent north-south or inshore-offshore pattern.
- Remember, bleached reef is not dead. Reefs bleached minor to moderately expect that most corals survive and recover from bleaching.

Northern GBR

- Far north coastal reefs moderate and severe bleaching 2020 (also 2016-2017) – 3rd time.
- Cairns to Torres Strait offshore reefs little to no bleaching.
- Aerial surveys conducted last week showed most offshore reefs north of Cairns had no or low levels of bleaching. Moderate to severe bleaching was observed on inshore and mid-shelf reefs over this area.
- Key tourism areas northern and central GBR only moderate bleaching – hopeful most corals will recover and survive.
- There was an area offshore in this northern section where reefs were more moderately bleached, including high value tourism reefs.

Central GBR

- Inshore and offshore reefs south of Cairns, particularly between Tully and Townsville, showed severe bleaching.
- Key tourism areas northern and central GBR only moderate bleaching – hopeful most corals will recover and survive.

Southern GBR

- Southern areas moderate or severe bleaching, not in 2016-2017 – 1st time.
- Many reefs in southern part GBRMPA little or no bleaching now and in 2016-2017.
- Inner and mid-shelf reefs surveyed between Townsville and Mackay were mostly severely bleached, but some were only moderately bleached in this central section, including high value tourism reefs.
- Reefs in the Swains Pompey Reef complexes (the extreme southeast of the Marine Park) surveyed on 25 March 2020 show high variability in bleaching.

Climate crisis may have pushed world's tropical coral reefs to tipping point of 'near-annual' bleaching (1 Apr 2020; Guardian)

Quotes from an interview with Mark Eakin (NOAA)

<https://www.theguardian.com/environment/2020/apr/01/climate-crisis-may-have-pushed-worlds-tropical-coral-reefs-to-tipping-point-of-near-annual-bleaching>

- There are fears the world's tropical coral reefs may have reached a tipping point of bleaching nearly every year.
- Tropical coral reefs tend to be at a higher risk of bleaching during times when the Pacific Ocean is in a phase known as El Niño. The latest bleaching on the reef has hit during this cycle's neutral phase.
- "What we are seeing on the Great Barrier Reef and potentially elsewhere is really being driven just by anthropogenic climate change.
- I was not ready to have another bleaching event this quickly.
- As the planet gains heat from increased greenhouse gases in the atmosphere, about 90% of that extra heat is taken up by oceans. In January, a study of heat down to 2km in depth concluded that 2019 was the warmest year on record.
- Many areas of the Great Barrier Reef are known to have experienced severe bleaching this summer, likely killing many corals, but others, including tourist reefs near Cairns and the Whitsundays, only experienced mild bleaching. Most offshore reefs in the far north escaped bleaching entirely.
- She (Associate Prof Tracy Ainsworth at the University of New South Wales) said mild bleaching can also impact the ability of the corals to spawn which can slow recovery from impacts.
- A 2019 study found bleaching in 2016 and 2017 had caused the numbers of new baby corals produced in 2018 to crash by 89% (Nature, <https://www.nature.com/articles/s41586-019-1081-y>)
- Cantin said that unlike in 2016 and 2017, the bleaching in 2020 appeared to have covered "the entire system" of the Great Barrier Reef.

Terry Hughes Tweet – video aerial survey

<https://twitter.com/ProfTerryHughes/status/1243117101788721153?s=20>

Data from nine days of aerial surveys over the Great Barrier Reef, carried out in mid-March, are being analysed and compiled at the ARC Centre of Excellence for Coral Reef Studies at James Cook University.

Aerial surveys of 1,020 individual reefs completed across the length of the 2,300km marine park confirmed last week a third mass bleaching event in only five years.

NOAA – National Oceanic and Atmospheric Administration

Mark Eakin said that in January Coral Reef Watch's models were warning that heat stress would build across the reef in February and March. Sea temperatures over the Great Barrier Reef were the highest on record this February.

