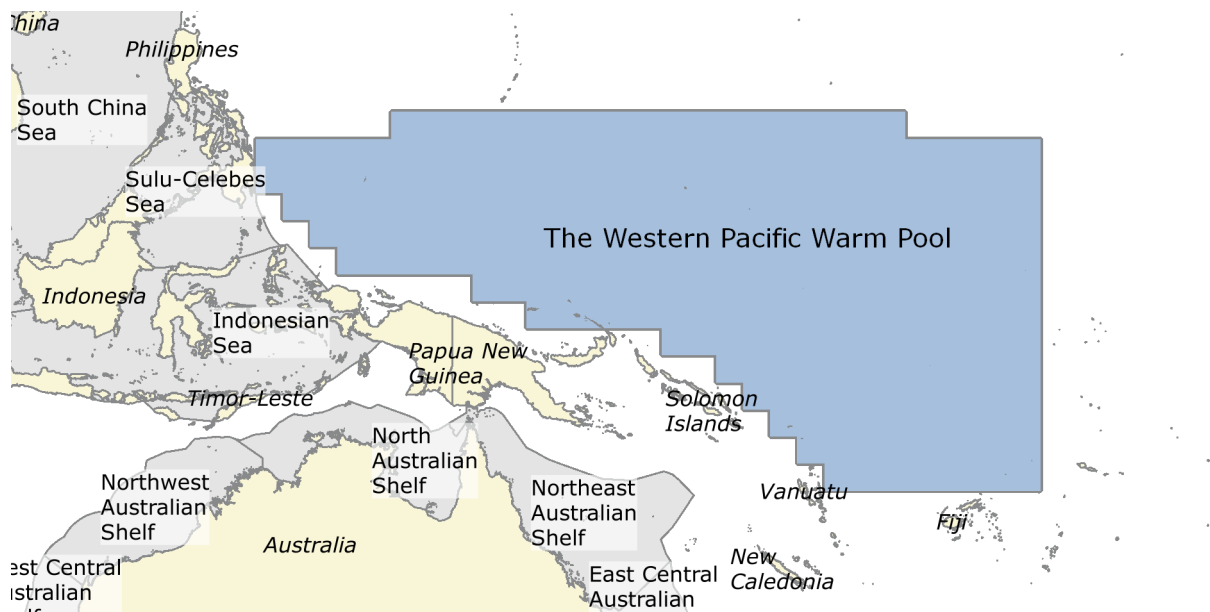


Western Pacific Warm Pool



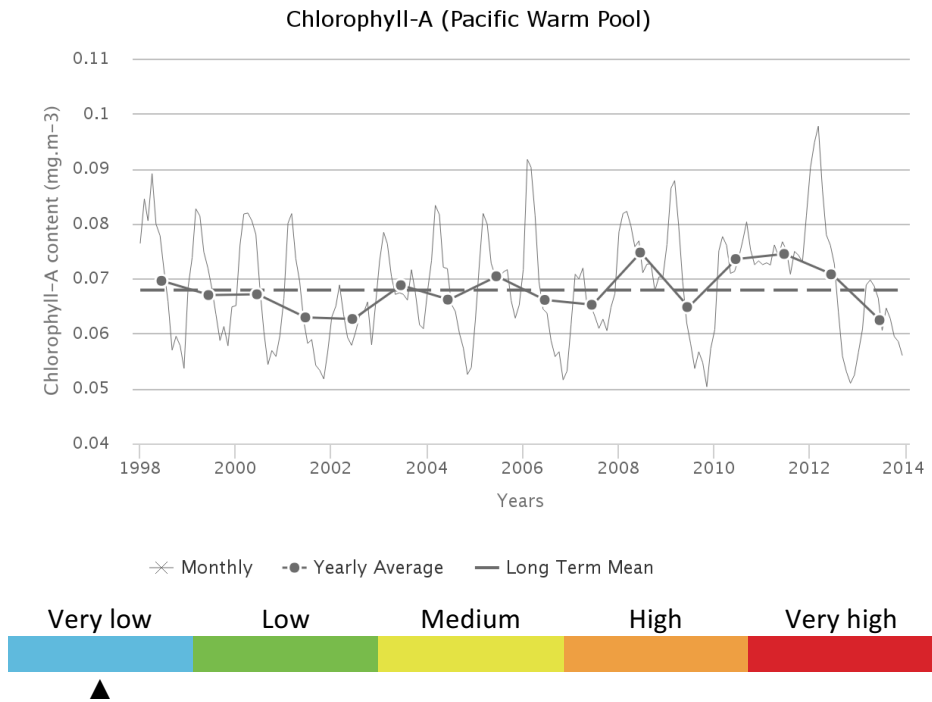
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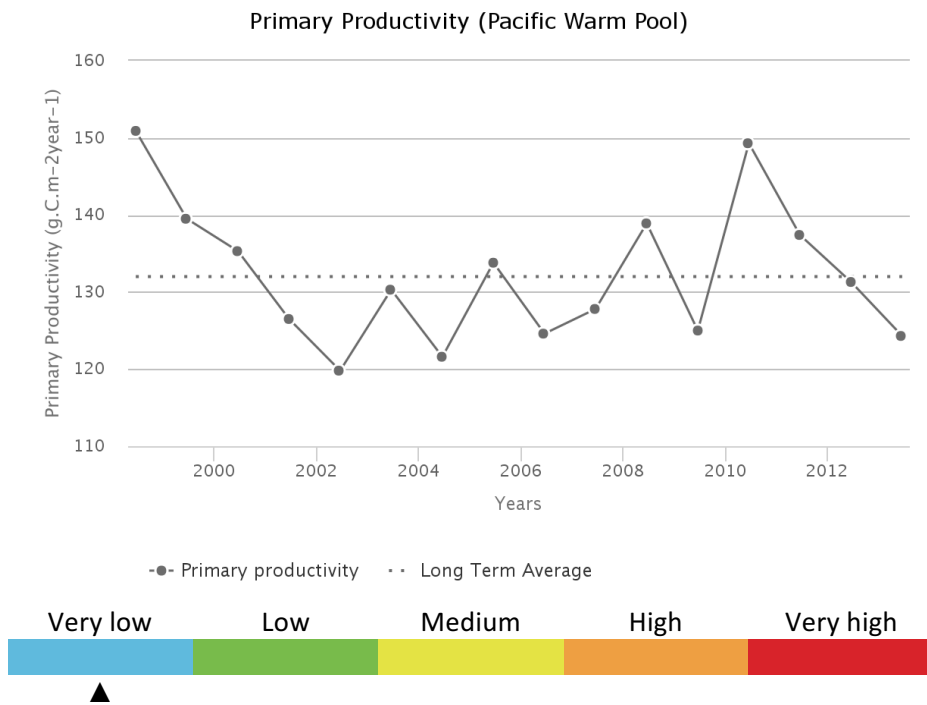
Productivity

Chlorophyll-A

The annual Chlorophyll a concentration (CHL) cycle has a maximum peak (0.0799 mg.m⁻³) in March and a minimum (0.0590 mg.m⁻³) during November. The average CHL is 0.0679 mg.m⁻³. Maximum primary productivity (151 g.C.m⁻².y⁻¹) occurred during 1998 and minimum primary productivity (120 g.C.m⁻².y⁻¹) during 2002. There is a statistically insignificant increasing trend in Chlorophyll of 7.66 % from 2003 through 2013. The average primary productivity is 132 g.C.m⁻².y⁻¹, which places the Western Pacific Warm Pool in Group 1 of 5 categories (with 1 = lowest and 5= highest).

