

# Integrating Distributed Sites of Ecological Vulnerability and Delineating Areas of Interest (AOI).

Pacific Region Integrated Data Enterprise (PRIDE)

Dr. Carol Wessman, John Kineman, and Rozita Abdul-Williams



## Abstract

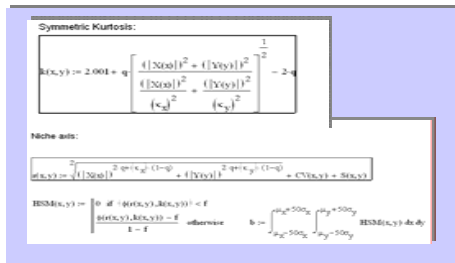
- Currently, regional vulnerability assessments are data-poor and involve a great deal of uncertainty. Wise policy and management require accurate information from observing systems, that can be provided repeatedly and consistently to evaluate change (Christian, 2005).
- The proposed work addresses this need by providing a method for defining the area of interest (AOI) boundaries analytically from available data.
- Producing Area of Interest (AOI) boundaries is the first step for collaborating on data mining and integration for comparative studies across distributed sites.

## Project Objectives

- To implement a proven general method for delineating areas of special interest.
- To demonstrate it for mapping invasive coastal macrophytes under various scenarios.

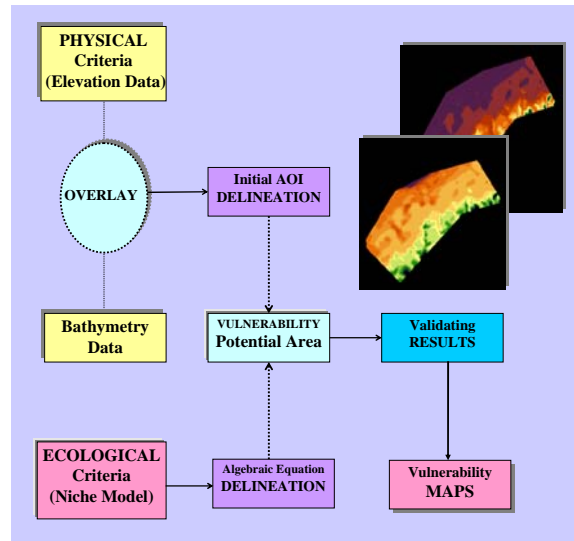
## Benefits of this approach

- By employing a model-based delineation procedure a delineation can be performed in a simple, standard way that can be systematized.
- The model can be stored and documented with metadata, and it can be updated and it can also represent past dynamics by supplying it with time-series data.
- These models can interact in an iterative mode to simulate dynamics.



## Methodology

- Previous work involved applying standard GIS overlay and classification techniques to produce an initial set of coarse delineations of potential areas of vulnerability based on:
  - Physical criteria [relief and other boundary data]
  - Ecological criteria [physiological limits]
- In this project, the delineation will be duplicated using the niche-model technique and confirmed to produce the same results for physical criteria. Then we will add ecological criteria and physiological limits.
- The model will be applied in Hawaii to estimate ecological potentials.

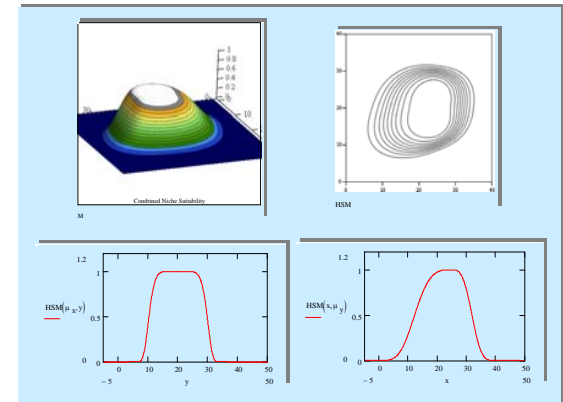


### Co-Investigators:

Dr. Mark Fornwall, Director, Center for Biological Informatics (CBI-Denver) and Pacific Basin Information Node (PBIN-Maui)  
 USGS National Biological Information Infrastructure (NBII)  
 Derek Masaki, University of Hawaii and USGS/NBII/PBIN

## Results

- The model produces a single *algebraic equation* for the delineation, where each variable is supplied by a data layer identified in the database as one of the critical delineation factors.
- The model produces a *generalized boundary* for each distributed site which can be used to window data from other sources.
- These results will be validated using Landsat or other classifications of known locations.
- This capabilities can be used to facilitate compilation of integrated research databases across sites for more detailed study of the ecology and *vulnerability of affected communities*.



## Project Deliverables

- A niche model demonstration for delineating physical and/or ecological areas by criteria.
- A Hawaiian Islands regional map of model-generated locations and potential vulnerability to algal invasions.
- A set of reviewed GIS boundary files delineating the vulnerability AOI's.
- Prototype database of appropriate variables for this delineation cut to the AOI boundaries.