# SURFLINE TEAHUPOO, TAHITI SURF REPORT

## Historical Analysis of Swell Patterns in August & September, 1997–2009

***Prepared for Billabong ~ by Sean Collins, October 2009***

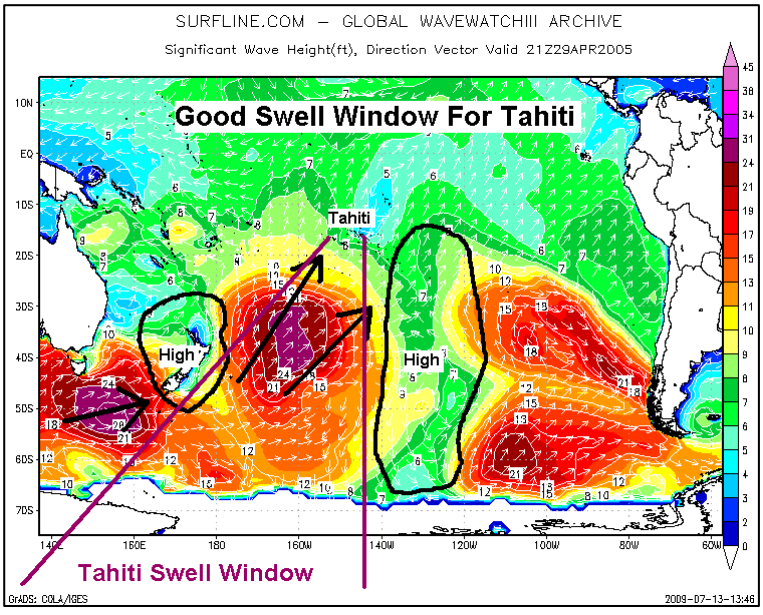
This is a summation of the swell data between 1997-2009 for the months of August and September for Teahupoo, Tahiti. In the last report I submitted to Billabong for April and May 1997-2009, I covered most of the storm track and high pressure variables for good waves to happen at Teahupoo. There are a few different factors at play between the April-May and August-September periods that I do want to point out. **This report will also analyze and compare historic Moon Phases with swell activity for August and September 1997-2009.**

During April and May the Antarctic ice pack is still very receded after the southern hemisphere Summer and Fall, which allows more southerly fetch distance for storms to build up swell off Antarctica. Additionally, late summer tropical moisture sweeping down from the tropics often super charge these storms into extra-tropical storms with much higher wind speeds and larger swells during April and May. This additional tropical moisture helps to bend the storm track from a dominant west to east pattern, to a more southwest to northeasterly pattern, resulting in more swells coming up toward Tahiti, Hawaii, and North and Central America.

Contrarily, in August and September the southern hemisphere Winter is at its full peak so the **Antarctic ice pack is at the maximum extension of at least 600 miles farther north, which cuts off that additional southerly storm fetch to generate swell.** However, the overall storm track has moved farther north, so the bulk and business end of the storms are **much closer to Tahiti often resulting in larger waves**. The subtropical high pressure systems also move farther north in August-September and present less of a blocking pattern off eastern New Zealand compared to the high pressure blocking in April and May. *This blocking high pressure off New Zealand has been the primary culprit in mediocre waves at the last few Billabong Pros at Teahupoo during the month of May.*

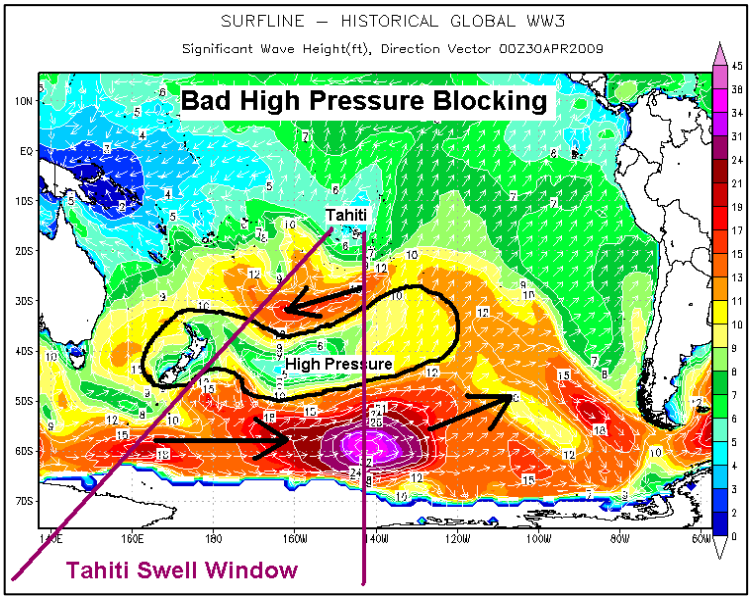
Surfline LOLA / Wavewatch III archived swell data between 1997 and 2009 was used to develop a statistical foundation for our expectations of future swell patterns. **The exact swell model data point was located at 17.95 South and 149.5 West, approximately 10 nautical miles southwest of Teahupoo, Tahiti.**

