COMPENSATION POLICY IN RELATION TO IMPACTS ON FISHING AND LAND-BASED DEPENDENT BUSINESSES OF GLADSTONE PORT DEVELOPMENT†

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A. Main Report

A.1 Summary

The Coordinator General has directed that:

"GPC [Gladstone Ports Corporation] must mitigate all reasonable financial losses to existing commercial fishing operators attributable to the maritime development in the Western Basin of the Port of Gladstone. This is to cover temporary and permanent loss of access to fishing areas and marine fish habitat" (Coordinator General 2010, p. 97).

In the absence of a detailed analysis by the proponent of the economic implications for the commercial fishing sector of Western Basin development, this report serves to focus attention on the development's effects, their likely consequences for commercial fishing, and the flow-on impacts on land-based businesses.

This report's findings are summarised as follows:

- **The number of commercial fishers affected has been greatly underestimated in environmental impact statements (EISs) of the Gladstone Ports Corporation and by the Coordinator General.**

- **The physical and temporal extents of the cumulative direct and indirect impacts on the commercial fishing industry have not been fully accounted for in the EISs of the Gladstone Ports Corporation or by the Coordinator General.**

- **The fish habitat offsets proposed will not offset the expected financial losses in the commercial fishing and wholesaling sectors.**

- **The likely severe impacts on wholesalers, processors and exporters – ignored by the EISs of the Gladstone Ports Corporation and the Coordinator General – need to be considered as part of any compensation policy.**

In relation to a compensation policy this report contends that:

- **A compensation package, that includes all fishing sectors that fish, or are based in Gladstone Port, as well as for the wholesaling sectors, should be developed and put in place without delay.**

A.2 Number of fishing enterprises and value of fishing affected

The EIS reports and the Coordinator General's report underestimate the negative impact on fishing and land-based dependent businesses of the present and future development of the Port of Gladstone. The reports assert that 6 fishing enterprises are directly affected by the permanent loss of 443 ha of seagrass and 250 ha of intertidal wetland due to the Western Basin Dredging and Disposal Project, Fisherman's Landing Northern expansion and Wiggins coal terminal.

The number of boats recorded fishing in 2005 in grid 30 of the Commercial Fishing Logbook Data Collection Grid System was 65. A large proportion of these fishing enterprises could well suffer direct, indirect and cumulative effects of port development. While this number could have declined since 2005 due to restructuring, to this number must be added the trawlers and live fish vessels that fish offshore but are based in Gladstone harbour and therefore exposed to the negative effects of Gladstone Port development.

The GHD supplementary EIS acknowledges that the number of fishermen stated to be affected in the GHD social impact statement is based on project consultation, and not verified against any other source. The supplementary EIS states that any compensatory measure will be subject to a rigorous identification of all potentially affected stakeholders.

As well as underestimating the number of fishing enterprises affected by Gladstone Port development, the assessments in EISs of the impact on commercial fishing fall

well short of addressing the full range of the likely direct and indirect physical impacts of development projects, their likely cumulative impacts and their consequential economic and social costs. All sectors of the fishing industry that fish, or are based in, Gladstone Port are already – or will be – affected.

The present value of fishing in the harbour that will be reduced by port development is $37 million. To this value affected must be added the considerable value of offshore prawning and live fish operations that are unlikely to be able to be based in Gladstone Port (see Section B1.1).

Furthermore, the EISs and Coordinator General's report fail to address the impacts of Gladstone Port development on dependent land-based businesses. There are very likely severe consequences for wholesalers, processors and transporters (hereafter referred to as wholesalers) of the long term reduction in product supplies from the commercial fishing sector.

The lack of markets for fish resulting from the closure of wholesaling businesses will further impact remaining fishing enterprises.

The impacts are further summarised below.

A.3 Direct and indirect impacts on commercial fishing

A.3.1 Direct impacts

As well as the direct impact of permanent loss of valuable fishing grounds due to the Western Basin Dredging and Disposal Project there are additional likely direct impacts on commercial fishing, in terms of water quality and access.

A.3.2.1 Water quality

The risks to the commercial fishing sector from impacts of Gladstone port development on water quality are far greater than addressed in EISs and the Coordinator General's report.

Not addressed in the above reports is the impact on the commercial fishing sector of the so-called "indirect impact footprint" of turbidity plumes in the harbour resulting from dredging activity potentially affecting an area of 5,108 hectares, extending into the Narrows, as far north-west as Black Swan Island, and into harbour waters, as far south-east as the Auckland Channel.

Neither do the reports address the risks to commercial fishing of the increased level of offshore disposal of spoil. Sources are the additional dredging associated with the project together with a greater volume of disposal resulting from an increased maintenance dredging program necessitated by the extension and deepening of navigable channels and swing basins.

To the impacts of plumes of suspended solids on fish habitat and therefore on fish catches must be added the risks to live fish boats that require a continuous supply of water of good quality on entering the harbour.

Oil spills are an additional hazard, affecting water quality, habitat and fish resources.

A.3.2.2 Access

Access by commercial fishermen to fishing grounds will be affected to a significant extent, summarised as follows.

- **Restricted access to harbour fishing grounds by prawn, crab and net fishers due to greatly increased levels of boat traffic associated with Curtis Island and Fisherman's Landing LNG developments and other proposed port developments.**

- **Restricted access to the Narrows and associated inlets of fishing vessels due to its constriction by the Western Basin Reclamation and the Fisherman's Landing expansion and by the level of dredging activity and associated barge activity for an extended time.**

- **The greatly increased boat traffic as a result of LNG and other port developments together with constraining security and exclusion zones. The security zone round LNG vessels is half a mile in transit. There will be 500m exclusion zones around wharves and vessels at berth.**

A.3.2 Indirect impacts

The booming economy of Gladstone, resulting from resource development in the hinterland, associated Port Development for handling bulk and processed materials, plus the increase in associated service industries, is already having a major impact on the commercial fishing sector, as follows:

- **A scarcity of deck hands and skippers for trawlers and live fish vessels due to:**
    - **The high remuneration levels offered by dredging and transport companies for maritime skills, and the inability of the fishing industry to match such remuneration levels.**
    - **The high cost of accommodation in Gladstone, which encourages the relocation of deckhands and skippers or their employment in alternative higher-paying industries.**

- **A shortage of engineering and maintenance personnel for repairs and servicing of vessels in Gladstone Harbour. High remuneration, not matched by the fishing industry, is offered to skilled workers by the resources and processing industries and by businesses associated with the development of Gladstone Port.**

- **Restriction of timely access to vessels at wharves for maintenance and repairs. Wharf access to fishing vessels is restricted to between 7.30am and 4.30pm.**

- **Restriction of timely access to wharves for unloading fish.**

A.4 Direct and indirect and cumulative impacts on wholesalers, processors and transporters of fish and fish products (hereafter referred to as 'wholesalers')

A.4.1 Direct impacts on wholesalers

Gladstone wholesalers mainly handle locally-caught product. A diminished supply of fish to wholesalers, as a result of the cumulative direct and indirect effects of Gladstone Port development, will have a severe impact on the turnover, profits and therefore the viability of wholesalers.

As well as potential reduction in supply of fish, there are potential risks to Gladstone wholesale businesses of contamination of fish by suspended solids, heavy metals and hydrocarbons. As an example, a large Gladstone exporter of scallops uses a designated area in the harbour near the marina to process scallops for export. The high quality of sea water essential for this operation is very likely to be compromised by increasing pollution as a result of harbour development and increasing traffic. The viability of this major business enterprise is thus in jeopardy. Indeed, the whole of the fish processing industry in Gladstone is at risk if contaminants are detected in their products (see Section B1.10.2).

