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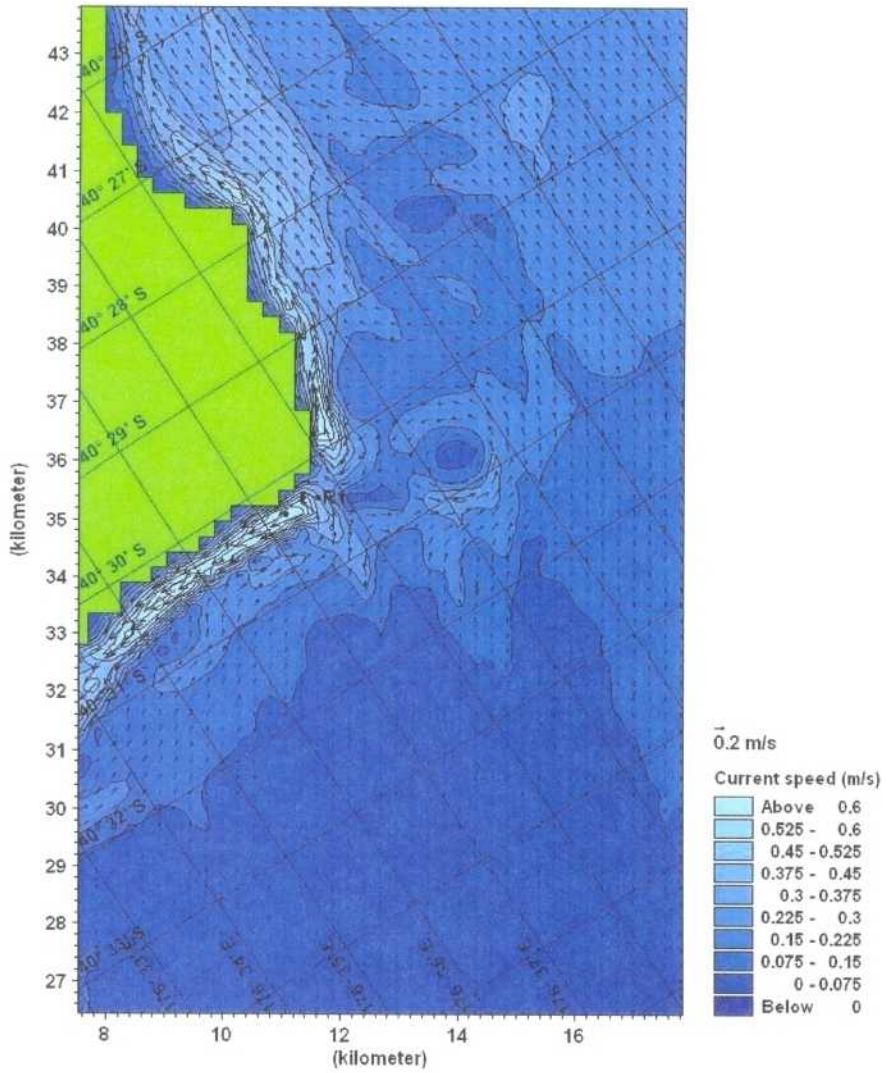


Figure 12c: Predicted residual currents in the vicinity of Cape Turnagain under conditions of an average Wairarapa Coastal Current, average wave conditions and tides.