After reviewing the data, in my opinion the best time period for significant swell for Teahupoo, Tahiti during the months of August and September, are during the *last two weeks of August, and during the second and third weeks in September.* *(Details to follow)*




**WEATHER ANALYSIS OF SURFACE PRESSURE AND WAVE HEIGHT CHARTS –** The ideal swell window for Teahupoo, Tahiti is displayed in the chart on the right. This swell window is the region that extends from just east of New Zealand to directly south of Tahiti, between 140-180 degrees West Longitude. As storms move underneath New Zealand, the storm fetch will extend northward throughout this region with strong winds and seas aimed at Tahiti.

Strong high pressure systems follow storms around the globe and can occasionally lock themselves down in specific areas for a month or more. If one of these strong high pressure systems happens to lock down in the middle of the swell window for Tahiti as per the example in the chart at the right, it will block swell generation by forcing the storm tracks to stay far to the south in a west to east flow of winds and swell. *This is exactly the poor swell situation that happened in 2009 when a strong high pressure system blocked the storm track during the waiting period of May 9-20th.*




**SWELL DATA FOR TEAHUPOO, TAHITI**
**August-September, 1997-2009**

The swell data is displayed in a series of graphs to allow easier analysis and presentation within this report. A shorter time period between 2005 and 2009 was also compiled to display a near-term trend over the last 5 years versus the entire 13 year period. Swell heights were filtered from 6, 8, and 10 feet when dominant swell periods were 12 seconds or greater, and the swell direction was within the Teahupoo directional parameters. The source of swells for Tahiti is usually within 1,500 miles, so the 12 second period filters are the most significant to review and would also contain the longer 16-20 second period energy of the largest swells.

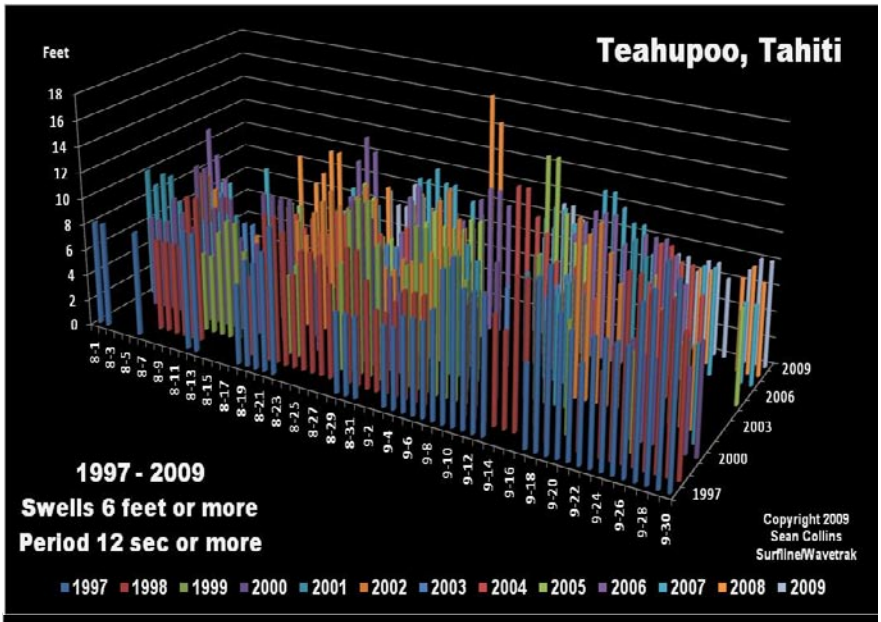
**The graph to the right displays the overall swell trend for August and September throughout the entire 1997-2009 period,** and the number of days of deep water swell 6 feet or greater, 8 feet or greater, and 10 feet or greater. This data indicates very **good years of swell during August and September 1997-2002, and again 2004-2007.** Generally poorer years with smaller swell prevailed during August and September in 2003, and again in 2008-2009.