A.4.2 Indirect impacts on wholesalers

A scarcity of labour and managerial personnel due to the high cost of accommodation in Gladstone and the relatively high wages offered by resource and development industries.

A.4.3 Cumulative impacts on wholesalers

The impacts of a likely reduction in product supply, an increasing risk of contamination of product and a scarcity of labour, are undermining the financial viability of wholesaling businesses in Gladstone.

A.5 Compensation policy

As well as recognising that a financial compensation for the commercial fishing sector is necessary, funded by the Gladstone Ports Corporation, the Coordinator General directs the Gladstone Ports Corporation to also provide habitat to compensate for losses due to port expansion.

While an offset that will provide fish habitat is proposed at Port Alma, this will not compensate for the direct loss of fishing grounds and habitat given that it is not an additional resource. The offset proposed in the form of protection of coastal land currently within the GPC's strategic port land at Port Alma merely affords protection of land that could be converted to industrial use some time in the future. Moreover, its utility is diminished by the fact that it is remote from the habitat removed by development projects in the Narrows.

The EISs and the Department of Employment Economic Development and Innovation (DEEDI) suggest compensation should be considered for commercial fishing when economic impacts become apparent. However, this is an inefficient policy, both economically and socially, given that it delivers financial relief after economic losses have been suffered, insolvencies and bankruptcies have ensued and the accompanying social distress has taken its toll.

The strong linkages between fishing sectors and fish wholesaling should be explicit in the development of compensation policy. Section B.10 highlights the likely impacts on wholesalers of a reduced supply of product as a result of Gladstone Port development.

Fishing and wholesale enterprises are in business limbo. They are unable to invest with confidence given the uncertainty of the intensity, extent and timing of impacts on fishing of Gladstone Port development. The longer the delay in instituting a compensation policy the greater the negative cumulative effects on business.

To the negative impacts of planned development outlined above, must be added the impacts of development as yet unassessed but likely – given the pace of growth of resource exploitation in Queensland and the capacity of the Gladstone Port for future expansion (see for example GPC's *50-year Strategic Plan*).[1]

The long term planning for, and facilitation of, the development and growth of Gladstone Port should be complemented by long term planning for dealing with the consequential negative impacts, including impacts on the fishing industry and dependent land-based businesses.

It is proposed that a proactive and pre-emptive compensation policy be adopted. This would involve an immediate response with the following components:

- **Each business case – commercial fishers and wholesalers – to be dealt with individually.**

[1] It is noteworthy that the pace of Gladstone Port development already greatly exceeds that anticipated in the Gladstone Ports Corporation's *50-year Strategic Plan*.

- **Offers to be made by Gladstone Ports Corporation, in coordination with DEEDI, to purchase and retire fishing licenses, quota and effort units, together with the provision of exit assistance for fishers and wholesalers who do not wish to continue in business.**

The retirement of purchased licences and quota and effort units would have the added benefit of reducing the level of fishing effort commensurate with the reduction in the fish resource likely to be accessible in the region in the longer term. Such retirement of entitlements avoids a domino effect where displaced fishing enterprises move into alternative areas already fully exploited, thus reducing the profitability of established fishers in those areas.

- **Restructuring assistance of remaining fishing and wholesale businesses, to either increase their capacity and/or to diversify.**

B. Supporting information

Introduction

It was stated (GHD 2009a) that an economic impact assessment would be undertaken to quantify the negative impacts of the project on commercial fishing, but no such study has been completed. The EIS (GHD 2009b) and the Coordinator General (2010a) not only underestimate the number of fishing enterprises affected, they also fail to identify the consequences for the different fishing sectors of the project. A review of the physical and temporal effects of the project and an assessment of the impacts on commercial fishing and land-based businesses follows in this section.

In this study, information was gathered through interviews with 11 fishing enterprises representative of all the sectors fishing, or based in, Gladstone harbour and with five wholesalers. Interviews were augmented by physical sighting of the location of developments, existing and proposed, in the Gladstone Port. Public documents consulted on Western Basin development include: GHD (2009a,b,c,d,e); GHD (2010); Coordinator General (2010a,b); and Aurecon (2011).

B.1 Impacts on Commercial Fishing as a result of Dredging and Disposal

These impacts are outlined below.

B.1.1 Number of fishing enterprises and value of production affected

The Social Impact Assessment (GHD 2009c, Chapter 13, p. 32) states that consultation meetings with local commercial fishers had revealed that there are around six commercial fishing operations that use the areas in and around the Port of Gladstone. Public submission 16 on the EIS for the Western Basin Dredging Project (GHD 2009d, 16.3) suggests that this number (six) of commercial fishers directly affected was underestimated and that, in the area directly affected by the project, which is Subgrid 12 of Logbook Grid 30, there had been 12 commercial fishers operating in the sub-grid in the week ending 12 December.

The Supplementary EIS (GHD 2010, p. 10-134) subsequently acknowledges that the number of fishermen supplied in the original EIS (GHD 2009a) was based on project consultation, and not verified against any other source. The supplementary EIS (GHD 2010, p. 10-134) states that any compensatory measure will be subject to a rigorous identification of all potentially affected stakeholders.

Despite this qualification, the Coordinator General (2010a, p. 63) seems to corroborate the former estimate in noting that "The EIS estimates that there are six commercial fishing operations that use the project area and adjacent surrounds". [2]

In this assessment of the impacts on commercial fishing it is argued that impacts will be felt not just by fishers in Subgrid 12, the area directly affected by the project, but potentially by all fishers in Grid S30 (see Figure 1).

[2] The Coordinator General (2010a, p. 63) also notes that the Department of Employment Economic Development and Innovation (DEEDI) had indicated that approximately 10–15 per cent of commercial fishing operations based in Gladstone are conducted in the wider Port Curtis area.

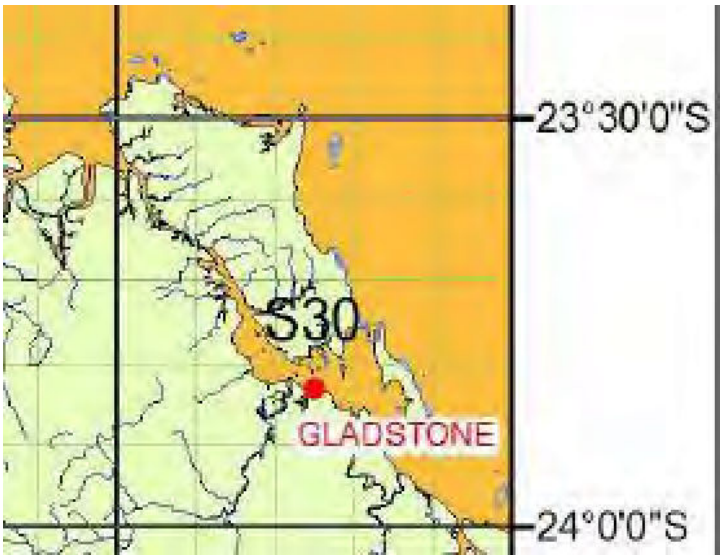

Figure 1 : Commercial Fishing Logbook Data Collection Grid System under the Commercial Fishers Information System

Source: DPI.

In 2005 there were 65 commercial fishers operating in Grid S30, with a commercial catch in that year of gross value $2,827,000 i.e. an average of $43,500 per fisher (DPI).

Assuming that this value would be maintained under "normal" circumstances, the present value of the fish catch in Grid 30 to be diminished by the direct, indirect and cumulative activities of Gladstone port development is $37 million.[3] To this value affected must be added the considerable value of fishing by enterprises that do not fish in Grid S30 – principally live fish and offshore prawning – but whose operations are, and will be, directly and indirectly impacted, by port development.