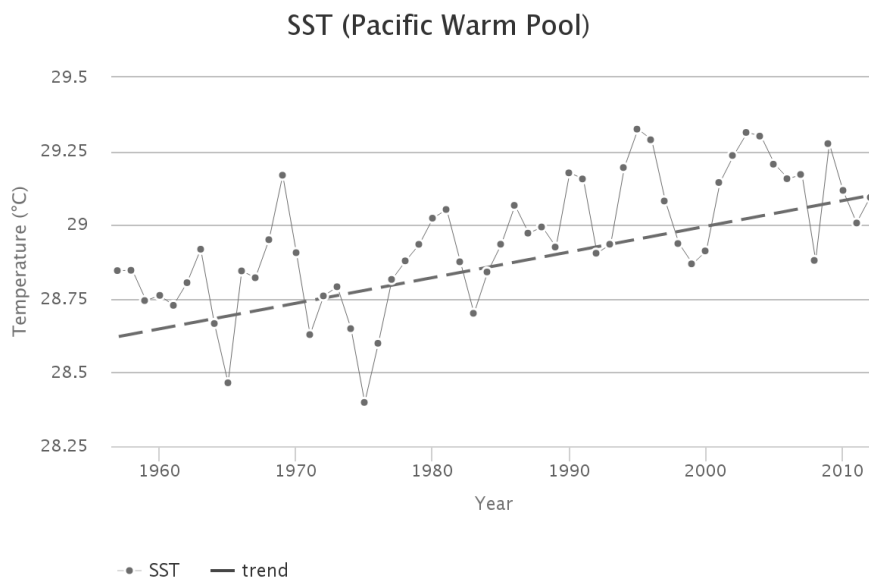


Primary productivity



Sea Surface Temperature

From 1957 to 2012, the West Pacific Warm Pool Province has warmed by 0.48°C, thus belonging to Category 3 (moderate warming region). The thermal history of this vast region consisted of two epochs separated by a regime change with a breakpoint in 1975. A cooling epoch can be identified from 1957 through 1975, during which SST decreased by 0.5°C, after which SST warmed sharply in 1976-1977. This abrupt warming could be tentatively linked to the North Pacific regime shift of 1976-1977 (Hare and Mantua, 2000), although the onset of warming occurred in this province about one year before it occurred elsewhere. Two warm events can be identified, in 1995 and 2003. The El Niño 1997-1998 did not manifest in this province. In many LMEs the El Niño 1997-1998 manifested as a warm peak of extreme magnitude. Thus, this province belongs to a very small subset of Pacific regions, where the El Niño 1997-1998 did not manifest the same way as elsewhere.