The graphs below display three views of the data for swells during each time period:

1) The first **LONG TERM view shows the maximum swell heights** for each day in August and September between 1997-2009 after being filtered for swells greater than the 6-foot, 8-foot, or 10-foot threshold
2) The second **LONG TERM view shows the overall percentage** of the time that a specific day was over the 6 foot, 8 foot, or 10 foot threshold between 1997-2009
3) The third **NEAR TERM view shows the overall percentage** of the time that a specific day was over the 6 foot, 8 foot, or 10 foot threshold for the more recent 5-year period between 2005-2009

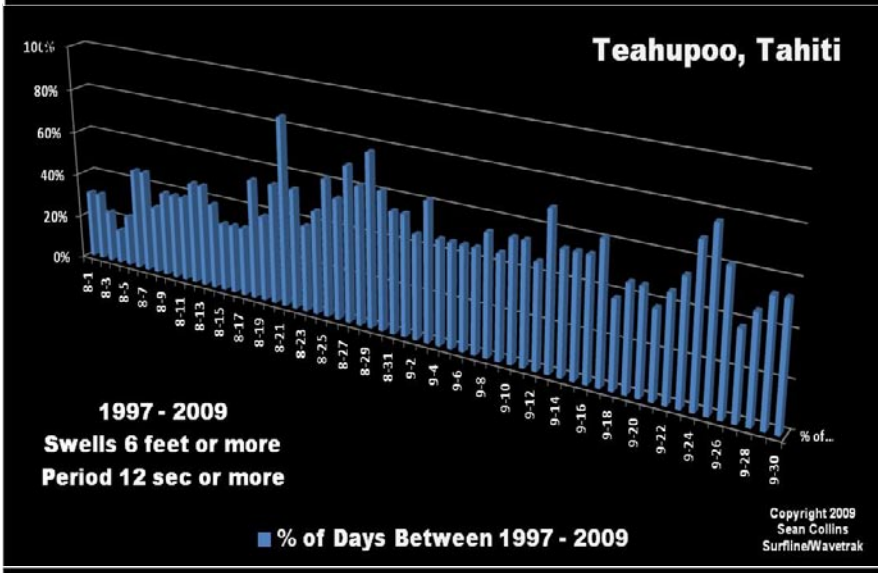
**1997-2009 SWELLS >6 FEET DAILY MAX**

In these 6-foot or greater charts we're really looking for swell consistency to produce lots of waves during a time period. The chart at right displays the maximum swell heights with more resolution for each day during the period. As in the "Good Swell Days" chart on the preceding page we can see the same very **good years of swell during 1997-2002, and again 2004-2007.** Again, generally poor years of swell prevailed during August and September in 2003, and again in 2008-2009 in the back rows.