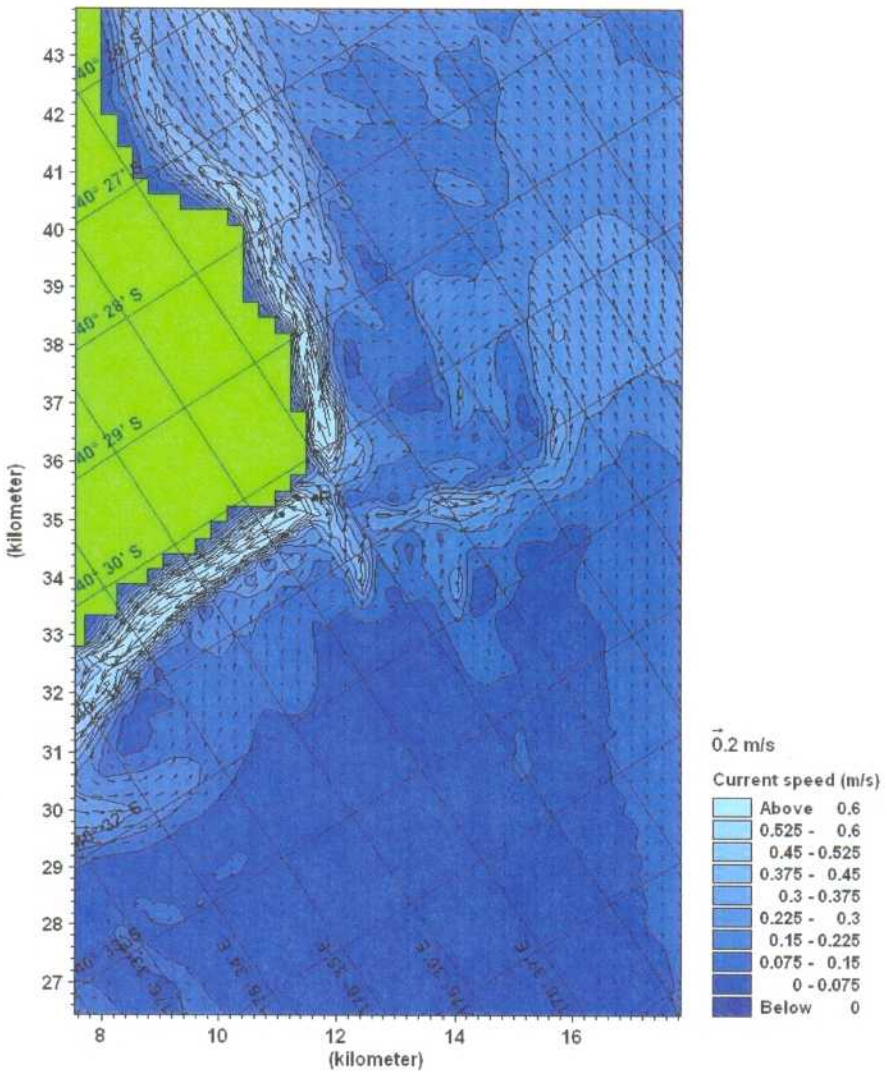


Figure 12d: Predicted residual currents in the vicinity of Cape Turnagain under conditions of a strong Wairarapa Coastal Current, southerly storm wave conditions and tides.

**0.5 day simulation for kelp species**

Under tidal forcing alone (Figure Al. la) kelp are predicted to be dispersed no more than 1620 m offshore and, due to the small northward residual currents near the release point (Figure 12a), kelp are dispersed up the coast by no more than 1890 m. With the influence the WCC and waves up coast dispersal is limited to 540 m because of the net residual to the south-west from Cape Turnagain. Under weak WCC and easterly storm wave conditions (Figure Al. 1b) dispersal to the south is up to 1890 m.

At this distance from the release site it is predicted that kelp will be dispersed up to 2160 m offshore. Stronger net residuals very close to the coast under average WCC and wave conditions (Figure Al. lc) result in kelp being dispersed up to 4860 m down coast but limited to less than 1080 m offshore. Under the influence of a strong WCC and southerly storm wave conditions (Figure Al. ld) kelp are dispersed slightly further down the coast (5400 m) where small numbers of kelp are dispersed up to 3510 m offshore.

**4-day and 10-day simulations for bubu, limpet, and paua species**

Under tidal forcing alone (Figure A1.2a) the effect of the residual currents at the headland (Figure 12a) results in these species being dispersed offshore from the headland by up to 4590 m. Dispersal up coast is greater than the predicted down coast dispersal and settling (3780 m and 1890 m respectively). With the influence of a weak WCC and easterly storm wave conditions (Figure A1.2b) the net residual currents in close to the coast results in dispersal down coast and offshore of 2700 m. Stronger net residuals very close to the coast under average WCC and wave conditions (Figure A1.2c) result in these species being dispersed 5400 m down coast with a band of higher concentration (1.0% per cell) in the nearshore zone. A small percentage of the larvae are transported far enough offshore (up to 2970 m) to be transported around the headland and consequently up to the coast by 6210 m. Under the influence of a strong WCC and southerly storm wave conditions (Figure A1.2d) these species are dispersed up to 27270 m up coast and 11880 m down coast. Dispersal offshore is also enhanced (6210 m) but at very low concentrations. As for the average WCC and average wave conditions the majority of the larval are contained within a tight band along the inshore zone.