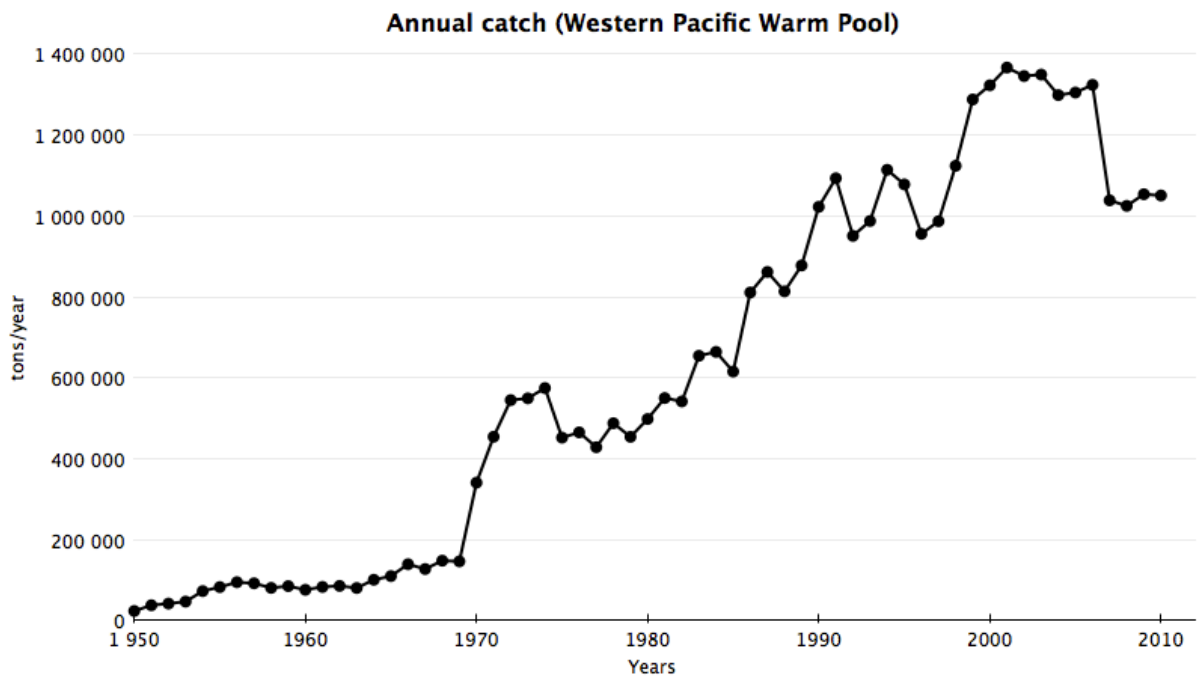


Fish and Fisheries

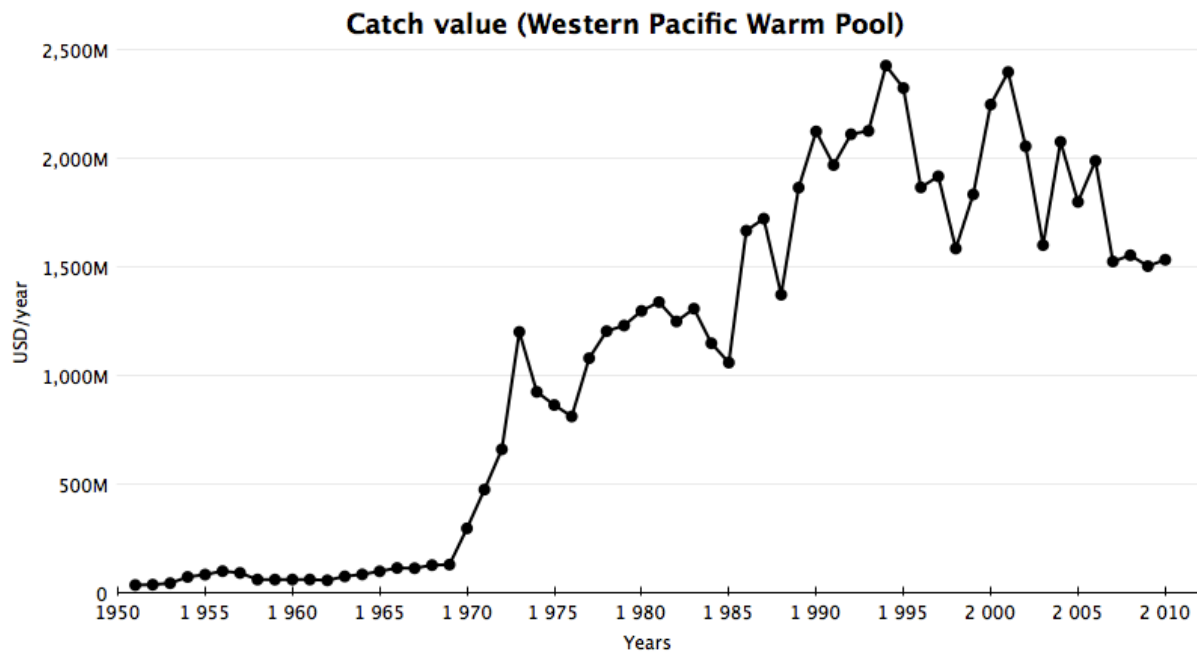
The Western Pacific Warm Pool (WPWP), which is not a designated LME, covers 13 million km² in the Central Western Pacific.

Annual Catch

As the WPWP is in effect, a vast expanse of deep tropical waters studded with small volcanic islands or atolls, the bulk of the fisheries catches consists of tunas and other large pelagic fishes caught in open waters (more than 50%), and smaller reef-associated fishes and invertebrates. In absolute terms, this amounted to an average of 130,000 t per year in the 1950s and 1960s, to between 1.0 – 1.4 million t since 1990. The catch of the WPWP from bottom-impacting gear went from a few hundred tonnes in 1950 to about 40,000 tonnes in 2010, which is currently about 4 % of the total catch, but as much as 20% of the non-tuna catch.