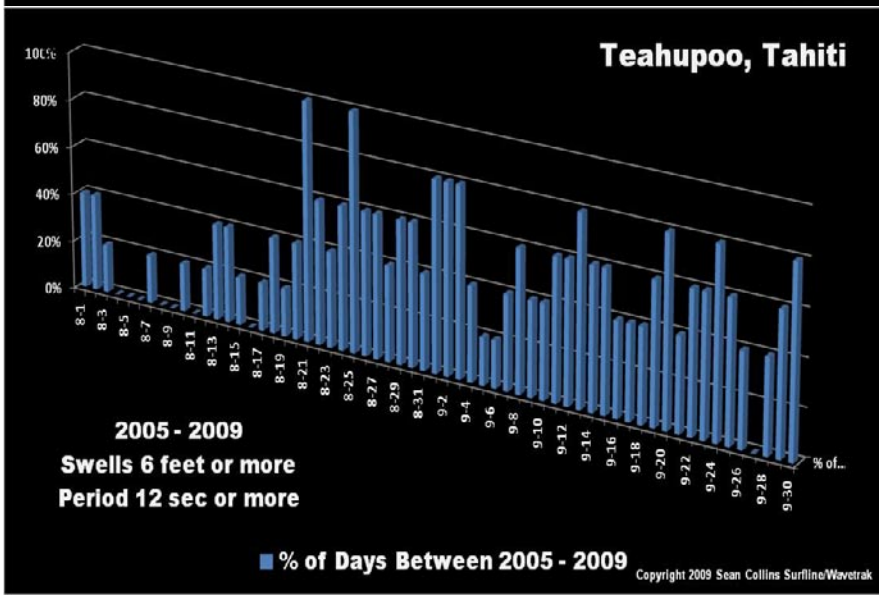

**1997-2009 SWELLS >6 FEET DAILY %**

This graph combines all of the days in August and September during 1997-2009 into a daily percentage for each day that the swells were 6-feet or greater. **We can generally see more swell consistency and peaks from 8/19 through 9/26.** Time periods with less swell consistency and smaller sizes are during the first two weeks of August, and also a slight dip around 9/18 and 9/27.



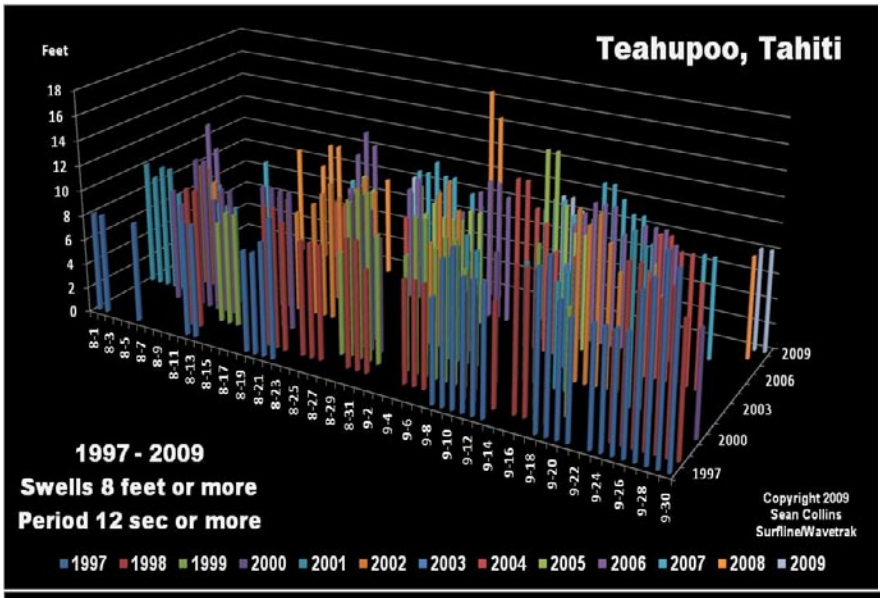

**2005-2009 SWELLS >6 FEET DAILY %**

A shorter term view over the past 5 years filters the swell data even more and we can continue to confirm the **most consistent swell periods between 8/20-9/2, and 9/7-9/25.** In this view the first two weeks in August becomes very exposed as a much smaller and less consistent period of swell for Teahupoo, Tahiti.



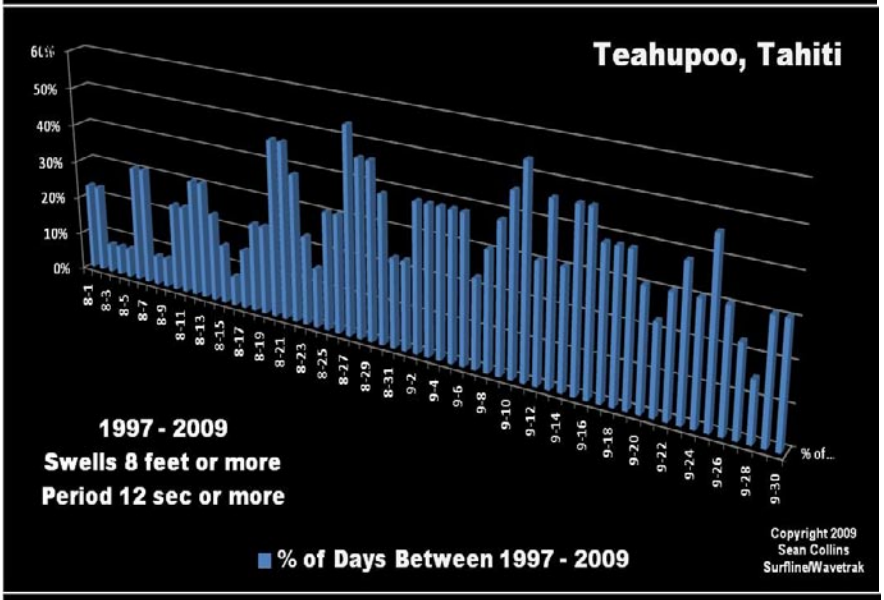
**1997-2009 SWELLS >8 FEET DAILY MAX**

In the 8-foot swell charts we begin to filter out all of the common everyday good swells from the **significant very good swells that produce surf face heights of 12-15 feet or more.** We can see that the 8-foot days are much fewer and less consistent than the 6-foot days and significant holes in the data begin to appear.