Very similar dispersal patterns are predicted for the 4 and 10-day simulations. Under tides alone (Figure Al.3a) slightly more transport to the north and south occurs after 10-days compared to 4-days (4320 m up coast and 4050 m down coast) resulting in higher numbers of larvae (as a percentage of the total settled) settling away from the source after 6 more days of dispersion. After 10-days of weak WCC and easterly storm wave conditions (Figure A1.3b) slightly more larvae settle just south of the release points compared to the 4-day simulation (offset by a reduction in the numbers of larvae settling at the source). After 10-days of average and strong WCC and wave conditions (Figures A1.3c-d) slightly more larvae are transported north compared to the 4-day simulation. For example, the percentage of larvae per cell to the north of Cape Turnagain under strong WCC and southerly storm wave conditions has increased from less than 0.01 to around 0.02 - effectively doubling the predicted number of larvae that may settle here. In addition, there is a small decrease in the

percentage of larvae settled in the near shore which is offset by slightly higher larvae numbers offshore.

**20 and 30-day simulations for kina**

After 20-days of tidally driven conditions (Figure A1.4a) kina are predicted to be dispersed up to 5670 m up the coast, 15660 m down the coast and up to 6210 m offshore. The majority of the settled larvae remain close to the headland with a small percentage of larvae streaming to the south under the influence of the net residual current along the 20m depth contour (Figure 12a). With the inclusion of the weak WCC and easterly storm wave conditions (Figure A1.4b) kina are limited to the area immediately south of the headland (2970 m down coast and 2700 m offshore). Under average conditions (Figure A1.4c) dispersal is predominantly to the south (5400 m down coast). A small number of larvae are dispersed to the north by either hugging the coast (in the zone of net currents in the nearshore zone) or by being dispersed into deeper water off the headland and then gradually working back inshore several kilometres north of the headland. Under strong WCC and southerly storm wave conditions (Figure A1.4d) there is significant dispersal offshore and to the south of the headland (12420 m down coast and 6210 m offshore). To the north of the headland it is predicted that larvae numbers will be of the order of 0.01 percent per cell in a significant part of the coast (29700m northwards and around 5000 m offshore).

For the 30-day simulation the patterns of dispersal are very similar. Under tides alone (Figure A1.5a) the larvae settle further from source (24300 m). This results in slightly less larvae (as a percentage of the total settled) near the source. With the addition of WCC and wave forcing (Figures A1.5b-d) the additional 10-days of dispersal results in a small decrease in the percentage of larvae settled in the near shore offset by slightly higher larvae numbers offshore.

### 2.7.2 Release point 2 (Porangahau River mouth)

Figures 13 a - d show the predicted residual currents for the four conditions modelled in the vicinity of this release point. Under tides only (Figure 13a) this release point sits in an area of symmetrical tidal flows which result in a zone of zero net residual current. Under tides, weak WCC and easterly storm wave conditions and easterly storm wave conditions (Figure 13b) the residual currents run shore normal into the coast. Under tides, average WCC and wave conditions (Figure 13c) a net northerly residual flow is set up south of the release point. Under tides, strong WCC conditions and southerly storm wave conditions (Figure 13d) a similar pattern of residual flow to the average WCC and wave conditions is predicted. Slightly stronger residual flows are predicted and the residual flows become more closely aligned with the shoreline.

