**Letters of Intent: EPR**
**Target Date: February 15, 2003**

**Cooperative Research: Studies on the physiological ecology of hydrothermal vent chemoautotrophic symbioses**

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A letter of intent to continue our studies of the relations between environment, metazoan metabolism, and community productivity.

We are in the last year, and have completed our last field season (on Dec 23 2002), of the above project and will either propose a renewal for the above proposal, or directly integrate (as co-PIs) with other investigators proposing to work in the 9-10°N area of the EPR.

The productivity of vent ecosystems and how that productivity changes over the life of a vent and in different parts of a vent ecosystem is a major aspect of vent ecology which is still not at all well resolved. Our studies to date have shown that the EPR tubeworms from favorable habitats can maintain very high rates of production and that the mussels and clams from favorable habitats have much lower rates. However, it has also become clear that the individuals in any particular vent microhabitat are acclimated to that habitat or limited by it. That is, for example, mussels from large beds at lower temperatures have different metabolic responses to temperature than do mussels from higher temperature areas around tubeworms. We propose to study these differences in the metabolism of C, N, O2, and H2S in symbioses from vent sites of different age and environmental conditions. We will also continue our efforts to characterize the metabolic rates of the many non-symbiotic species as well.

These results will be combined with data that we will collect on the area specific biomass and composition of the communities in the different habitats using our unique quantitative collection equipment and protocols. The 8 quantitative collections of Riftia pachyptila aggregations we have already made, from both favorable and unfavorable habitats, will provide the data needed for these tubeworm communities, however if changes in venting have allowed colonization by Tevnia jericonana in any areas, we will collect the data necessary to add these tubeworm aggregations to our models. We also have area (not volume) specific biomass data for mussels and clams in one area that we characterized very fully (Mussel bed), but will expand that work to other areas that will require new collection equipment to sample efficiently and quantitatively.

Finally, new imaging and navigation capabilities on Alvin in 2002 allowed us to obtain high resolution imagery and faunal maps (with a resolution that allows identification and quantification of individual crabs and other fauna above about 1 cm in diameter), of five diffuse flow fields in the area. This data is used to scale up our models of community productivity to the size of vent fields, and will also be compared to future maps and imagery collected at the same locations to document changes in the extent and composition of these communities.