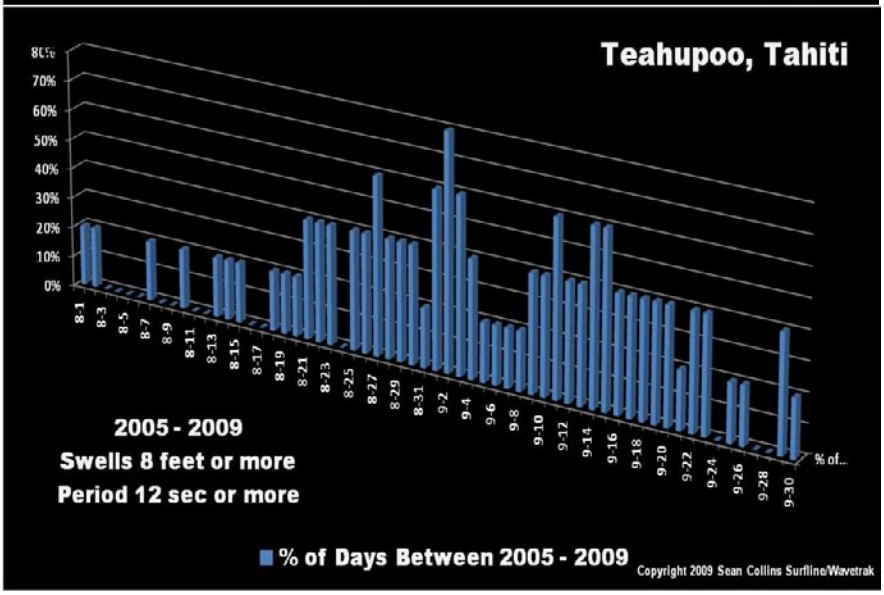

**1997-2009 SWELLS >8 FEET DAILY %**

Now we really begin to separate the good swell days in this chart. The strong periods of swell as evidenced by the 6-foot charts continue with a **higher percentage of 8-foot days during the last two weeks in August and also during the 2nd and 3rd weeks of September.** What is interesting in this view is that the **1st week of September also looks fairly solid for 8-foot swells at about 33% of the time during the 1997-2009 period but we'll see it drop to a much lower percentage in the next more recent 2005-2009 chart.**



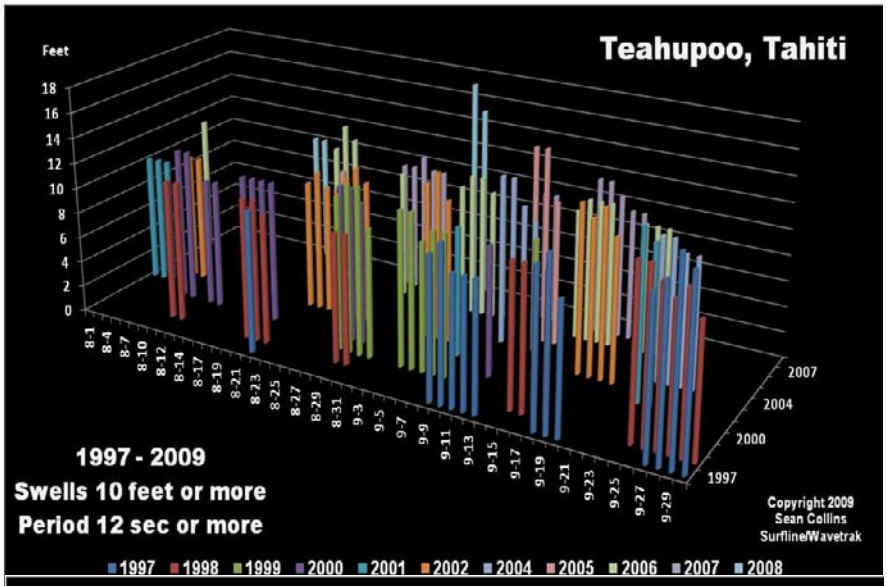

**2005-2009 SWELLS >8 FEET DAILY %**

In a more near term view over the last 5-year period, the first two weeks in August and last week in September continue to be very low percentage to receive 8-foot swells or greater. **The last two weeks in August continue to look very good as do the 2nd and 3rd weeks in September. Contrarily, the first week of September drops significantly from almost 40% during 1997-2009, to 20% during 2005-2009 for 8-foot swells or greater, and obviously not a good trend for 2010.**



