

miles to the westward in the Pacific Ocean. It is also known that the severe storms that roar into the Pacific in the winter through Mexico affect the biological productivity of ocean waters and movements of tuna in the eastern Pacific. Events that push cold air southward over the United States into the Gulf of Mexico frequently have their origin in the north central Pacific or even over northeast Asia. The same atmospheric conditions over northeast Asia that may ultimately produce winds in the Gulf of Mexico also cause winter monsoons in the northern Indian Ocean. Northeast winds bring dry continental air over the Indian Ocean, causing surface water flow to the westward. Low rainfall and high evaporation cause a rise in salinity. The process reverses in the summer monsoon from May to December. Undoubtedly, but in a way still little understood, the monsoons have a profound effect on abundance and availability of Indian Ocean resources.

So, just these two high pressure areas have a tremendous effect.

Senator HANSEN. Dr. McHugh, do I infer from your testimony that there is a rather significant fluctuation in the degree of salinity in certain currents in the ocean at different times of the year or comparing one year with another?

Dr. McHUGH. Well, the currents each have their own characteristics of temperature and salinity. The California current, for example, has a low temperature. And it has a fairly low salinity, too, because a great many rivers run into the north Pacific. It is characterized by its low temperature and low salinity. We can tell simply by that and we can watch the movements of these currents. They do not always flow in the exact place and change with atmospheric circulation, too.

Senator HANSEN. Dr. McHugh, I think you have presented a very interesting story here this morning and I can appreciate the applicability that it has. It goes far beyond simply the concern we all have in fisheries and takes in other areas as well.

I do not think I have any further questions. I would like to commend you for a very interesting discussion here.

Dr. McHUGH. Thank you, sir.

I would like to make one other comment. Dr. Pecora mentioned briefly our interest in Eros satellite. We also have been working with manned satellites, working very closely with the Gemini astronauts. In fact, on their last flight we had them take pictures so that we could follow the currents. Unfortunately, we were working over the mouth of the Mississippi River, all covered with clouds at the time. But we have all their photographs and we have learned a great deal. It looks to us it will be very significant and will be very useful in the future.

The CHAIRMAN. Dr. McHugh, this has been very helpful. I am sorry I had to step out just a minute. I hope at another time we will be able to have you back as well as your predecessors who made their presentation. Obviously we have not been able in this limited time to get into all the facets of your work and the work of the other departments within the Department of Interior.

Your testimony has been extremely helpful and enlightening. I am sure I speak for my colleagues when I say how much I am impressed by the display. I think Stan Olsen has been responsible for arranging that, Dr. Bates.