NOAA 90-day prediction video (Jan-Mar)

https://coralreefwatch.noaa.gov/data/5km/v3.1/current/animation/gif/baa-max_animation_90day_large.gif

Great Barrier Reef suffers third mass coral bleaching event in five years (25 Mar 2020; Guardian)

Quotes from an interview with Prof Terry Hughes (Director of the ARC Centre of Excellence for Coral Reef Studies at James Cook University)

<https://www.theguardian.com/environment/2020/mar/25/great-barrier-reef-suffers-third-mass-coral-bleaching-event-in-five-years>

- Coral bleaching at Heron Island, which did not bleach during the 2016-17 mass bleaching
- It follows the worst outbreaks of mass bleaching on record killing about half the shallow water corals on the world's biggest reef system in 2016 and 2017. How it is compared with 2016 and 2017 we are not sure yet."
- Working with a staff member from government agency the Great Barrier Reef Marine Park Authority (GBRMPA), Hughes has assessed bleaching levels on 682 reefs from a spotter plane flying at about 500 feet.
- *Northern part*
 - Hughes said the first four days of aerial surveys last week covered almost 500 reefs from the Torres Strait to Cairns. They revealed a mixed picture, with some severe bleaching on reefs closer to shore, but outer "ribbon reefs" in the far north escaping damage.
- *Central part*
 - He said surveys this week in the central parts of the reef had found extensive bleaching at levels "comparable to 2017", when it is estimated about 22% of shallow water coral along the reef's 2300km died.
 - Hughes said about 80 reefs between Tully and Townsville were badly bleached. Both inner and outer reefs were hit. "We could see that some of those corals were big enough that they must have survived the 2017 bleaching and now they re-bleached," he said.
- *Southern part*
 - Hughes said he was worried about corals in areas yet to be surveyed in the south. Those reefs had higher proportions of corals that were more susceptible to bleaching. "If they do bleach severely, we will see significant losses," he said.
 - "This is the year that the southern Great Barrier Reef has taken a bit of a hit," she said (Associate Prof Tracy Ainsworth at the University of New South Wales).
 - Ainsworth said reefs in deeper water had been less affected, but there had been near 100% impact in shallow lagoon areas that were exposed, or close to exposed, at low tide. (Heron Island)
 - "Pretty much everything [in the shallows] is bleached. There wasn't a lot of difference between the species and there is quite a lot of mortality," she said.

High temperatures add more stress to Australia's Great Barrier Reef (20 Feb 2020; AIMS)

Interview with AIMS Oceanographer Craig Steinberg and AIMS Chief Executive Officer Dr Paul Hardisty

<https://www.aims.gov.au/news-and-media/high-temperatures-add-more-stress-australias-great-barrier-reef>

- During this time, temperature readings from marine weather stations operated by the Australian Institute of Marine Science (AIMS) have shown sea surface temperatures throughout most of the Reef at 1 to 2.5°C above average.
- Fortunately, cooler weather over the weekend has brought some relief, reducing the immediate likelihood of severe widespread bleaching.

- “This year, we have come close to a major bleaching event. We are still on the knife-edge. How the reef fares will depend on weather conditions over the next few weeks. Importantly, this is happening in a non El-Niño year,” Dr Hardisty said.
- “Coral reefs typically take a decade or more to recover from disturbances like severe bleaching events, yet they are becoming more frequent. Without a reduction of global temperatures, the health of the Reef is expected to continue to decline.”
- “Fortunately, in Queensland over the weekend we have also experienced cooler weather which is bringing water temperatures down by ~1 to 1.5 deg C from peak temps of 31 deg C on some areas of the Great Barrier Reef.
- “Winds are being drawn from the Coral Sea toward (ex) tropical cyclone Esther bringing with them heavy cloud and rainfall.

OTHER READS:

Great Barrier Reef found to be coral bleached from north to south for first time (7 April 2020; ABC)
<https://www.abc.net.au/news/2020-04-07/great-barrier-reef-most-widespread-coral-bleaching-on-record/12107054>

Great Barrier Reef suffers biggest bleaching event yet (9 April 2020; Mongabay)
<https://news.mongabay.com/2020/04/great-barrier-reef-suffers-biggest-bleaching-event-yet/>

Great Barrier Reef Suffers Third Mass Bleaching Event In Five Years – But It’s “Not All Bad News” (27 March 2020; IFLSCIENCE)
<https://www.iflscience.com/environment/great-barrier-reef-suffers-third-mass-bleaching-event-in-five-years-but-it-s-not-all-bad-news/>

“An underwater bushfire”: third mass bleaching event in five years on the Great Barrier Reef confirmed (26 March 2020; Australian Geographic)
<https://www.australiangeographic.com.au/news/2020/03/an-underwater-bushfire-third-mass-bleaching-event-in-five-years-on-the-great-barrier-reef-confirmed/>

Great Barrier Reef bleaching concerns after hottest month of sea temperatures on record (15 March 2020; ABC)
https://www.abc.net.au/news/2020-03-15/cyclone-great-barrier-reef-bleaching-record-sea-temperatures/12050102?fbclid=IwAR226PzwM4on3TnUq8TQrUPPEPA-j2DTEIMZGbgW00dv6o5pj_de7hUhPA0