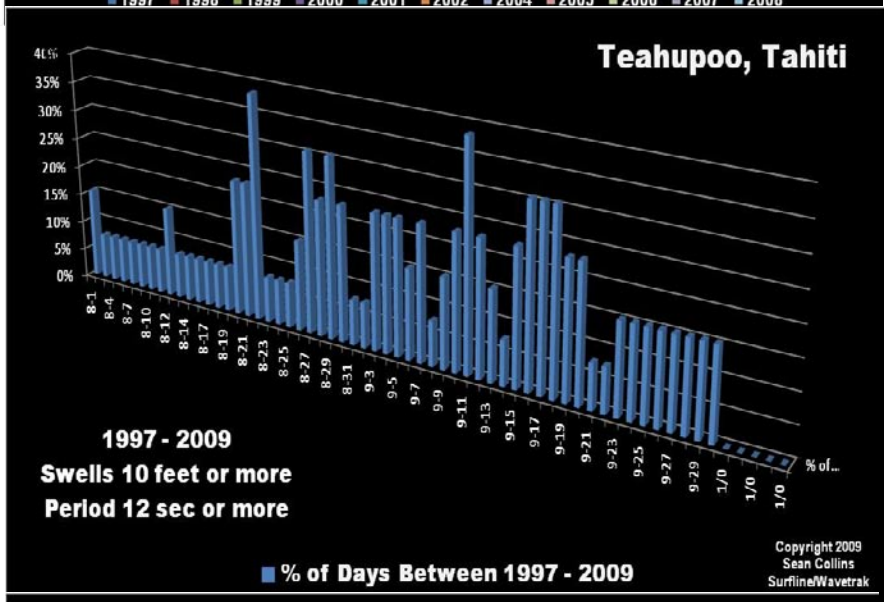
**1997-2009 SWELLS >10 FEET DAILY MAX**

In these 10-foot swell charts we begin to see the **major swells for Teahupoo that produce surf face heights 15-25 feet or more**. Typically, surfers can paddle-surf Teahupoo up to about 12 feet, after which tow-in surfing becomes more prevalent when the swell increases to the 12-15 foot range or more. Once again, as the swell size threshold increases in our data filtering we can see more holes in the data representing less consistency and fewer days of these larger swells.