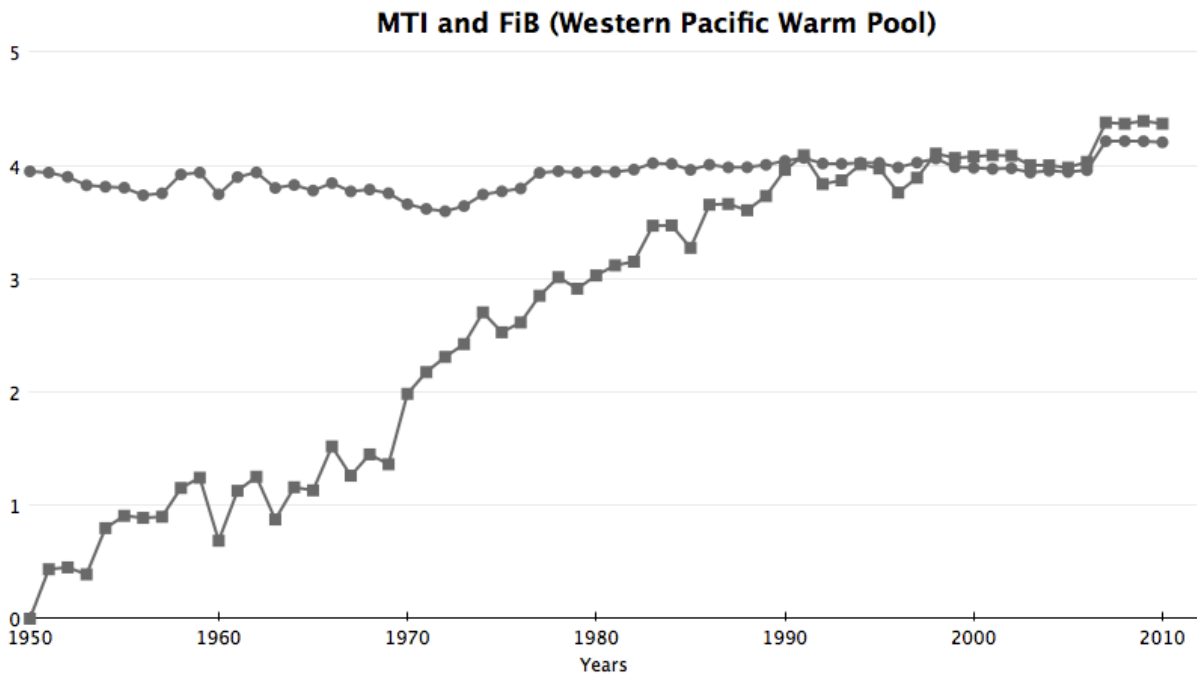


Catch value



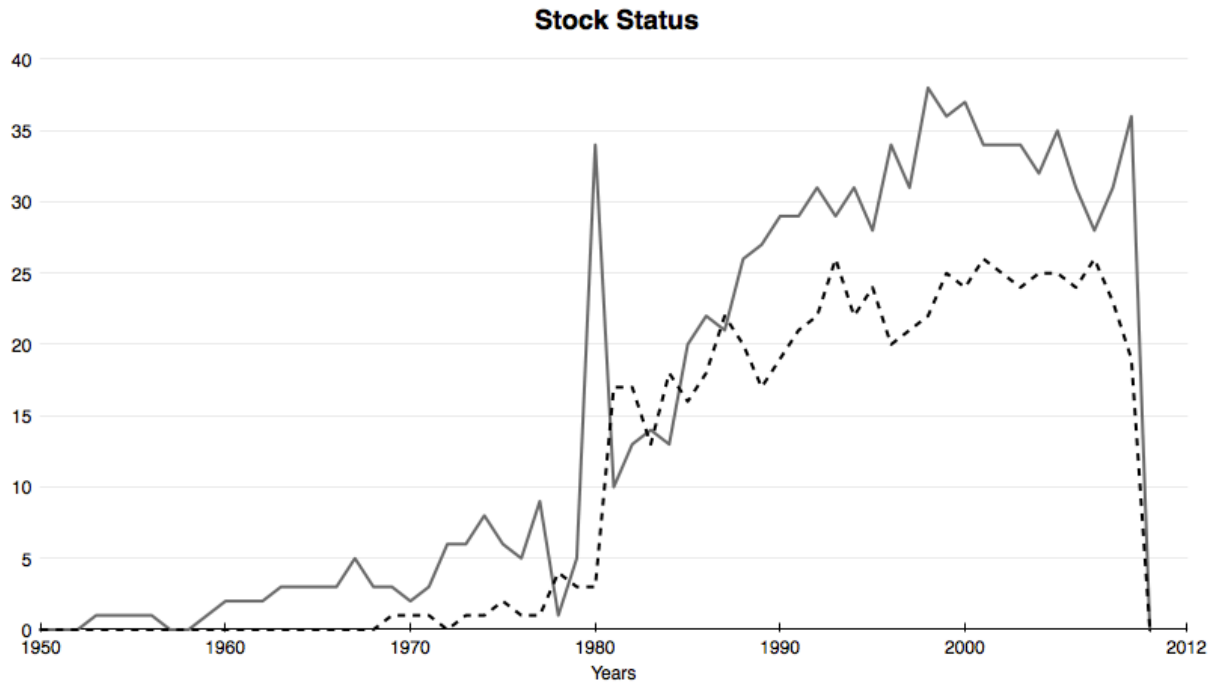
Marine Trophic Index and Fishing-in-Balance index

The primary production required (PPR) to sustain the reported landings in the WPWP grew slowly from less than 1% in the early 1950 to about 2% in 1970, but it increased rapidly to a plateau of about 20% in the mid-1990s, around which it now oscillates. Related to this, the MTI decreased from 1950 to the early 1970s, but picked up and plateaued from 1990 on as tuna and other high-trophic level pelagic fishes increased, the post-2006 increase being an artefact of the time series extension. The trend in the FiB index confirms this, and illustrates how the pelagic fisheries expanded their areas of operations.



