FatSparrowRacing

Sailing in a Bending Wind

What is a Wind Bend?

A wind bend is a progressive change in wind direction as you head up the race course. It is different to a shift which is a relatively abrupt change. A wind bend gives a continuous, cumulative change up the course. Sometimes a bending wind pattern will cover the whole course; sometimes it is a more localised effect.

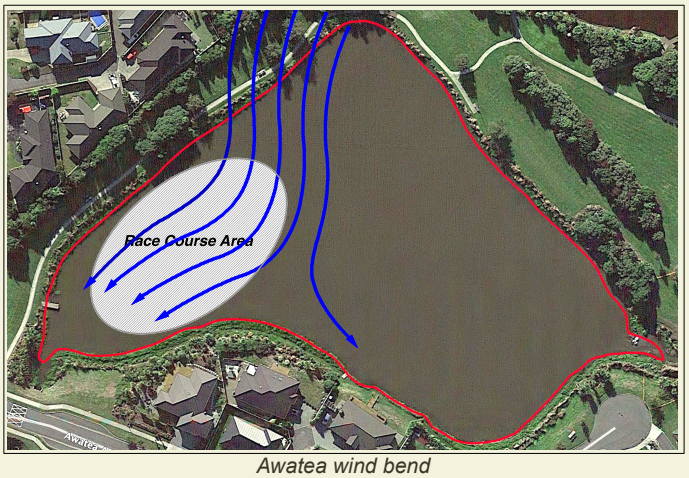
Why the Wind Bends

The wind will often bend around visible obstructions and so are usually easy to spot. Obstacles often give a clue as to where a bend might form. A stand of trees, or a projection of a shoreline are enough to create an obstacle that wind needs too navigate itself around. Higher air pressure is created on the upwind side and lower air pressure on the downwind side. The wind will try to move from the high pressure side, around the obstacle to the low pressure side and a bend develops.

Look for these types of physical barriers and see if your boat can detect a corresponding bend on the water.

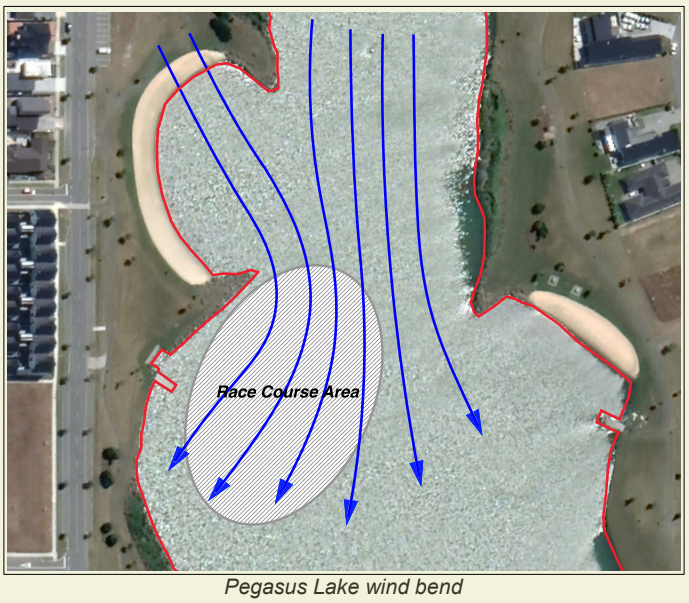
Examples of bending Winds

In the following examples we look at how physical obstructions might create a wind bend.



Awatea wind bend

At Awatea Lake, northerly winds are bent by the stand of trees along the path at top-left of the image, and by the houses and their surrounding vegetation at bottom of the image. This a very predictable pattern in north to northwest breezes, caused solely by physical obstructions around the shore.



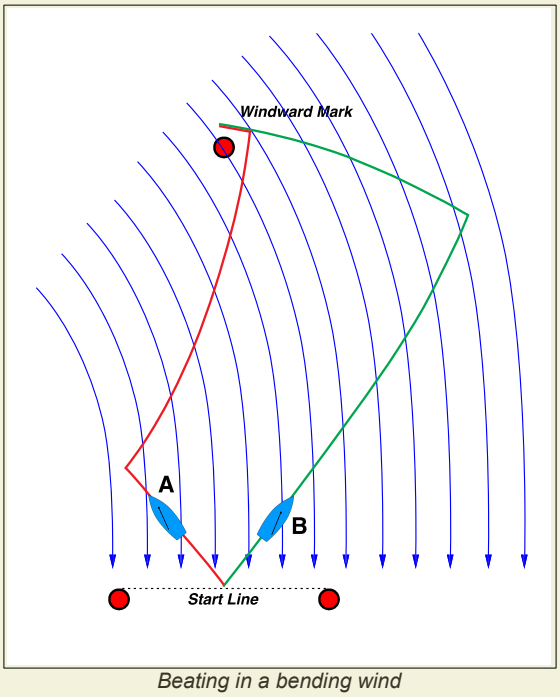
Pegasus Lake wind bend

The depicted area on Lake Pegasus is used in north to northwest breezes. As the wind proceeds down the lake, it is compressed trying to get through the narrows at the top of the course. Pressure in the narrows can be high and conditions gusty with increased chop.

Immediately through the narrows, the shorelines either side open up, the compressed high pressure air is able to expand and the pressure drops. As a result of this process a wind bend is created in the top half of the course.

Beating in a Bending Wind

In the diagram below, the windward mark is directly upwind of the starting line. Both boats, A and B, are sailing on a consistent heading 40º off the true wind direction and have the same boat speed. A starts on starboard and B on port. After a short beat on port, A tacks onto the lifted, curved port layline for the windward mark. B however, begins on the lifted port tack to the starboard layline then tacks for the mark.



Beating in a bending wind

A has sailed less distance and will round the windward mark ahead of B. In the example shown, A's course is around 20% shorter than B's. A's shorter course is the result of her being on the inside where the bend is tighter and therefore the lift more pronounced.

Whenever you spot a consistently bending wind, it should be taken into account when developing your race strategy. You will want to sail up the inside of the bend, or at least be more inside than the opposition.

Beware the Great Circle Course

Boat B is in a no-win situation, constantly being lifted, but not getting closer to the windward mark. To make the mark, she will have to sail a huge header to get back. Worse still is that the header increases as she approaches the mark and she may have to put in another tack to get around.

If Boat B had kept sailing on port, her course would have taken her right around the mark. Her only option is to go about onto the headed tack as early as possible.

Conclusions

- If you have the choice, in a bending wind, take the headed tack first.
- Sail to the inside of the wind bend, be first to get there and maintain your position as the most inside boat