B.2 The loss of fish habitat and fishing grounds

Seagrass communities are recognised as important ecosystems for maintenance of seabed stability, water quality and biodiversity. They are also known to act as nursery grounds for the juveniles of fish targeted by commercial and recreational fishers as well as being important food sources for other fish. The seagrass meadows, and the associated benthic macroinvertebrate communities that will be directly affected by the construction of the Western Basin Dredging and Disposal Project are considered

[3] The discount rate applied to the value of future production is 6%.

to be of high ecological value (GHD 2009b, Chapter 9, p. 100). But it is noteworthy that seagrass beds are also situated in the intertidal wetlands affected (GHD 2009b, Chapter 9, p. 141).

The removal of habitat reduces the productivity of the harbour in terms of ability to support fish populations. The direct primary impacts identified for the project are the permanent removal of benthic habitat (including seagrass meadows, algal beds and macroinvertebrates), declines in water quality associated with construction and dredging events, and the flow-on effects to benthic habitats from declines in water quality (GHD 2009b, Chapter 9, p. 126).

The residual risk assessment with control strategies adopted for the direct impacts of removal or damage to benthos, seagrass species, algae, macrobenthos, including fish and crab species and reduction in biodiversity, both within the reclamation and within dredge material rehandling areas, is assessed as "high"; as there is "no ability to control the impact" (emphasis the author's)(GHD 2009b, Chapter 9, Table 9.15, p. 116).

The Coordinator General (2010a, p. 92) summarises the permanent loss as 443 ha of seagrass and 250 ha of intertidal wetland due to the Western Basin Dredging and Disposal Project, Fisherman's Landing Northern expansion and Wiggins coal terminal.

An impact on fishing not taken into account in EISs is the loss of harbour prawning grounds due to dredging. Presently trawling is undertaken in channels where Dredge Stages 1 and 2 are proposed. Section B.9 below details the cumulative impacts on harbour prawning of dredging and increased shipping, which are likely to render the prawning in the harbour unviable in the near future.

B.2.1 Permanent and temporary loss of habitat

This report disputes the conclusion that the impact on fishing will be "local" (GHD 2009b, Chapter 13, p. 65).

GHD (2009b Chapter 9, pp. 9-105, 9-106) states that the various construction and operation activities for the project are expected to result in a range of impacts on the marine systems within the area, including smothering of benthos, reduction in

photosynthetic activities, scouring and mobilisation of contaminants. GHD (2010, p. 9-73) in its Supplementary EIS, states that, in summary, there will be an impact (impact could range from short term to permanent in some instances) to seagrass beds because of a decrease in the light climate due to elevated turbidity levels. Further, in some regions potentially high sedimentation rates will cause some degree of smothering.

To estimate the area of seagrass that could be impacted by the project dredge plumes, the entire potential area of seagrass habitat as mapped between all surveys conducted by DEEDI, was calculated by assimilating across all areas where seagrasses have occurred across all surveys. This gave a potential seagrass area (meadow + seed bank) within the project footprint against which an assessment of indirect impacts was made. This totals approximately 6,318 ha of benthic habitat, including 1,417.8 ha of known seagrass habitat, which could be directly or indirectly impacted under the worst case scenario of development and dredging works GHD (2010, p. 18-163).

The scenario predicted to have the largest impact on water quality in the region is that for Stages 1A and 1B, where simultaneous dredging activities could include rehandling and decant from the reclamation. It estimates the area that could be being touched by the dredge plume at least once and includes approximately 1,128 ha of seagrass areas. (GHD 2009b, Chapter 9, page p. 9-100.)

The areas that could be impacted by dredge plumes, which is expected to have the largest impact on water quality in the region, is illustrated in GHD (2009b, Chapter 9, Figure 9-31) and reproduced below as Figure 2.

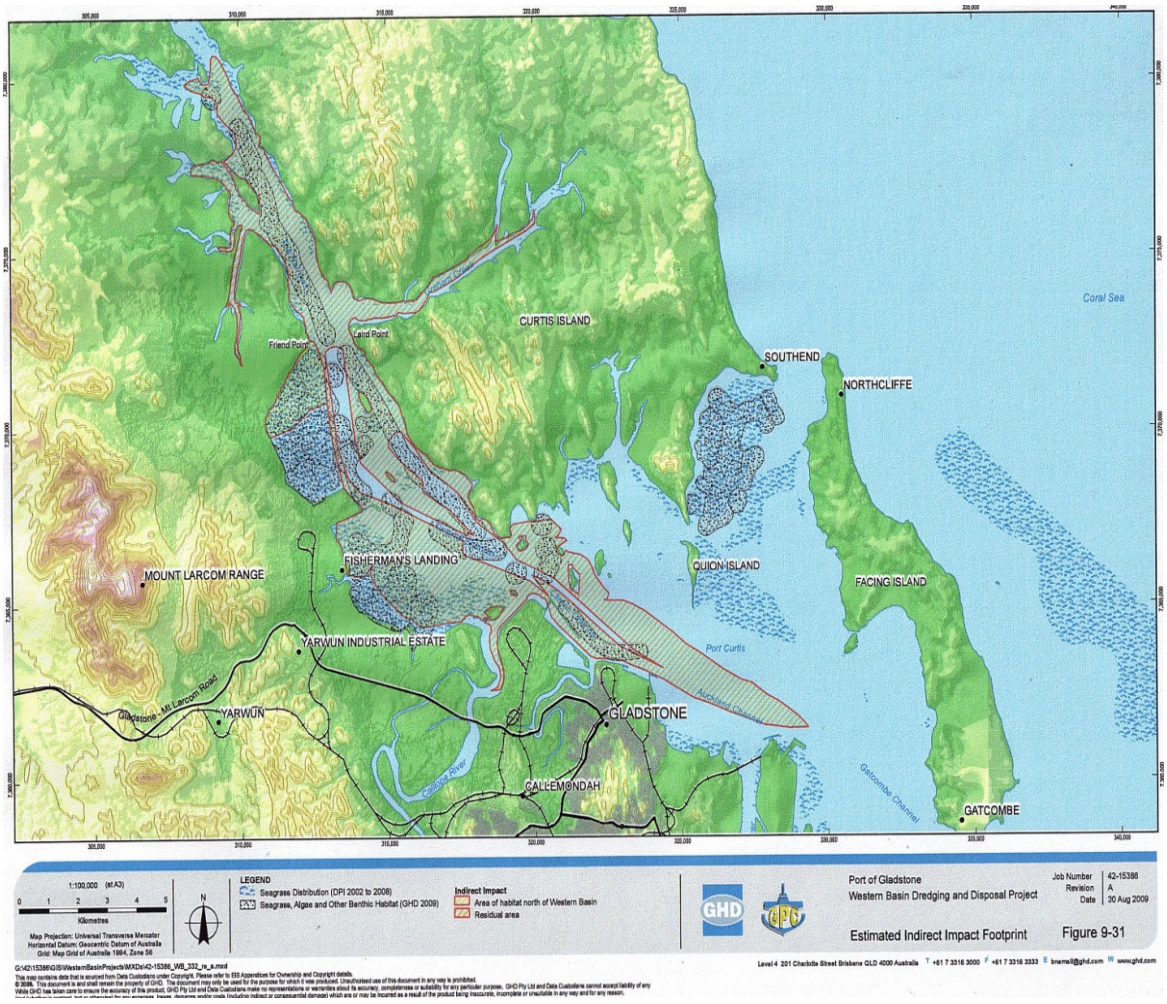

Figure 2: Estimated indirect impact footprint

Source: GHD (2009b, Chapter 9, Figure 9-31).