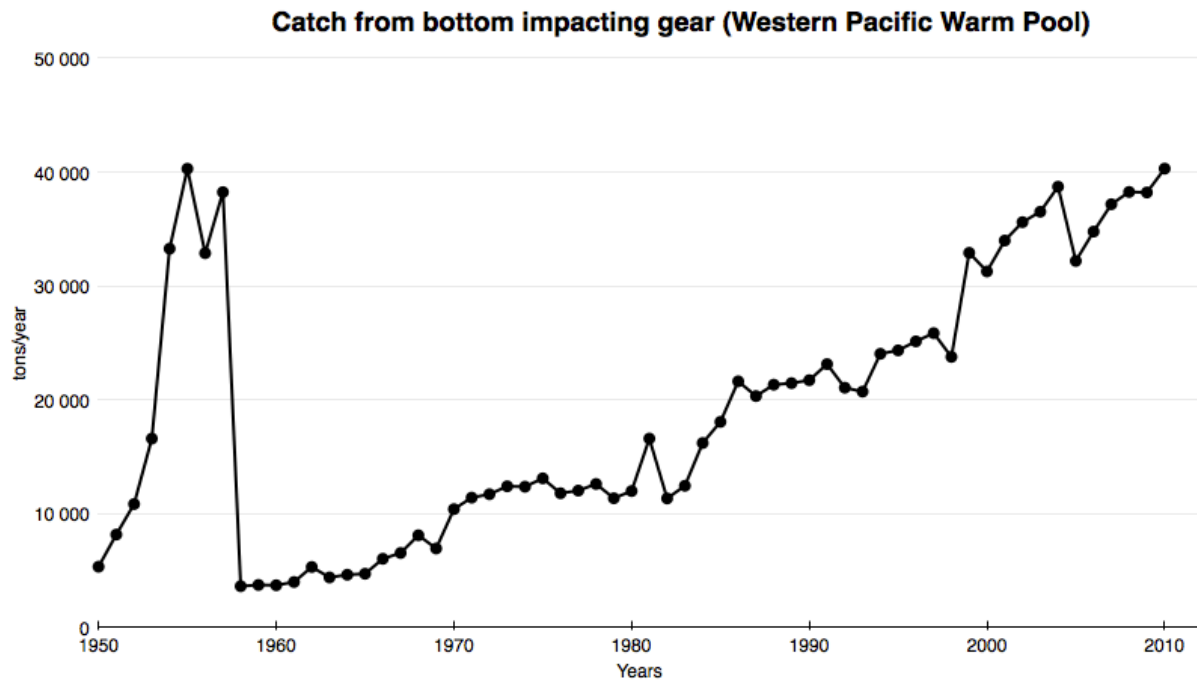
Stock status

The Stock-Catch Status Plots indicate that about 90 % of the catch of commercially exploited stocks in the WPWP are fully exploited, while stocks in the developing stage, estimated to be nearly 100% in the 1970s, has shrunk to 10%.



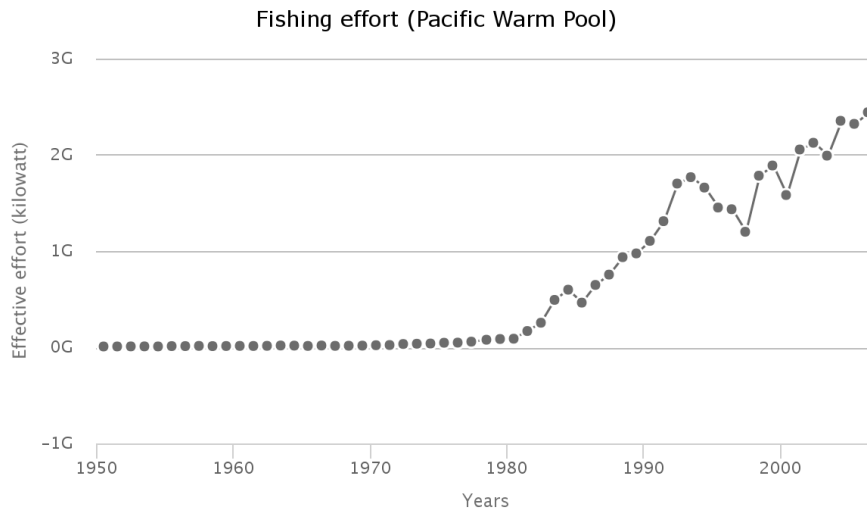
Catch from bottom impacting gear

The percentage of catch from the bottom gear type to the total catch fluctuated between 1 and 6% from 1950 to 2010. This percentage fluctuated around 3% in the recent decade.



