

**CIOSS Working Groups
Product Development
Sept 8, 2005**

General Considerations:

- Products and services developed at the local/regional level (IOOS Regional Associations, Regional CoastWatch nodes, etc.) should be moved to the national level and made available to all of the Regional Associations and Regional CoastWatch nodes.
- A workshop should be held to help define a “taxonomy of user decision-making.” This involves identifying the remote-sensing (and other) products that are useful for decision-makers, classifying them by attributes such as their temporal and spatial scales, the decision/problem type, the language used to describe those decisions. Local, state and federal agencies should be involved (and help fund). Jim Good will follow-up.
- In many cases, users need “simple indices”, rather than larger data sets composed of fine-scale maps. The fine-scale maps are still needed to form the indices. Examples include the upwelling index, ENSO, PDO.
- Many “users” employ GIS systems and need the metadata associated with data products, including the projection, geoid, datum used to produce each “map.” Different agencies mandate that certain mapping procedures (choice of projection, reference datum, etc.) be used. Tools for converting products from one mapping system to another should be identified and made available. Users should be educated about the use of available metadata, tools to use the metadata, etc.
- Delivery systems developed at regional levels (CoastWatch, other) should conform to present national protocols. Systems need to be dynamic and capable of responding to changes in these protocols.
- Products extend beyond maps and indices. One example is an interactive “kiosk” that can be used at “science museums” such as aquariums and zoos. These are interactive workstations that provide users with choices and lead them through a tour of a marine system, a decision-making process, etc. Many different electronic products may be used within this system. More sophisticated systems may use 3-D projection systems. These can be adapted to PC and Mac systems and placed on CD’s for use in schools and by individual users. These systems have many uses in both formal and informal education for the public, managers, scientists, etc.
- Time series are often needed, an aspect often not included in GIS systems. Managers need to be educated as to the temporal variability of their environmental systems. These include changes in statistical properties during

specific periods (El Nino events, before, during and after changes in climatic “regimes”, etc.)

- Products that integrate multiple parameters and sensors provide a broader perspective.
- Products describing the statistics of habitats (proper SST ranges for specific fish, HAB’s etc.) are useful in designing MPA’s, regions of frequent shellfish closures, etc.
- Most products can be used as is or adapted to formal and informal educational needs of differing audiences, with varying degrees of effort needed to do so. It would be useful to develop a meta-product such as a matrix that shows what products are available for specific uses, including the limitations of that product. An interactive system that queries users for the attributes needed for their application could then provide a list of available “products”, services, etc.
- Within estuaries and in very nearshore environments, more fine-scale maps are often needed, which exceed the capabilities of present satellite remote sensing systems. For those aspects that do not evolve rapidly in time, aircraft remote sensing may be appropriate.
- For some applications, time series of attributes of a moving target (drifter, fish, whale, derelict vessels) need to be constructed from time series of 2-D satellite fields or 3-D data sets (from surveys, models, etc.). An interactive system that allows the user to “fly through” the environment on a path which they specify would be useful. These can be made into educational games, management scenario tests, etc.
- A data base of place-names and event-names would be useful, allowing users to request products related to a given location or event without knowing lat/lon or time of the specific region and event. These may be region-specific and will evolve over time.

Specific Products:

- **QuikSCAT Climatology of Surface Winds:** This is being developed at COAS by MRM student Craig Risien, working with Dudley Chelton and the NOS HazMat office.
- **Interactive Compositing:** A web-based interface has been developed that will allow users to composite SST, color, and SSH fields over user-chosen periods and regions. The interface design can be implemented at regional CoastWatch nodes or other public web sites. These also need educational support.

- **Feature-tracking, and animation** of sequences of images help in visualizing transport paths. Automated methods of producing animations from running means of SST, etc. (considering cloudiness) need to be developed.
- **Maps of frontal positions** developed from SST and color (from the same sensor or from nearly simultaneous sensors) should be made available. As a start, the frontal positions from GOES and/or AVHRR, MODIS and SeaWiFS sensors can be made available at all coastal locations.
- **Lagrangian “swim-through”**: Enhanced visualization tools can be developed to use the “swim-through” capabilities that exist.
- **The pilot kiosk**, under development at HMSC, should include the capability to be transitioned to web sites, placed on CD’s, etc.
- **Time-derivatives of parameters** such as chlorophyll-a and SST can be used to detect blooms (HABs).
- **Anomalies of SST and Chlorophyll-a** can/are being produced for some data sets, but research issues remain concerning clouds, jumps in SST between images, etc.
- **Primary production products** are available as experimental products and will soon be made available through CoastWatch nodes.
- **Cloud-derived fields**: Climatologies and individual fields of cloud related properties are needed. These include the surface radiation fields (visible, PAR, IR).
- **High-school level lesson plans and extended scenario-based problems** (related to marine science) can be transitioned to IOOS regional web sites and CoastWatch nodes.
- **Inventory**: An inventory of satellite sensors, their characteristics (resolution, spatial coverage, periods when available) and capabilities and existing products could be made available at some CoastWatch nodes. Past uses of each sensors should be included. Future sensors and expected characteristics, uses, should be included.