B.3 Combined impacts of projects on fish habitat

In the Supplementary EIS (GHD 2010 pp. 9-74,9-75) changes are made to the management of dredging in the project to decrease the impacts to seagrass beds arising from the Project. These include the sea dumping of larger quantities of dredge spoil. The capacity of the East Banks Sea Disposal site was recently reviewed, with the current remaining capacity assessed at approximately 15 million m^3. This option

was not included in the original EIS (GHD 2009b) as the capacity of the spoil ground was understood to be less than 5m^3 and reserved for maintenance works. With confirmation of the offshore spoil ground capacity and the request via public submissions for offshore dredge material disposal to be considered, it was an option being investigated. The process proposed would be to seek a new permit for the existing spoil ground (in a separate, but parallel approval process to the EIS). Federal minister Burke approved, on 22 October 2010, the dumping of dredge material of up to 11 million m^3 in the East Banks Sea Disposal Site (Burke 2010).

The offshore sea disposal ground potentially provides a significant environmental net benefit, as use of the ground would almost entirely negate the need for rehandling. Rehandling has been predicted to generate a significant turbid plume through the dumping process, and also the subsequent dredging of this material using a cutter suction dredge (CSD). Disposal would be managed so that the dump offshore occurs furthest away from any environmentally sensitive areas (i.e. the disposal location will vary with the state of the tide and wave effects). The environmental benefit of offshore disposal would be a significant reduction in turbidity within the estuarine environs of the Port of Gladstone.

The Supplementary EIS states that the most likely scenario would involve the offshore disposal of the majority of material dredged using a trailing suction hopper dredge (TSHD). A volume of the order of 6 to 8 million m^3 could be disposed off in this manner (GHD 2010 p. 18-159). It is anticipated that a TSHD would remove 5-6 loads per day which translates to a total disposal time at the spoil ground of no more than 6 hours per 24 hours. There would be a temporary plume at the spoil ground, the duration of which would be detailed in the sea dumping permit (GHD 2010, p.18-159). However, estimates of the extent of the temporary plume associated with dumping up to 11 million m^3 of dredge material in the East Banks Sea Disposal Area do not appear to have been made.

It is noteworthy that Fisheries Queensland does not support the deposition of dredge spoil on tidal lands (GHD 2010, p. 3-12).

In summary, the estimates accepted by the Coordinator General (2010a, pp. 92, 93), as a result of management changes in dredge spoil disposal, are that the permanent loss of seagrass due to the project would be 443 ha and the permanent loss of wetland 250 ha.

In addition, temporary loss of seagrass, for the duration of the dredging works, would be sustained as follows: “moderate to severe” (highly degraded or complete loss) affecting 350 ha, plus “minor to moderate” loss affecting 1,000 ha (Coordinator General 2010a, pp. 92, 93). See Table 1, which summarises losses.

B. 4 Duration of temporary impacts and consequences

It should be emphasised that the dredging works are expected to continue to at least the middle of 2015 in the case of stages 1A and 1B; and in the case of Stages 3 and 4 dredging will be staged over a “number of years”. The table of project timing (GHD 2010, Table 5-2, p. 5-33) is reproduced below in Table 2. The location of these stages is shown in Figure 3.

The recovery of seagrass from temporary losses is expected to take 2-5 years following cessation of construction and dredging by GHD (2010 p. 10-81) and 3 years by DEEDI (GHD 2009d, 18.c.8). The full recovery of seagrass might therefore take until year 2018 given a three-year recovery period after 2015, and 2020 given a 5-year recovery period. To this time period must be added the number of years that dredging continues in Stages 3 and 4.

A cumulative impact over time on productive areas can be derived by combining estimates of loss in Tables 1 and project timing forecasts in Table 2 with recovery time estimates. The conclusion drawn in this report is that commercial fishing will be affected by a reduced productivity over at least 2,050 ha of productive area until the middle of year 2018 or 7 years from now, assuming an average 3-year recovery period for seagrasses.

Table 1: Permanent and temporary losses of seagrass

Project	Permanent loss	Temporary disturbance	
		Moderate to severe	Minor to moderate
Fisherman's landing Port Expansion	174 ha of sea bed including 90 ha of seagrass and 84 ha of 'potential' seagrass		
Western Basin Dredging and Disposal	Reclamation dredging affecting 259 ha of seagrass		
Wiggins coal terminal	Reclamation of 260 ha of including inter-tidal wetland and 10 ha seagrass		
Gladstone LNG Stage 1 channel dredging			
Totals for all projects	**443 ha of seagrass plus 250 ha of wetland**	**350 ha seagrass**	**1,000 ha seagrass**

Source: Coordinator General (2010a. Table, p. 92 and Sections 3.3.1.2, p. 93).
Note: The Coordinator General (2010a, p. 93) concludes that there has been double counting under 'Permanent losses' in Table 12 on p. 92; nevertheless, the 'Totals for all projects', permanent and temporary disturbances, as stated in Table 1 above, are those accepted by the Coordinator General.

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Table 2: Project zones and timing

Zone	Project	Start	Complete
Zones 1,2	Clinton Bypass and Targinie Channel	2011	2015
Zones 3,4	North China Bay	2011	2014 and as required
Zones 13,14	Laird Point	After North China Bay and Fisherman's Landing	2014
Zones 5, 6, 7, 8, 9, 15	Curtis Channel, Marine Offload Facilities, Swing Basins, Berth Pockets	2011	2014 and as required
Zone 10	Curtis Channel Extension,	2011	2014
Zone 11	Fisherman's Landing: Targinie Channel Widening and FL Swing Basin Deepening	2011	2015
Zone 12	Stage 3 Fisherman's Landing	2011	Staged over a number of years
Zone 15	Hamilton Point and LNG	2011	Staged over a number of years
n.a.	Wiggins Island	2011	2014

Source: GHD (2010,Tables 5-2 and 5-3 and Figure 5-1).

