

Molokai Watershed Recommendations

The link between sediment and the quality of coral reefs is quite strong on Molokai. The following recommendations are suggested to reduce sediment inputs to the reefs on a watershed basis.

The Molokai partnership has advanced the watershed concept, increased watershed and water quality awareness, and recruited active stakeholders to the process. Many of the ingredients exist to go from planning to implementation, and sharply reduce sediment inputs. The stage is set for local stakeholders to develop an early action plan consisting of the ideas developed at the workshop. It is recommended that the partnership develop a grant with specific pilot implementation projects in one or more of the following areas.

Upland reforestation and establishment of native vegetation

- Expand oasis fencing experiments
- Address fire management and ungulate control
- Draft simple guidelines on planting methods and species (and get permitting authorities to approve)
- Establish native tree nursery on the island to provide stock
- Have MLSWCD take lead in coordinating public/private efforts
- Experiment with riparian fence enclosures/piligrass plugs in hillslopes

Reduce Sediment Inputs from Dirt Roads

- Develop standard road design specs to minimize erosion as part of Maui County ESC permit.

Design a prototype sediment basin in target subwatershed

Reduce Erosion from New Development Sites

- Designate a Maui County ESC inspector to regularly deal with construction sites on Molokai and provide technical assistance to private landowners (especially on dirt road drainage)
- Generally improve the ESC program for Maui. The following specific recommendations were submitted to Maui County staff.
 - **Construction Phasing.** Most sites were being cleared property line to property line, with little evidence of phasing or clearly defined limits of disturbance. Several sites appeared to be open for many months without major activity. Suggest dropping the minimum threshold for construction phasing down to 10 acres (from current 15), and/or providing stricter stabilization requirements for these sites (require seeding and irrigation to get grass cover).

- **Temporary stabilization** will always be problematic in Maui given high ET rates and poor subsoil conditions. Three options should be pursued:
 - combine crimping with spraying of wood fiber mulch—which is most common practice – but many sites visited had only a very thin layer. It is worth developing an inspection benchmark as to the thickness of wood fiber mulch—and reapplication after two months after it breaks down.
 - develop a pilot project to develop island-derived organic mulch from shredded coconuts, cane waste, palm and banana leaves and other green wastes. This material could be produced much cheaper than imported wood fiber mulch products, and provide a useful option to reuse these wastes. These materials should be applied together with small quantities of the current wood fiber mulch to create at least one-half inch thick cover over exposed soils. Consider applying for a grant with the state or EPA to try it out.. Such material may have other beneficial uses within bioretention areas for stormwater treatment.
 - c) Consider instituting requirement for seeding, soil amendments and temporary irrigation for specially designated exposed soils—for example, areas open at least two months within SMA—and consider dropping any watering requirements for dust control in these areas. At \$2000 an acre, the cost to establish grass cover may act as a powerful incentive to close sites rapidly.
- **Silt fences and dust fences** should be combined into a single unit on the lower downgradient portions of construction sites, so they can help reinforces each other and be more stable with respect to wind and runoff.
- Coconut or other natural **erosion control fabrics** should be used on all cut or fill slopes greater than 15% as a standard plan requirement.
- **Installation of stormwater practices in the construction sequence.** While curbs, gutters and storm drain pipes can be installed early in the construction process, they should daylight to a sediment basin or trap on the site that is sized with the same volume as the water quality requirements. The basin can be converted into a stormwater pond facility after the site has been stabilized. Installation of permanent stormwater practices such as bioretention and infiltration (and perforated pipes used for peak discharge control) should only occur after site construction is completed and the site is stabilized. In general, the proposed locations of infiltration and bioretention areas should be considered outside of the limits of disturbance and fully protected from compaction and sedimentation throughout the entire construction process by silt fence or other means.
- **Develop a better set of benchmarks during inspections** to trigger maintenance and/or enforcement of erosion control practices. These might include quality of temporary stabilization, cleanout depths for sediment

basins, silt fence repair, replacement of construction entrances, reapplication of wood fiber mulch, etc. Having clear triggers helps both inspectors and contractors know what and when practices have to be maintained or repaired, and provide a more defensible basis for any enforcement activity.

- **The limits of disturbance** should clearly be shown on plans as well as the means to exclude construction equipment. During the field surveys, there did not appear to be many site areas that were not cleared—stream buffers, steep slopes, wetlands, stormwater BMPs, native forest and other areas should always be protected.
- To take a watershed approach, it might be nice to tie ESC penalties to upland reforestation/revegetation efforts—it will always be tough to sell a stringent ESC control program when there are major non-urban sources of sediment in the watershed. Upland revegetation is a cost effective way to reduce these sources.
- Lastly, consider **a general permit** with a standard set of conditions for single lot construction. Single lots are a real inspection and permitting problem, but a general permit helps improve compliance and can be used to deal with enforcement issues at bad actor sites. More details of general permits for single lot construction are provided in the companion memo.