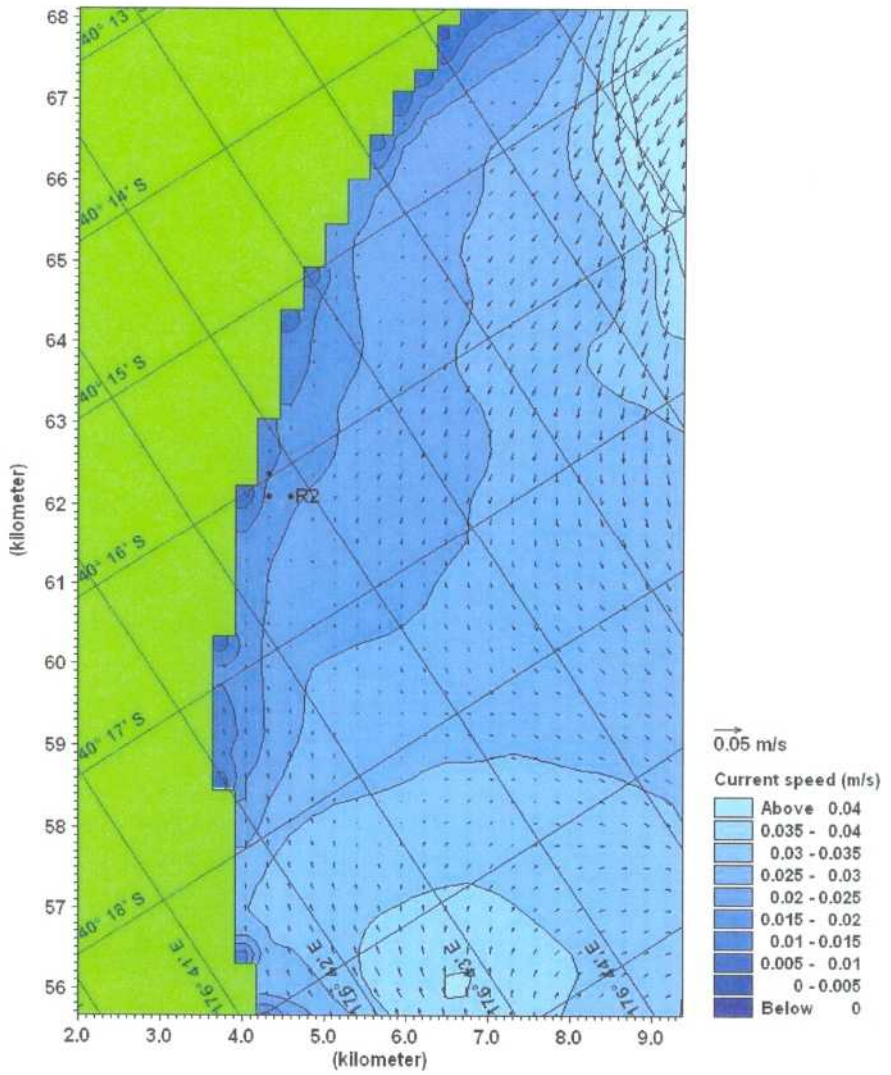


Figure 13a: Predicted residual tidal currents in the vicinity of Porangahau River mouth.