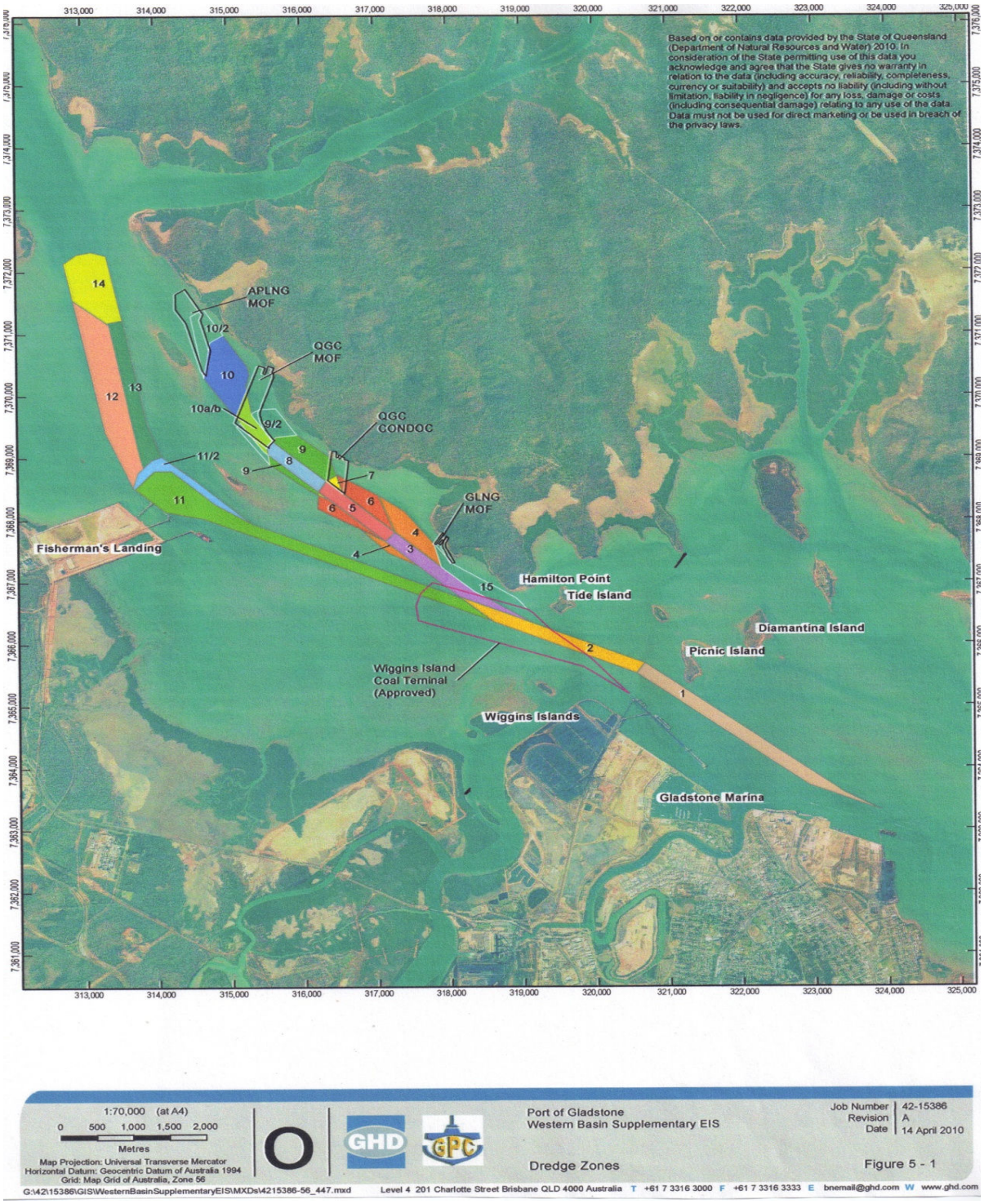


Figure 3: Location of dredging zones (corresponding with Table 2)

Source: GHD (2010a, Figure 5-1, p. 5-30).

The consequences of prolonged elevation of turbidity and sedimentation around the reclamation area and an unknown level of resuspension in shallow waters are outlined by the Queensland Department of Environment and Resource Management in its public submission (GHD 2009d, 2.11). These are:

- Loss of diversity and abundance of seagrass caused by impaired photosynthesis as a result of reduced water clarity (above natural variation) and smothering of leaves by settling-out of suspended settlements;

- Loss of macrobenthos through clogging of feeding apparatus by extraneous suspended matter; and

- Loss of habitat and food sources for fisheries' species.

B. 5 Uncertainty associated with estimates of impacts on seagrass

The level of uncertainty surrounding the impacts on impacts on seagrass of the dredging is illustrated by the following.

Fisheries Queensland (GHD 2009d, 18.c.6), has concerns that the indirect impact from the actual dredge plume may be more extensive than that modelled in the EIS. Fisheries Queensland's recent experiences with major dredging at Dalrymple Bay/Hay Point were that the actual plumes were far more extensive than modelled.

The supplementary EIS, GHD (2010: 7-56) acknowledges uncertainty with respect to turbidity impacts. And in direct response to the Queensland Department of Environment and Resource Management's (GHD, 2009d, 2) query on the ability to predict impacts on seagrass of dredge plumes, GHD responded in the Supplementary EIS as follows:

"It is acknowledged that additional data in regards to resilience of benthic ecological communities, including all primary producer habitats, is needed to better understand local affects of dredging impacts" (GHD 2010, p. 10-90).

And,
"As noted under response to Submission #2 [GHD, 2009d, 2] comment regarding the area of seagrass habitat that may potentially be indirectly affected is difficult to quantify with the available data" (GHD, 2010, p. 10-92).

The Coordinator General (2010a, p. 93) qualified his estimates of area of impacts by stating "… the likely impacts on seagrass areas cannot be accurately predicted until the detailed design of dredging programs is completed".

In relation to Eastern Banks disposal of dredge spoil, Aurecon (2011, p, 10),[4] states that there are sparse deepwater seagrass meadows within and adjacent to the Eastern Banks dredge spoil disposal area, and that disposal of the dredge material is expected to smother surrounding seagrass communities. Figure 4, of the Eastern Banks disposal area overlayed on a map of sea grass beds, illustrates the proximity of the disposal area to deepwater seagrass beds. However, there appears to be no assessment of the extent and impact of the plume expected to be associated with dumping of up to $11m^3$ of dredge spoil on the Eastern Banks disposal area.

The relationship between the extent and effect of turbidly plumes and their forecast impacts in EISs and the extent and effect actual plumes generated is governed by the quality of the data used in the simulations of dredging plumes. Given the admissions above that the quality of data is deficient and that more detailing in design is needed, the forecasted impacts in EISs and Coordinator General's report must be treated with a great deal of circumspection.

[4] The Supplementary EIS was approved by the Coordinator-General on 23 July 2010 under the premise that the conditions contained within the Coordinator-General's Report are addressed. The Western Basin Project was also determined to be a controlled action (EPBC 2009/4904) under the *Environment Protection and Biodiversity Conservation Act 1999* and was approved on 22 October 2010. The controlled action approval limits dredging to a total volume of no more than 25 million m^3, and also approved offshore disposal of dredge material at the East Banks Sea Disposal Site to a total volume of 11 million m^3. The Aurecon (2011) *Flora and Fauna Management Plan* covers the dredging and sea disposal of up to 5.6 million m^3 of dredge material associated with the Western Basin Project in the Port of Gladstone.

