



(Diagram from an Aha Moku presentation at Wildlife Society Annual Conference, Kona, Hawaii, November 5 – 10, 2011, Traditional Ecological Knowledge Symposium)

### Adaptive Management

Ideally, in an adaptive management approach policies are designed and implemented as experiments to probe the behavior of natural systems. Managers and decision makers develop policy incrementally based on ongoing acquisition of new information. Adjustments in policies and practices are made based on this new information. Unexpected outcomes are instructive findings used to make timely adjustments. However, an adaptive approach requires public confidence in the State's capacity and commitment to make needed corrections responsive to real environmental information free of political bias (Umemoto, 2006). This may be a major barrier in the State's willingness to implement an adaptive management approach. However, this adaptive management approach would not be begun as an experiment to test the behavior of a natural system. It would begin as a community's desire to manage, protect, sustain and/or harvest a specific resource. Data and information would be acquired by the community as part of a community-based natural and cultural resource management plan in cooperation with the State. The State has been given the power to recognize community-based fishery management planning in the past as Subtitle 5, Aquatic Resources, chapter 188, § 188-22.6. That authority expired July

1, 1997. It could be re-visited with stronger and clearer conditions and requirements for communities to participate, cooperatively, with the State to establish management regimes that would provide benefits to the community and regulatory control for the State. Similarly, the Hawaii State Departments of Agriculture, Health and other agencies dealing with natural resources can be examined to better benefit communities as a whole.

An adaptive plan for natural resource management requires that the central authority, the State, develop a management schema, or framework, that allows for quick adoption of rules and regulations and amendments initiated by a community organized along prescribed guidelines for natural resource management. The framework would have criteria for the adoption of management rules and regulations and require active review of the regulations and policies at prescribed intervals. Data and environmental information would be collected through consultation with the community. Management would be responsive to the community as well as the environmental conditions.

Adaptive management is an ongoing cycle of designing and checking a plan and then modifying management as new information is gathered. It implies that communities design a management plan that includes a method of checking and monitoring results, regular analysis and discussion of whether the plan needs modifying and action by the community to continue to manage the resource. The basic process can be summarized as:

1. Make a plan,
2. Implement the plan,
3. Check how it is going,
4. Revise the plan (if necessary),
5. Carry on (Govan, et al., 2008).

Communities cited that in specific locations the global, statewide, rules regulating natural resources were often wrong. Maui communities noted that the Hawaii closed season for spiny lobsters, to afford protection during the spawning period of this species, often misses the actual spawning period on Maui allowing gravid (fertile, berried or egg bearing) females to be harvested when the season opens. Moloka`i community, Mo`omomi, reported that *moi* (six fingered Hawaiian threadfin, a favored food fish), *Polydactylus sexfilis*, spawned at least two times in a year and they are aware of a third spawning period. These spawning periods do not necessarily coincide with the State of Hawai`i closed season for *moi*. The community organization *Hui Malama O Mo`omomi* monitors the *moi* stock to determine the spawning times. It uses this information to advise the Ho`olehua community on when this species should be and shouldn't be harvested. The *moi* can be harvested until it becomes clear that they are preparing to spawn, then a *kapu* is imposed and the actual spawning is calculated (They are known to spawn during a specific moon phase). Once they complete a series of spawns the *kapu* is lifted. Good catches are reported immediately following the spawn, before the spawning aggregation disperses. The communities as a whole recognized that the statewide closed seasons were specific to O`ahu populations of these popular species. It is in these little nuggets of knowledge that proper management can be applied at the fine scale level of the community or individual site that can serve to eventually reverse the decline of the environment and the decrease of favored natural resources.

The traditional community agreed that spawning aggregations of important species need to be protected and the best protection comes from the community themselves. To achieve this protection, community members:

1. Agree that a species is important for the community (inventory and prioritization of natural resources by the community),
2. Understand the behavior of the species in the specific location (biology and life cycles specific to the area determined by direct monitoring of the stock by the community or the community's representatives), and;
3. Agree to comply with the rules of behavior and conduct established by the community (voluntary compliance).

After numerous meetings and reviewing notes taken during these meetings, analysis of the comments shows that the best practice for management of marine and land resources is traditional management which is adaptive management - management that is responsive to the true state of the environment and ecosystem. Understanding the true state of the environment and ecosystem requires real time monitoring of the environment and comparison to a real, not theoretical or some "ideal", baseline of data for each specific location for review and management. This type of management is actually site specific empirical knowledge in active use.

Traditional resource management concentrates on the perpetuation of water, agriculture, aquaculture, near-shore and ocean practices that focuses on the sustainability of the resource. Specific practices that are part of the cultural identity of the traditional native community are still upheld today. For example, where the geography of an area made it impossible to cultivate fish ponds, Hawaiians stocked their lo'i with juvenile amaama, aholehole, moi and o'opu. They knew that the pua (juvenile fish) eat the *limu* (seaweed) that grows where the fresh water percolates in the ocean. Putting fish into lo'i helped to fertilize the kalo and ensured fish for consumption. When the kalo was harvested, the children would go into the lo'i; the o'opu would come to the surface to breath, and then would be harvested.

In conclusion, as evidenced by the three Hawaii Supreme Court cases, the protection of a natural resource and traditional practices associated with those resources are of vital importance to the State of Hawaii. It is commonly believed by the Native Hawaiians that if the Aha Moku Structure had been in place, there probably would have been no need for court intervention.

Further, a community should be exempted from statewide regulations if it self-manages, first planning and then rule-making, a natural resource within their area. The community would be responsible for monitoring the resource, enforcing (citizen enforcement with State enforcement support) the rules and regulations and providing the State with their management plan and natural resources data. The State, in cooperative agreement, and through an adaptive management framework, would assist the community by providing for an opportunity for the community to organize, standards for monitoring the resource and analysis of the information, support for enforcement of the community's rules and regulations and education on natural resource management, natural resource monitoring and enforcement procedures. The State would

gain data and information that would otherwise not be available. The community is responsible for:

- Inventorying and prioritization of natural resources that are important to the community,
- Monitoring of the natural resource,
- Establishing rules and regulations for the management of the resource,
- Submitting these management plans to the State and County.

(Excerpt from the "Final Report of the Aha Ki`ole Advisory Committee, Best practices and specific structure for the cultural management of natural resources in Hawaii, December, 2008)