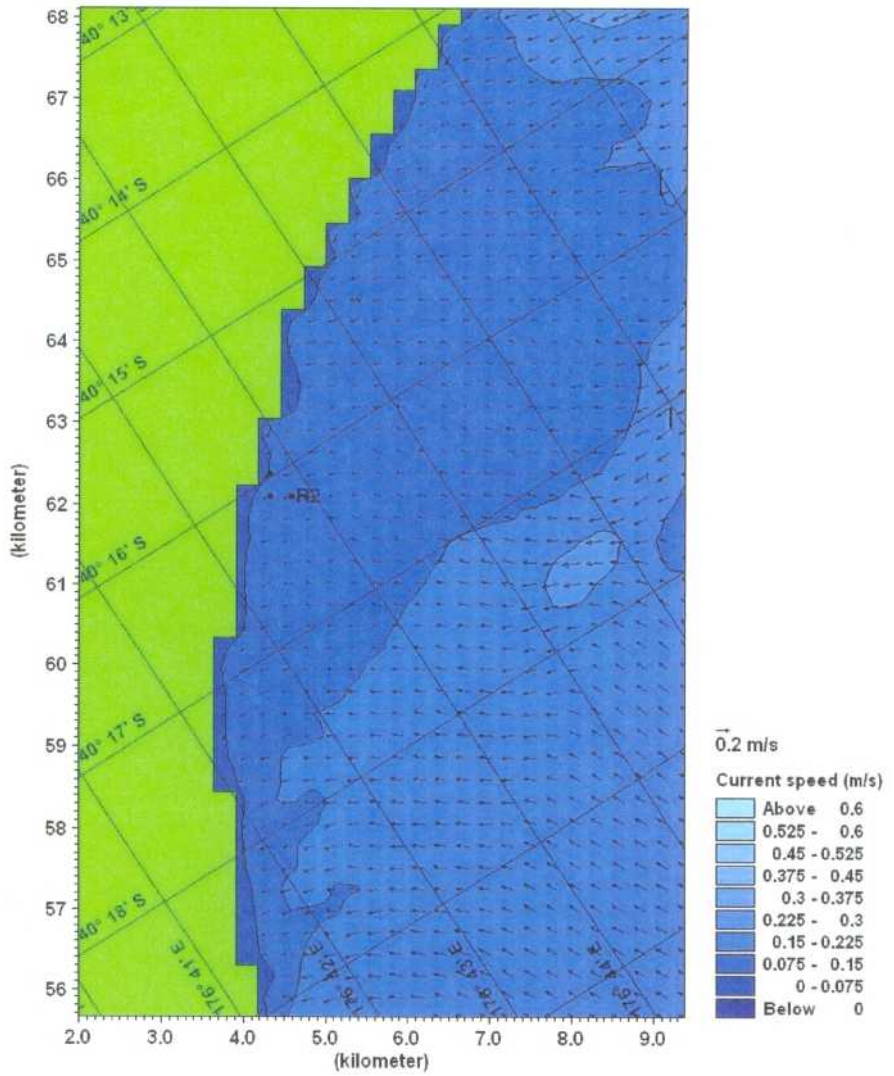


Figure 13b: Predicted residual currents in the vicinity of Porangahau River mouth under conditions of a weak Wairarapa Coastal Current, easterly storm wave conditions and tides.

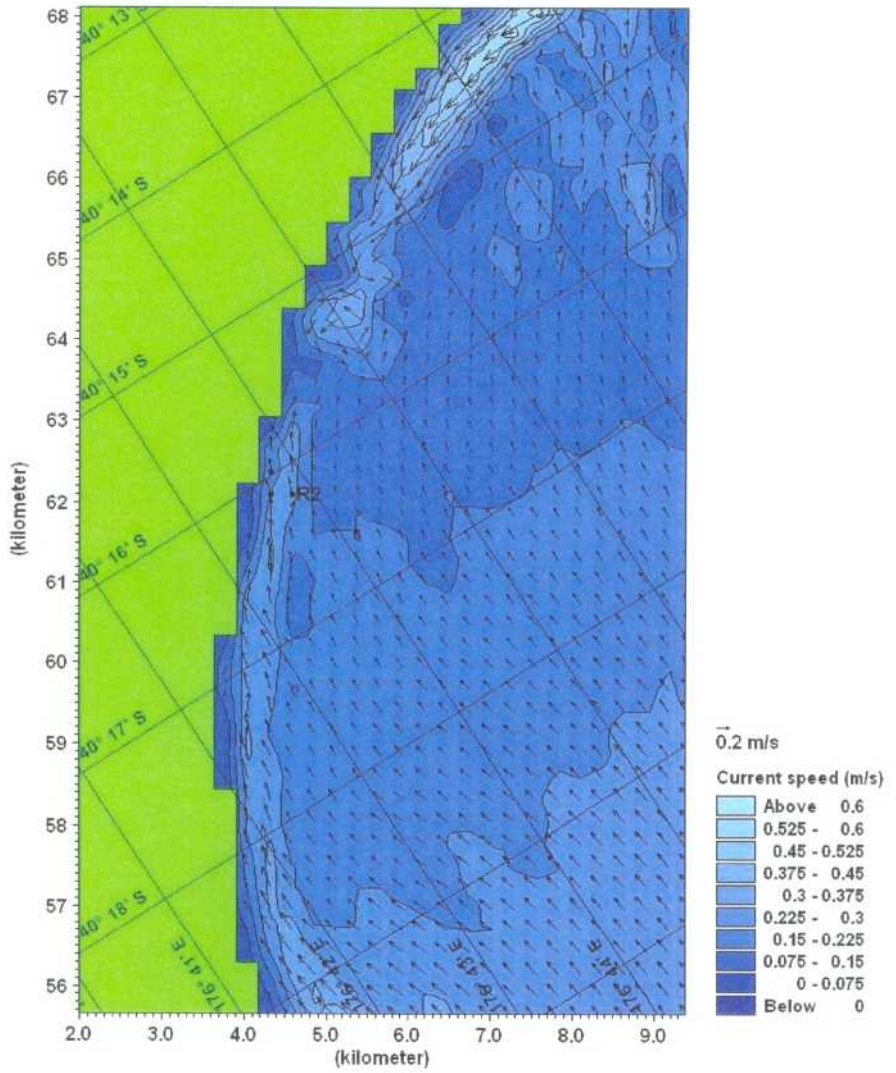


Figure 13c: Predicted residual currents in the vicinity of Porangahau River mouth under conditions of an average Wairarapa Coastal Current, average wave conditions and tides.



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