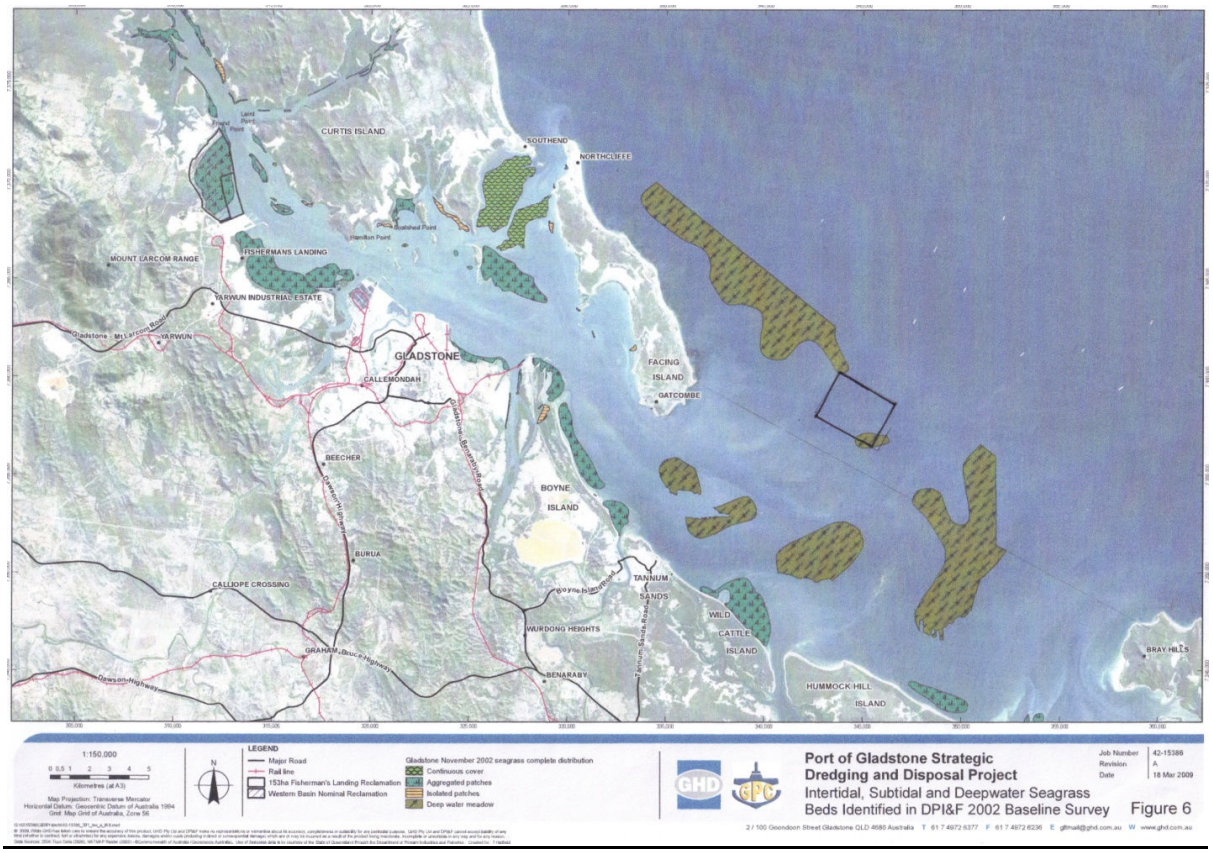


Figure 4: Eastern Banks dredge spoil disposal site and sea grass beds

Sources: GHD (2009b, Figure 6); GHD (2010, Figure 18-1).

B. 6 Cumulative impacts over time on habitat

The Coordinator General has accepted that the permanent loss of fishing grounds and fish habitat and food sources for fisheries species totals 693 ha and that the total area of fish habitat and food sources for fisheries' species will total an additional 1,350 hectares. The cumulative area affected is thus some 2,050 hectares, for a period of 7 years to 2018.

The baseline survey of Rasheed at al. (2003) mapped 13,578 ha of seagrass habitat within Port Curtis and Rodds Bay. Therefore the productivity of 15% of this total seagrass area that supports fishing will be affected and this can be expected to be reflected in the fish catches and value of production of fisheries in the harbour.

B. 7 Cumulative impacts on commercial fish catches in the harbour

There appears to be a strong correlation between the area of seagrass meadows and weight of commercial catch in the vicinity of the project area (see Figures 5a and 5b). Table 2 shows that some 2,050 ha of seagrass is expected to be affected by the project. As a consequence commercial catches are expected to suffer over a fairly large area near the dredging projects. However, there is uncertainty surrounding the reliability of *ex ante* modelling of the cumulative extent and impacts of sediment plumes and there is consequential uncertainty about the cumulative impacts on fish catches. Any impacts are likely to be felt for several years, allowing for the fact that major dredging projects will continue until 2015 and recovery of seagrass takes three years or more.

B. 8 Impacts of suspended solids and other pollutants on commercial fishing operations

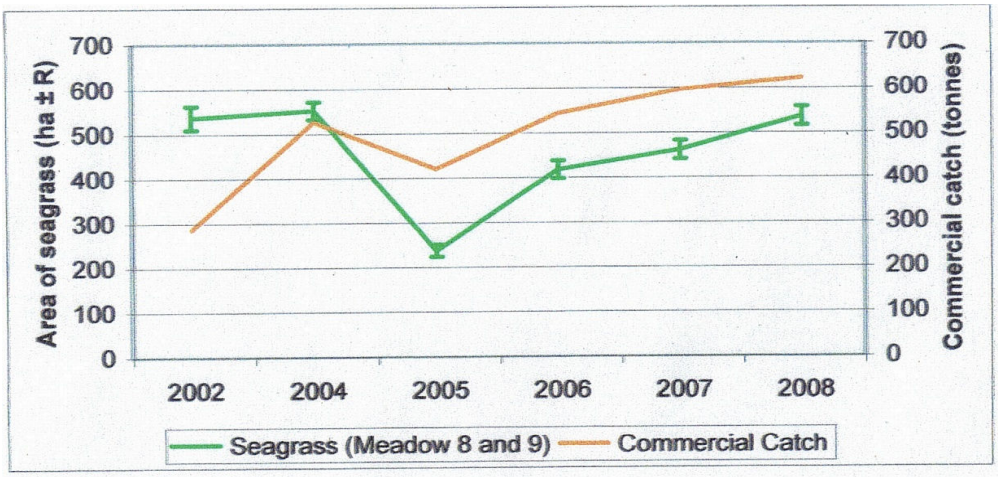
Suspended solids that cause turbidity will not only impact harbour fishing. Also affected will be the live fish vessels that mainly fish for coral trout offshore and bring their live catch into Gladstone marina for offloading for export. To arrive at the wharf in good condition the tanked live fish require a continuous supply of unadulterated sea water. Figure 2 shows that turbidity plumes could affect the area immediately adjacent to the harbour and through which live fish boats will need to travel.

Also a threat to live fish operations are the plumes generated at the harbour entrance, and dispersed by tides, by disposal of up to 11 million tonnes of spoil on the Eastern Banks.

Expected impacts of the Western Basin project include not only decreased water quality from dredging, but also from construction, spills of fuel or other hydrocarbons or other pollutants (animal wastes, paints, solvents and cleaners, etc.) (GHD 2009b, Chapter 9, p. 9-105).

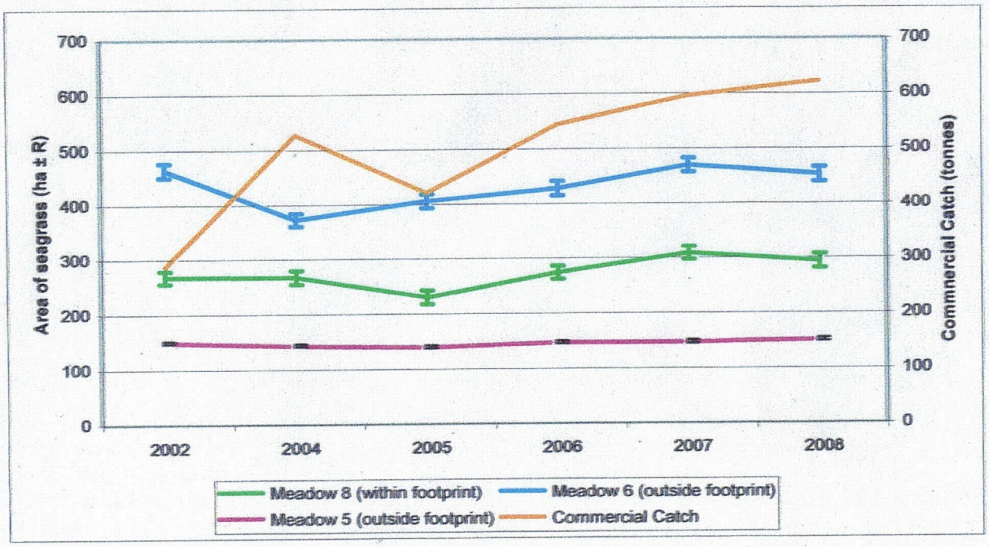
Given the expected cumulative effects on water quality of suspended solids plus other pollutants and their duration, and given the high value of live fish and the high costs associated with live fish export, the future viability of Gladstone-based live fish enterprises is problematic.

