

Scenarios

How long should we shut down before and after spawning?

Before and after spawning?

- COSTEN: This depends on the nature and scale of the dredging operation and any predicted impacts and needs to be determined on a case-by-case basis. There is no specific right answer but if you don't have robust predictions of impact then you need to be more conservative. Rather than no impact, we should aim for "acceptable" impact. And this again will be unique for each development
- SIMPSON: What are the questions we need to answer to make this decision is the important issue. We need specific questions, be it assessment or management.
- PRACHETT: We should shut down early enough before spawning to allow for any sediment the water column to settle out and then maintain that through to larval settlement.
- STODDART: Which on this side of the country means no dredging between February or March.
- PRATCHETT: The proponent should be looking to avoid periods of spawning in the first place.
- GILMOUR: What are the limitations from the proponent's point of view?

- OLIVER: There is a global shortage of dredges so availability is an important determinant on timing of dredging operations. Ideally dredging would occur outside of cyclone season but if you have a longer dredging campaign then may not be able to avoid cyclone season all together.
- Sediment is going to settle and so there won't be substrate available for larval settlement and new recruits will be smothered so maybe we should be looking at how to clear turbidity so that these larvae can settle some distance from dredging.
- BAIRD: What are we protecting by stopping dredging, is it larvae in the water column that are moving through the area or is it larvae that have settled?
- COSTEN: Impacts are a function of material and hydrodynamics and can change with the physics of the system (energy required for re-suspension etc.) They are system and environment specific.
- GILMOUR: We should protect fertilisation of eggs. If stopping dredging for 5 months is not realistic (pre spawning to settlement and establishment of new recruits), how should we prioritise the time we do stop dredging for? Protect the greatest number at the start – more in, more out.
- LEEMAN: This should be determined on a case-by-case basis. If there's not much reef, don't worry about it – again it comes down to acceptable impact.
- JERNAKOFF: But the more you shut down the dredge the longer you are impacting.
- GILMOUR: But if you remove an entire cohort, that's more of a problem.
- But what about impacts on gametogenesis?

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- GILMOUR: Adults are more robust so it's not so much of an issue.
 - Can we spend the money that shutdown costs in better ways to help reefs?
 - SMITH: If you have a large plume (eg. Gorgon may be ~70m long) you need to consider how many larvae will travel through that plume during a 2 week period. This may have a big impact on regional recruitment.
 - MASINI: In W.A. the minister sets conditions on developments. No argument has been presented that there will be no effect of dredging so we should take a precautionary approach. Proponents need to consider spawning a priori and budget for associated costs of avoiding dredging during spawning.
 - In WA there are multiple dredging campaigns in consecutive years. In Dampier it's 6 consecutive years this year. This goes back to the cumulative impacts of recruitment failure in consecutive years as per MP's presentation.
 - Local vs regional recruitment: Inshore reefs have a different community structure to offshore reefs. If there is a local element to recruitment then it is even more important to avoid spawning. And it is the responsibility of the proponent to plan around it.

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- So we need no turbidity before spawning and for a number of weeks afterward. In order to protect coral communities.
 - STODDART: This will have implications for the size of the management area that is most appropriate. Are we talking about protecting larvae moving through, or just settling?
 - SIMPSON: This assessment should be made prior to or during the approval process.
 - GILMOUR: Larval dispersal in WA probably <10-20km, which is more localised than on the GBR.
 - PRATCHETT: Planulae can seek out an area to settle on so can we entirely rule out recruitment just because there is sedimentation?
 - GILMOUR: That's true, but we don't incorporate wave data so we aren't sure to what extent new recruits will be smothered due to re-suspension post-settlement.
 - EIA has never considered down-stream impacts of dredging.
 - OLIVER: Industry would prefer a case-by case decision to be made rather than a blanket ban.

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- COSTEN: But this requires sufficient data to make decisions about each case. Impacts depend on distance to sensitive environment, level of sediment and duration of activity. At GBRMPA we generally stop 1 week before and 2 weeks after but these time periods were chosen arbitrarily. We need more research to determine the significant time periods.
 - PRACHETT: Can we trade off impacts in adjacent areas?
 - WARD: It would be useful to define the parameters needed to make a decision so that a case-by-case decision can be made and proponents understand what is required of them in their submission.
 - Would the money it costs to stop dredging be better spent on research?
 - COSTEN: Research can give you more certainty in your predictions of impact. We have a memorandum of understanding with industry that they put money into a kitty. It is effectively a fee that is paid by industry to fund research. If the data doesn't exist then we must apply the precautionary principle which can lead to refusal and be costly for the proponent. If we have better data we can make a more robust prediction of impact so we don't need to be as stringent on applying the precautionary principle.

Research needed & funding

- STODDART: Can we define set criteria or targets for “What is an acceptable impact?” or “What is “successful” management?”
- COSTEN: Meeting performance criteria or when outcomes are what was predicted. Eg. Not exceeding water quality thresholds. Again, this is determined on a case-by-case basis. Also, it will depend on the importance of the environment.
- STODDART: Are we concerned with proximate or ultimate, residual effects?
- SIMPSON: What is the generic set of data required? This would be a useful outcome of the workshop.
- SMITH: Percent cover is not enough. We need data on different life stages and recruitment.
- SIMPSON: We need a balance of structure and function.
- PRACHETT: Historically, the approach has been very simplistic. We need to look at processes. It can be part of a natural cycle to move to a new community structure. What is the recovery potential? We know these are dynamic systems but it is more difficult to quantify processes.
- FORDE: Proponents don't come in with the information because they're waiting on approval. You need historical data to provide baseline. This is a basic problem with the whole process.