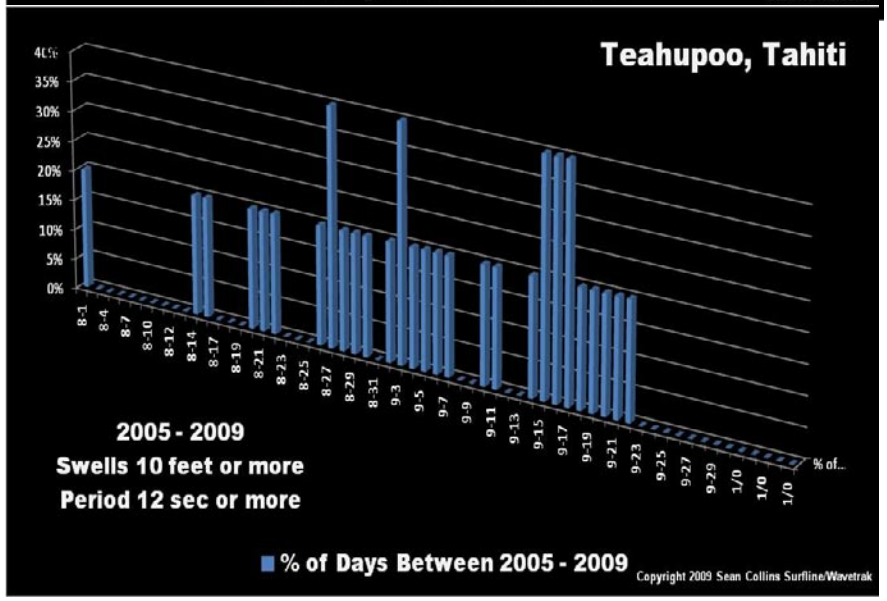

**1997-2009 SWELLS >10 FEET DAILY %**

The data becomes a little thin with our 10-foot threshold but the first two weeks in August continue to be very poor. There are quite a few sporadic 10-foot swells with 20% or more days between 8/20 and 9/20. **Once again, our previously identified good swell periods of the last two weeks in August and the 2nd and 3rd weeks in September seem to hold up well for the 10-foot and greater swell size threshold.**

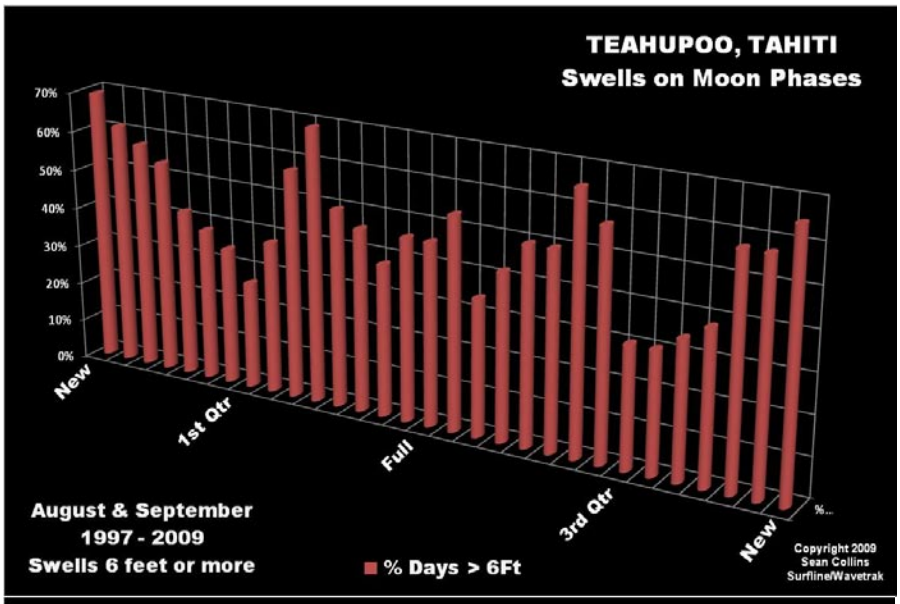



**2005-2009 SWELLS >10 FEET DAILY %**

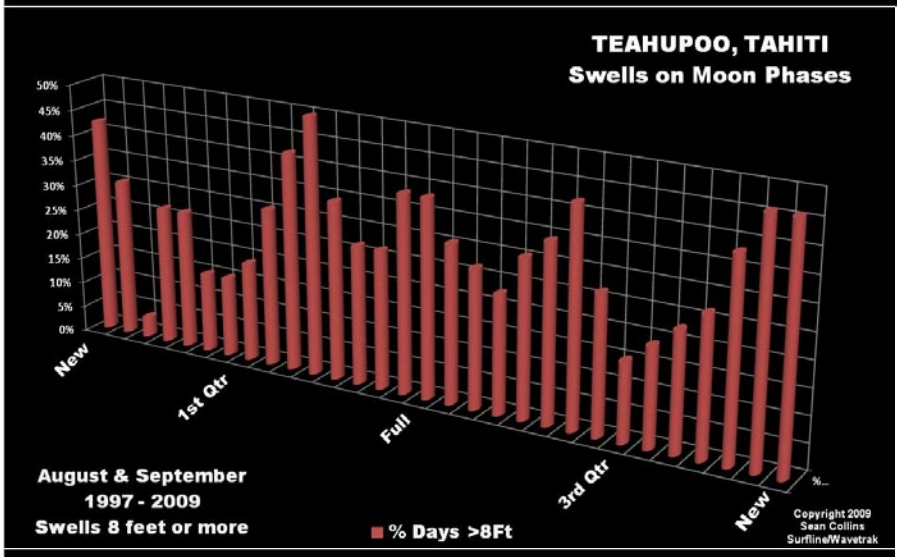
**Our more near term analysis of 10-foot and greater swells over the past 5 years continue to focus the best periods between 8/20 and 9/20.** The first two weeks of August and last week in September continue to be very poor. **Interesting to note:** *Our previously somewhat slack period in the first week in September held firm at 20% similar to the 8-foot and greater swells over the past 5-year period.*