The impacts of poor water quality could also extend to prawn trawlers. The handling areas on vessels for prawns are washed down in the harbour after unloading. Any



5a

Figure 11-1 Temporal trends in seagrass area (Meadow 8 and 9) and commercial catch



5b

Figure 11-2 Temporal trends in *Zostera capricorni* meadows and commercial catch in the vicinity of the Project Area

Figures 5a and 5b: Trends in area of seagrass meadows and commercial fish catch in the vicinity of the project area

Source: (GHD 2010, Figures 11-2 and 11-3, p. 117).

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contaminants on the wash-down water could be transferred to the subsequent prawn catch. Detection of heavy metals or hydrocarbon contaminants in prawns would seriously undermine the viability of Gladstone Port as a trawler base. This risk is additional to other indirect impediments to the operations of trawlers: see Section A.3.2.

An example of the cumulative impacts that can be expected as more and more projects are proposed and developed is the Australia Pacific LNG project, not considered under the Western Basin EIS and subject to a separate EIS. The project is recognised by Australia Pacific LNG to "…potentially impact on commercial fisheries during the construction of wharf and jetty structures associated with the LNG facility, and during the operational phase, with the movement of ships which could impact on industry output" (Australia Pacific LNG 2010, p. 41). While such projects may not have severe impacts in themselves their cumulative impacts can be substantial, and there are many more projects proposed whose impacts on commercial fishing will accumulate.

B. 9 Impacts on Commercial Fishing as a result of restricted access

Dredging activity at several sites simultaneously will limit commercial fishing activity in the harbour. The dredging activity and the barges hauling spoil will need to be avoided. The location of dredge zones is in Figure 3 and the start and completion dates of dredging stages are in Table 2.

The LNG development on Curtis Island will add heavy traffic from the Gladstone marina to the Curtis Island. The estimated number of ferry trip per day, mainly transporting workers and materials to Curtis Island LNG projects from the Gladstone Marina will be 10 to 12 per day; a similar number of barge trips transporting materials transporting materials and components will be necessary for the duration of the projects (Coordinator General 2010a, p. 88). [5]

Particularly affected with be net fishing and crabbing immediately north of the reclamation area by Fisherman's Landing and Laird Point dredging and net fishing adjacent to Curtis Island. After the completion of dredging projects, access to the harbour will be less than it is now due to increased maintenance dredging associated with new and deeper channels and swing basins.

[5] To this traffic must be added an unspecified increase associated with Australia Pacific LNG subject to a separate EIS and approval process (Coordinator General 2010b).

As many projects are completed in the next several years, access will be affected by the greatly increased level of traffic using the new and deeper channels and swing basins. As well as three LNG projects, expected to require 240 vessels per year from 2015, there are two other LNG projects in the pipeline as well as at least 9 other major industrial developments, currently under construction or planned, that will be shipping materials from Gladstone Port facilities (GPC 2011).

Compounding the problem of access to fishing grounds by fishers in the harbour are the maritime exclusion zones proposed for the Fisherman's Landing and its extension in the reclamation area and proposed for the loading zones on Curtis Island and the Wiggins Coal Terminal. There is a greater need for security zones round LNG vessels (half a mile in transit) in addition to the 500m exclusion zones around wharves and vessels at berth.

Figure 6 shows the extent of planned development in the Western Basin. However, it should be noted that developments have already exceeded the expectations of strategic planning. The current Western Basin will greatly increase the capacity of the harbour to 150-200 million tonnes of shipping. The scale of future development is illustrated by the Gladstone Port Corporation's forecast of a future capacity of over 300 million tonnes (GPC 2008, pp. 2, 3).

The limitations on access for commercial fishers will be in addition to the loss of fish habitat and fishing grounds caused by reclamation together with the loss of sea grass beds and other habitat in the harbour due to turbidity (see Sections B.2 to B.8).

Dredging and subsequently the greatly increased traffic using the new and deepened channels will have a severe impact on harbour trawling. Trawlers fish in the area east of Curtis Island. Banana prawn grounds will be affected by dredging in Zones 1 and 2. Access by trawlers will be affected by the increase in traffic the Auckland Channel, and the Gatscombe Channel in Port Curtis and in the Golding, Boyne and Wild cattle cuttings further south east in the harbour. The most productive shots are at the top and bottom of the tides when large ships are most likely to be using the channels.

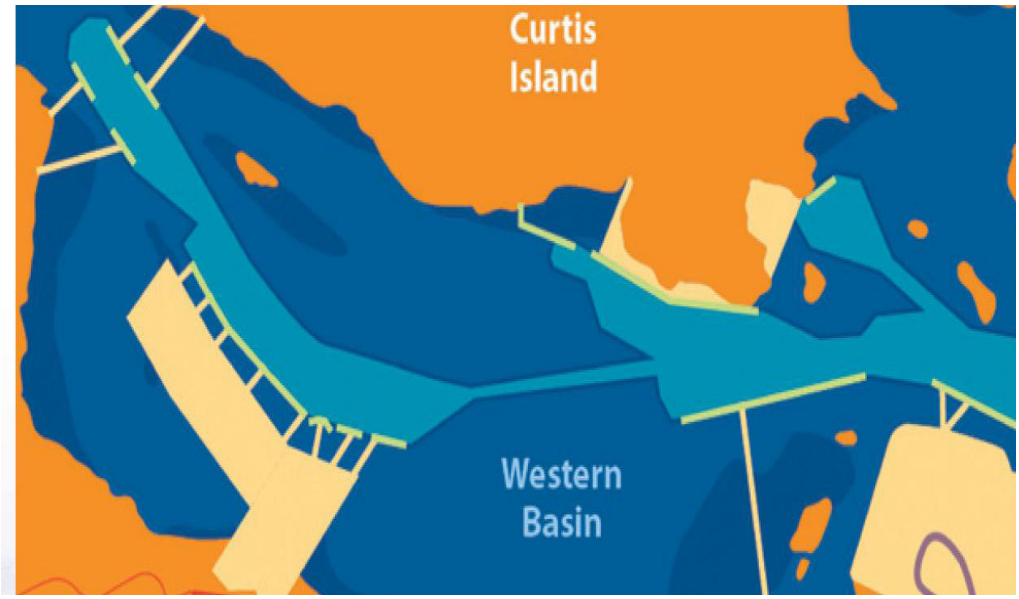

Figure 6: Proposed development of the Western Basin as shown in Gladstone Ports Corporation 50 Year Strategic Plan

Source: Gladstone Ports Corporation (2011, p. 3).

Trawling will also be affected by activity associated with spoil dumping on the East Banks disposal site (see Figure 4). Tiger and Endeavour prawns are mainly targeted outside the Port Limit, but in the area that will be traversed by increased ship traffic entering and leaving the eastern end of the Wild Cattle Cutting.

Given the impact on fishing grounds of dredging together with the constraints on access to fishing grounds of increased dredging over a number of years and of a permanent increase in shipping traffic in fishing grounds, it is unlikely that the harbour prawning will continue to be a viable enterprise.

Access by commercial fishermen to fishing grounds will be affected to a significant extent, summarised as follows.

- Restricted access to harbour fishing grounds by prawn, crab and net fishers due to greatly increased levels of boat traffic associated with Curtis Island LNG developments and other proposed port developments.

- Restricted access to the Narrows and associated inlets due to its constriction by the dredging activities associated with dredge zones 3 to 14 (see Figure 3 for dredge zones).

- Restricted access to harbour fishing grounds by prawn, crab and net fishers due to greatly increased levels of boat traffic using the new and deeper channels and swing basins.

- The greater need for security zones round LNG vessels (half a mile in transit) in addition to the 500m exclusion zone around wharves and vessels at berth.

There will also be an increase in costs, relative to other ports, due to delays in accessing Gladstone Port facilities.