- GILMOUR: In W.A. now, we need and have established reference areas. Who pays is a separate issue but if you don't want to spend time to establish background data then you need collective investment in reference site monitoring.
- There is an investment cycle within industry. There is no slush fund, the ability to pre-invest is constrained. Investment happens one step at a time.
- Can the Government plug the gap in the data?
- SIMPSON: The Government is investing \$20 million in the W.A. Marine Science Institute specifically for strategic research.
- Defining unacceptable impact may be more useful than acceptable. Then how do we monitor these? You need to look at the info you need before hand, the background.
- SIMPSON: What parameters do you need? We should have pre-determined criteria.
- STODDART: Do we need species level data? or size structure?
- COSTEN: In some cases we have asked for that.
- SIMPSON?: We need to understand cause-effect pathways.

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- If corals are going to spawn, and you shut down you are reducing flow on effects.
 - Cumulatively you're losing recruits and also their potential contribution to reproduction.
 - Any information gathered during a program should be good enough to make the next discussion easier.
 - Is the data or reports from previous monitoring programs available?
 - It is there, but not collated. We need a literature review.
 - We need to remember that people have ownership of the data, they have investment in it.
 - There are issues with quality and consistency. These monitoring programs were not designed for post-hoc synthesis.
 - You need to be systematic if you want to be able to synthesise different studies.
 - A central repository of data, government or otherwise, is required.

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- The Port of Geraldton has conducted strategic research on seagrasses and the effects of shading. This allows for more robust estimates of impact.
 - To cross-reference historical records would be difficult. We need to start now to produce something to give guidelines of what should be monitored and what data is required. A standard framework is needed.
 - COSTEN: GBRMPA has standard questions and this is useful so that industry know what is required of them.
 - Abundance and distribution data is usually collected in monitoring programs, should be change this approach to be more process based?
 - That data is important and we should keep collecting it, but if we understand the processes better and add to the data we can better manage impacts.
 - We need a standard protocol that is mandated.
 - We need more experimental data to understand the relevant footprints and thresholds.
 - Is there an example of impact from regulated dredging?
 - SIM: Yes, in Geraldton. We don't have good baseline data to be certain of the extent but there have been significant reductions in seagrass and epiphytes.

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- We should keep in mind that we are simplifying the system to only talk about corals. There are other organisms that will also be impacted.
 - Proponents should be encouraged to put in permanent sites so that changes can be tracked over time.
 - But then your placement is very important, are you seeing what you want to?
 - SIMPSON?: There is a broad case for government funding for strategic research.
 - But industry do collectively maintain and use the environment and infrastructure and should pay a levy for management. Perhaps there is room for co-investment.

Attendees

Apache Energy Limited	Giulio Pinzone, Libby Howwitt, Myles Hyams
Chevron	Dorian Moro
Commerical Coral Harvesters W.A.	Simon Hawke
Dampier Port Authority	Peter Smith
Department for Planinng and Infrastructure	Mandy Bailey, Rebecca Ince, Sarah Curren
Department of Conservation and Land Management	Alan Kendrick, Chris Simpson, Kevin Bancroft, Suzanne Long
Department of Environment	Cameron Sim, Doug Betts, Karen Crawley, Kevin McAlpine, Nicole Zago, Nyomi Bowers, Ray Masini, Sarah Coote, Tim Gentle
Department of Fisheries	Rob Tregonning
Department of Industry and Resources	Mike Bullard
Department of the Environment and Heritage	Cherie Hart, Ian Irvine, Matt Johnston
Fortescue Metals Group	Dan Rowe
IRC Environment	Alex Wyatt, Chris Ryan
Jean-Paul Orsini & Associates	Jean-Paul Orsini
Marine and Coastal Community Network	Edwina Davies Ward
Mermaid Marine	Debbie Anning
Mscience	Dave Blakeway, Sarah Bourke
Murdoch University	Michael Travers
National Oceans Office	Paula Tomkins

Attendees

Oceanarium	Peter Fullarton
Pilbara Iron	Leon Staude, Peter Landman, Peter Royce, Rob Griffiths
RPS Bowman Bishaw Gorham	Glen Young, Jeremy Fitzpatrick, Mike Ford
Sinclair Knight Merz	Dave Kabay, Peter Morrison
University of Western Australia	Anna Metaxas, Glen Shiell, Jim Underwood, Mark Westera, Sam Suanders, Trevor Ward
URS Australia Pty Ltd	Ian Baxter, Tony Roupael
Vanguard Environmental	Catriona Stuart-Andrews, Sjaak Lemmens
WA Museum	Jane Fromont
Woodside Energy Limited	Ceri Morgan, David Gordon, Peter Jernakoff, Emilio Papiccio