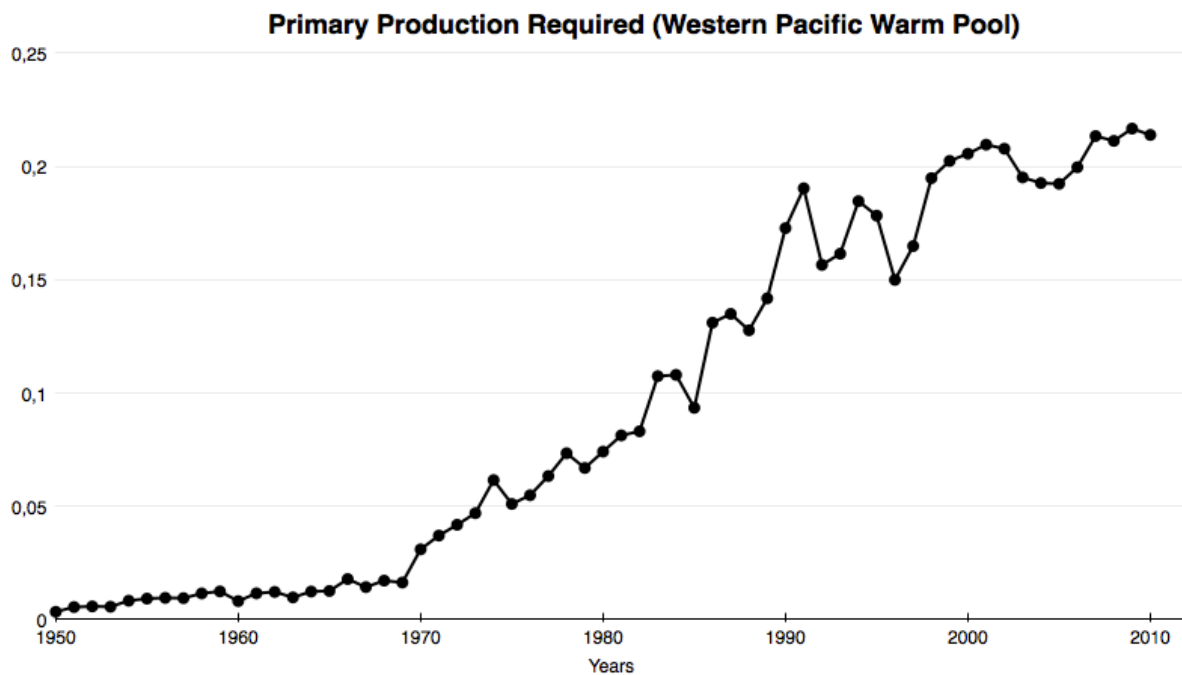
Fishing effort

The total effective effort continuously increased from around 8 million kW in the 1950s to its peak around 2.4 billion kW in 2006.



Primary Production Required

The primary production required (PPR) to sustain the reported landings in the WPWP grew slowly from less than 1% in the early 1950s to about 2% in 1970, but it increased rapidly to a plateau of about 20% in the mid-1990s, around which it now oscillates.



Pollution and Ecosystem Health

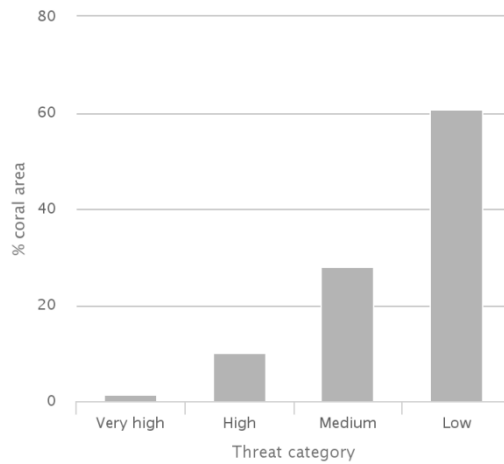
Ecosystem Health

Mangrove and coral cover

0.003% of the Western Pacific Warm Pool is covered by mangroves (US Geological Survey, 2011) and 0.15 by coral reef (Global Distribution of Coral Reefs, 2010).