**As surfers, we often wonder how Sun/Moon phases and associated tides might influence swells and surf. It's all energy – but at different cycles, frequencies, or phases.** We do know for a fact that currents in deep water can greatly influence swells, and sometimes even turn them in deep water the same as wave refraction in shallow water. Tides can create very strong currents in restricted areas, especially in places like Indonesia where massive amounts of ocean need to escape through narrow passes between the islands and reefs. Outgoing tides in Indo can completely shut down a swell for hours until the tide turns.

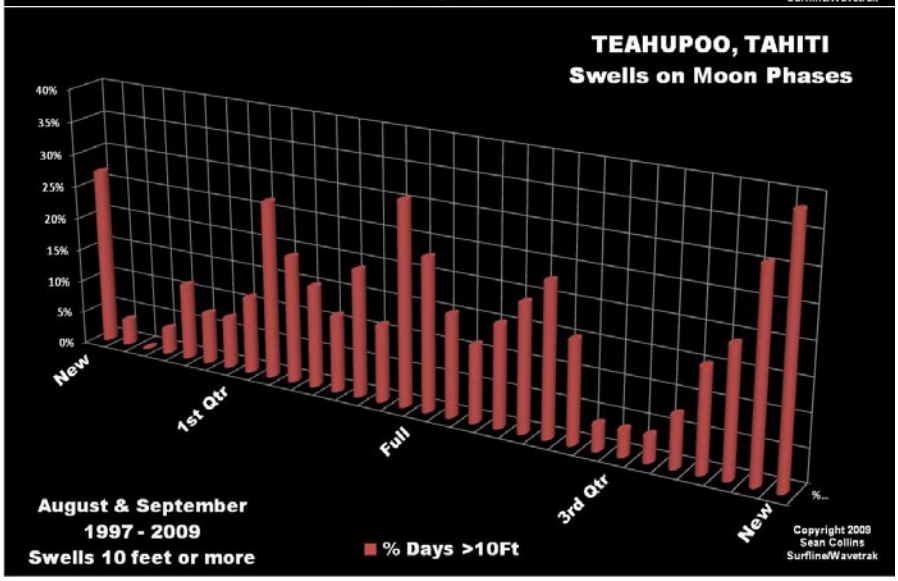



Tahiti's tidal currents will also have an effect on waves near the reef passes like Teahupoo. In other areas around the world the effects of the Moon and tides are less clear, but again, it's all energy, so there might be some sort of association…




I also sorted the data by Moon phase to look for possible connections between the swells and the Moon phases. **The data was kept in its original chronological order but the dates were replaced with the exact Moon phases that took place during those exact dates.** This offered a very unique and interesting view of the data.

Please note that this Moon phase analysis is a large scale overview of significant swell activity that was generated by storms some distance away from Teahupoo so it doesn't take into account any local tidal effects on the swell.




**This data indicates that during the months of August and September 1997-2009, Tahiti receives most swell activity:**

1) **Over the New Moon Period**
2) **Between 1st Qtr and Full Moon**
3) **Between Full Moon and 3rd Qtr**

**Slack periods with less swell seem to be:**

1) **Going into 1st Qtr**
2) **Just after 3rd Qtr**

Once again, the information in this report is a statistical analysis of swell activity that has occurred over the last 13-year and 5-year periods for Teahupoo, Tahiti. There are obviously no guarantees that the same activity will hold true in the future, but there do appear to be consistent trends in the analysis that we can use to plan future events with a higher degree of confidence.

**In conclusion, the best time period for significant swell activity at Teahupoo during August and September would appear to be between August 20 and September 2nd 2010. Additionally, this time period will also synch with the Full Moon to 3rd Quarter transition phase during 2010 – one of the top 3 Moon Phase periods identified above with increased swell activity over the last 13 years.**

Additional good periods of swell activity have been indicated for the 2nd and 3rd weeks of September, and slightly less for the 1st week of September. ***The data is overwhelmingly consistent with very poor swell activity during the early August period between the 1st and the 17th.***

Hopefully this information has benefited you in your future planning requirements. Please let me know if you have any questions and thank you for your long term support of Surfline.

Best regards,

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