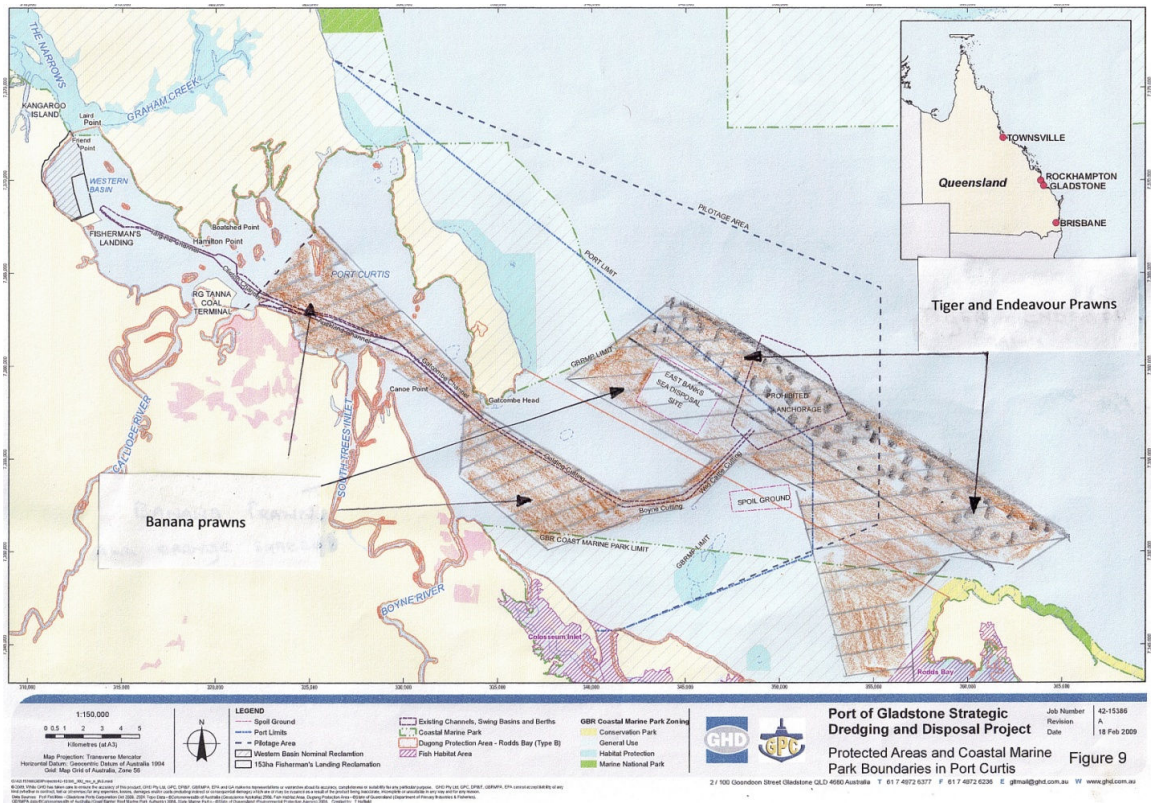

Figure 7. Prawn trawling areas in Gladstone harbour

Source: Personal communications harbour trawler fishers.

B.10 Impacts on wholesalers, processors and exporters

B.10.1 Impacts on demand for product

There is a risk of contamination of product by heavy metals as result of release of sediment by trailer suction hopper dredge operations. This is a residual risk, that is a risk even with additional control strategies because there is no ability to control the impact of metals concentrations (emphasis the author's) (GHD 2009e, p. 126).

Detection of heavy metals in seafood sourced from Gladstone would immediately reduce the local and export demand for Gladstone seafood with serious consequences for the viability of Gladstone wholesalers.

B.10.2 Impacts on supply of product

There are strong economic linkages between fishing enterprises and land-based businesses. These linkages should be taken account of in developing compensation policy (Hunt 2008). The local fishing sector is forward linked to Gladstone wholesalers, processors and exporters of fish (hereafter referred to as "wholesalers") and backward linked to local suppliers of capital goods, chandlery, fuel and service industries, depicted in Figure 8.

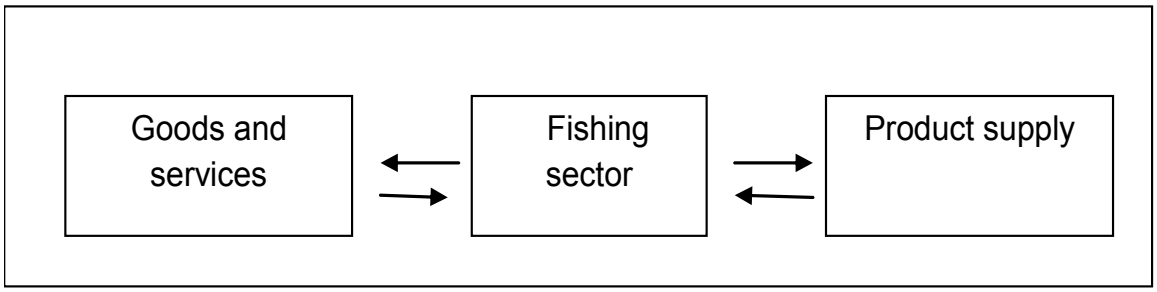

Figure 8. Forward and backward economic linkages to the fishing sector

The major wholesalers in Gladstone specialise in handling local product. A likely reduction in the supply of product as a result of Gladstone Port development will either reduce directly the volume of exports to Brisbane or overseas or, in the case of local demand, require the purchase of substitute product from adjacent regions.

Reduced exports will directly reduce Gladstone wholesalers' turnover and profits.

Substitution of local product by product from other regions will put Gladstone wholesalers in competition with wholesalers in other regions, and incur additional transport costs. These extra costs would need to be passed on to Gladstone region retailers and consumers, further widening the gap between the price of local fish and cheap imports and resulting in reduced sales volumes of local fish and, as a consequence, lower returns for wholesalers.

A less active fishing sector will reduce the demand for local goods and services. Suppliers of these services are unlikely to be as affected by Port development, however, because they have alternative markets such as the recreational fishing sector and harbour transport and dredging companies.

B.11 The adequacy of proposed offsets

B.11.1 The Port Alma offset

The offset proposed in the form of protection of 5,000 ha of coastal land currently within the GPC's strategic port land at Port Alma (Coordinator General 2010a, p. 96). The proposed offset will have no positive impact on commercial fishing in the Port Gladstone area because it provides no additional habitat to offset habitat lost. Furthermore, the value of the proposal is limited by the following factors:

- Seventy percent of the proposed area lies within the Habitat Protection Zone of the Great Barrier Reef Marine Park (GBRMP) and therefore is already protected.

- The remaining Port Alma coastal area, not already protected in the GBRMP, would not be developed for 20+ years.

- The proposed offset includes no wetland and is therefore not comparable to the habitat lost in the Western Basin.

- The offset's utility is diminished by the fact that it is remote from the habitat removed by development projects in the Narrows (Coordinator General 2010a, pp. 93, 94).

B.11.2 The enhancement of fish habitat offset

The Coordinator General (2010a, p. 94) determined that an appropriate fish habitat offset would also include a contribution of $5 million to support Fisheries Queensland initiatives for future research and studies and/or appropriate works for fish habitat rehabilitation and enhancement.

To be staged over a 5-year period, the funding would be directed to a range of projects aimed at enhancing marine fish habitat resources in the region. Some of the work would involve scientific research and investigation; however a large proportion would fund rehabilitation and enhancement projects in the Port Curtis region.

It is impossible to forecast the success of such a program. Moreover, the benefits are not expected to be felt for several years – that is after the most severe impacts of the Western Basin development have been felt by the commercial fishing sector and dependent land-based businesses.

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