Reefs at risk

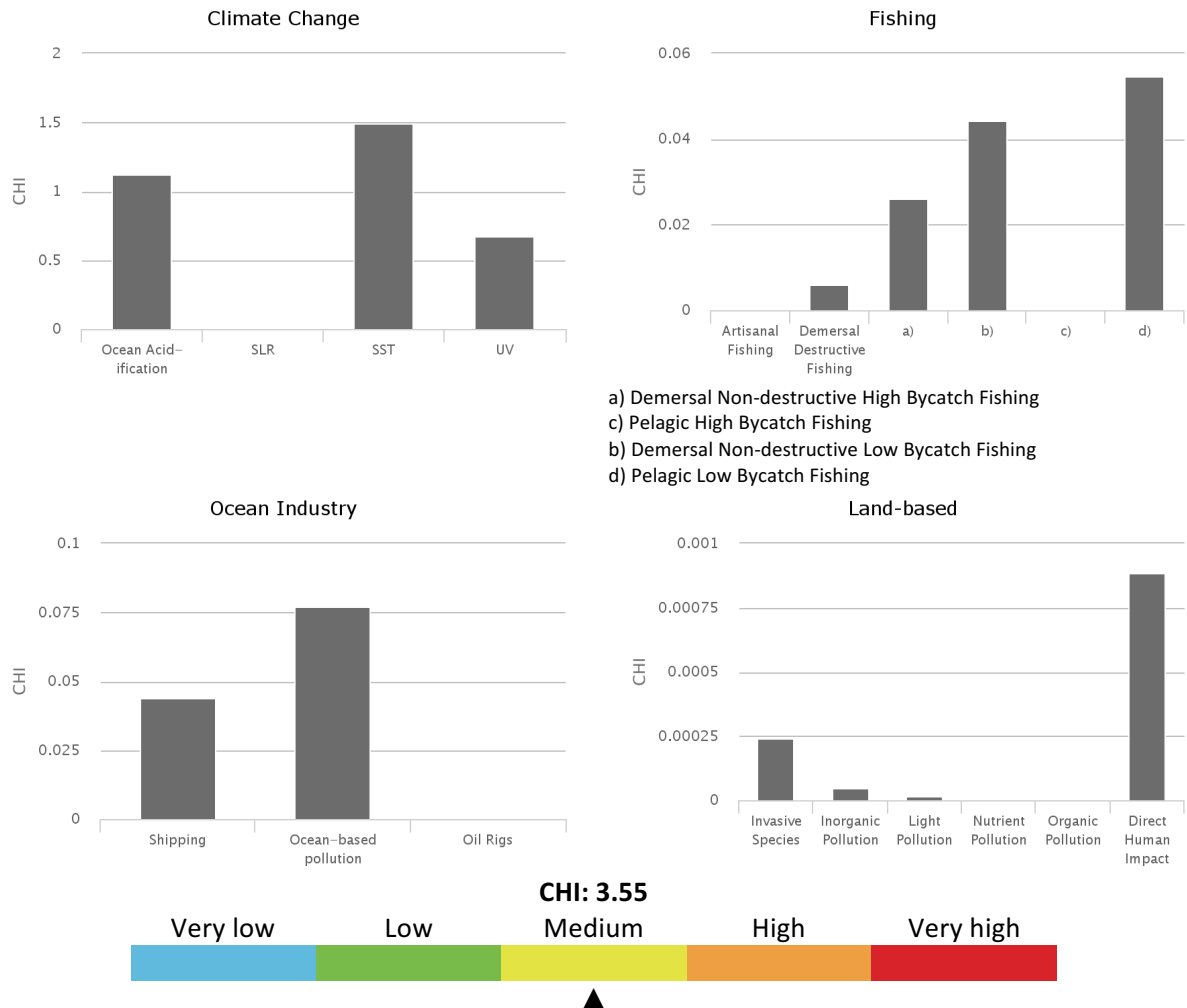
The Western Pacific Warm Pool (WPWP) has a present (2011) integrated threat index (combining threat from overfishing and destructive fishing, watershed-based and marine-based pollution and damage) of 142. 1.44% of coral reefs cover is under very high threat, and 10% under high threat (of the 5 possible threat categories, from low to critical). When combined with past thermal stress (between 1998 and 2007), these values increase to 6.55% and 19.85% for very high and high threat categories, respectively. By year 2030, 11.44% of coral cover in the WPWP is predicted to be under very high to critical level of threat from warming and acidification; this proportion remains unchanged in 2050.



Marine Protected Area change

The Western Pacific Warm Pool experienced an increase in MPA coverage from 3,367 km² prior to 1983 to 114,485 km² by 2014. This represents an increase of 3,300%, within the medium category of MPA change.

Cumulative Human Impact



Socio-economics

Population

Island state	Population (2010)
Fiji	854 098
Samoa	183 081
Solomon Islands	535 699
Tonga	104 260
Vanuatu	245 786

Human Development Index

Island state	Population (2010)
Fiji	0.724
Samoa	0.694
Solomon Islands	0.491
Tonga	0.705
Vanuatu	0.616

Climate-related Threat Indices

Island state	Population (2010)
Fiji	0.5196
Samoa	0.3104
Solomon Islands	0.5597
Tonga	0.2395
Vanuatu	0.2292

Governance

Governance architecture

The three transboundary arrangements for pollution and biodiversity that fall under the Noumea Convention are integrated under SPREP although there is a deficiency of protocols to give effect to the intent of the convention. The Pacific Islands Region has a well-structured mechanism for policy coordination and integration across all issues in the form of the Pacific Islands Forum. It is not clear that integration at the technical level is as well-structured, although there are many linkages and interaction among the relevant processes in this region, several of the supported by MOUs between agencies. The Western Pacific Warm Pool (WPWP) has been assigned an overall integration score of 1.0 due to the presence of the Pacific Islands Forum (PIF) with its ability to function as an overall policy coordinating organization for the key transboundary issues within the WPWP.

The overall scores for ranking of risk were:

