

Workshop Summary



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To: DPNR workshop participants

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Re: Summary from August 14-16, 2006 Watershed and Stormwater Management Workshop, St. Croix USVI

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This memo summarizes discussions and recommendations generated during a three-day training workshop on watershed and stormwater management funded by NOAA OCRM and supported by DPNR CZM. Workshop participants included primarily DPNR staff from CZM and DEP, as well as representatives from Building and Permits, CCZP, and DFW. Non-DPNR staff in attendance included representatives from SHPO, NOAA and USDA. Day 1 of the workshop introduced a variety of regulatory and programmatic tools for watershed protection, and discussed the feasibility of applying these tools in the USVI. The first half of Day 2 focused on improving the current erosion and sediment control program and identified key practices to be installed on construction sites and dirt roads. Strategies for implementing a post-construction stormwater program and adapting structural practices to the USVI were discussed in the afternoon. Effective watershed planning and better site design techniques for new island development were covered on Day 3. The group worked through a ranking exercise to develop criteria for prioritizing watersheds for future planning efforts, and critiqued and redesigned two local development plans.

This workshop summary is organized under the following topics: Watershed Protection Tools; Erosion and Sediment Control; Stormwater Management; and Watershed Planning. Each topic includes a list of findings and recommendations to strengthen effectiveness of existing programs and move DPNR forward in watershed management efforts. A section outlining CWP's overall recommendations for next steps is included at the end, as well as a summary of the workshop evaluation forms. Additional detail on approaches to managing stormwater (during and post-construction) and watershed planning based on site visits and consultation with local staff is provided in the PowerPoint presentations prepared for the workshop.

1.0 USVI Watershed Protection Tools

On Day 1, Paige Rothenberger presented scientific information regarding the negative impacts of development observed in USVI coral reefs, wetlands, guts, and groundwater resources. In particular, increased sediment loading, channel erosion, flooding, and reduced recharge to groundwater were discussed. In response, the majority of the day was spent discussing local regulatory and programmatic tools that can be applied throughout the development cycle to help

minimize impacts on water resources. These tools include land use planning; land conservation; aquatic buffers; better site design; erosion and sediment control; stormwater management; non-stormwater discharge management; and watershed stewardship. A comprehensive approach to watershed management should incorporate elements of all of these tools. As a group we discussed each of these tools and how they are or are not currently applied in USVI. Findings related to the availability of these tools and recommendations to improve their use are described below.

1.1 Land Use Planning

Findings

- Land use planning in the USVI has not evolved into an adequate tool for watershed management. CCZP is in the process of developing a comprehensive plan for the islands, however legislative approval is required and highly unlikely without tremendous public and agency support.
- There is current zoning authority, however rezoning is routine and rarely prohibited. Lack of planning and political will to enforce existing zoning makes it extremely difficult to project future buildout, predict watershed vulnerability, and direct growth based on long-term infrastructure, environmental, and social needs.
- Workshop participants identified various areas where they know development is going to occur (east end STT; coral bay STJ; hill tops on STX).
- USVI has precedence for using "overlay districts" (e.g. historic and wellhead protection districts); this may be a useful approach in the future to establish performance criteria for watershed-based, resource protection districts (such as more stringent stormwater criteria, required site fingerprinting, or increased open space protection in a highly sensitive subwatershed).

Recommendations

- DPNR support of the comprehensive plan is critical to long-term watershed management. Earth change, WQ, and TPDES programs all have a stake in projecting future demands that will effect long term staffing, maintenance, and budgetary needs. CCZP should share key elements of the draft plan with CZM and DEP to make sure resource protection priorities have been integrated. Explicitly linking land conservation, TMDL implementation and APC strategies with proposed land use planning goals may help encourage agency support for legislative adoption.
- The process for rezoning property needs to be more stringent. Consider using variances for development permits that do not transfer with property sales.
- At a minimum, CCZP should conduct a simple buildout analysis looking at three scenarios: (1) current zoning; (2) best- professional judgment (assuming probable rezoning); and (3) a worst-case scenario. Use impervious cover, percent developed, or another indicator to identify which watersheds will see the most growth over the next 10 years. Development potential should factor into watershed ranking (see ranking discussion below).
- Consider including CCZP staff in the plan review process. This could not only increase

capacity of review staff to handle permit loads, but also bring a more holistic view point to the plan approval process.

1.2 Land Conservation

Findings:

- Most upland conservation areas in the USVI are national parks, historic sites, or The Nature Conservancy (TNC) (or other private) property. There is no current open space or land acquisition plan for the USVI; however DFW does have a wetland protection plan that identifies a "short-list" of priority wetlands for protection on STT and STX.
- No tax fund or other dedicated funding source exists that can be applied towards active purchase of land by the territory. There is mitigation funding that could be applied, but this is limited by a spending cap that forces annual spillover into general funds (limited to about \$250k). NOAA identified the CELCP program as a potential source of funding.
- DPNR can hold and transfer conservation easements, however there are a handful of third parties that can as well (i.e. TNC, STX Foundation, SEA, RC&D). A third party holder is essential because the government may or may not enforce easements in perpetuity.
- Clearing restrictions are not currently sufficient to protect remaining natural areas, and open space requirements for development are mainly for active (rather than passive) open space. Workshop participants were unable to identify any existing incentives or mechanisms to protect remaining natural areas.

Recommendations:

- CCZP should coordinate with DFW, Parks, and NGOs on developing an island-wide open space or land acquisition plan that identifies priority parcels, preferred method of conservation, and sources of funding. Incentives to encourage conservation easements and other land conservation in USVI should be identified and implemented as part of plan.
- The spillover cap for mitigation funds needs to be revised to accommodate land acquisition goals. In the meantime, parcels <\$250k should be pre-identified for mitigation funding, and the potential to use CELCP funds for land acquisition should be investigated. Consider a partnership approach that pools \$ from mitigation funds with NGO \$ to increase purchasing power.

1.3 Aquatic Buffers

Findings:

- Currently the USVI has a territorial wide buffer requirement of 25 ft from the edge (or 30 ft centerline) of waterways (including dry guts). Regulations do not provide detail on designated uses within the buffer zone, utility crossing criteria, vegetative standards, or maintenance provisions. The 2002 USVI Environmental Protection Handbook recommends up to 150 ft buffers in some situations.
- CZM has the flexibility of requiring wider buffers on wetlands, shorelines, and channels as part

of its Tier 1 site plan review process, but this is site specific and not available in Tier II.

- Staff felt like current buffer regulations were sufficient, but enforcement and education was an issue. Enforcement of buffer requirements is not extensive, and many violations (even during newer construction) were observed by CWP. Enforcement in Tier II of buffer encroachment must go through the AG office.

Recommendations:

- Using new aeriels and by walking guts, DPNR staff should identify waterways with inadequate (<25ft) vegetated buffers. This inventory can help identify areas for buffer reforestation, which can often be funded by USDA (in rural areas), dumping prevention; and homeowner or business education.
- Buffers need to be clearly marked on site plans, in the field, and on final plats. Both plan reviews and site inspectors should be looking specifically for buffer and floodplain encroachment (include as item on review and inspection checklists) during each stage of the development process.
- Tier II plan reviewers should be able to negotiate for larger buffers similar to flexibility provided in Tier I.
- If new buffer regulations are being developed, consider revising to include: (1) widths that incorporate 100 yr flood plain or additional area as relates to adjacent steep slopes; (2) vegetative targets and selective clearing guidelines; (3) wetland critical area provisions; (4) design standards for roadway and utility crossings.

1.4 Better Site Design

This topic was discussed in further detail on Day 3, and the group applied concepts during a redesign activity for a STX residential and commercial site plan.

Findings:

- The 2002 USVI Environmental Protection Handbook lists the 22 principles of Better Site Design. Staff reported that most were feasible and applicable here in USVI.
- While much of the new residential development is single lot, they are beginning to see large subdivisions (60 acre +).
- Roads are already narrow and mostly open section, though newer developments are changing over to curb and gutter. Flexibility in turn around design with depressed, landscape centers is feasible. In particular, staff liked the idea of partially pervious parking lots and using landscaped islands for stormwater treatment. Given the lack of adequate parking, reducing parking ratios was not favorable. Stall dimensions are already small, and shared parking has been perfected.
- Group housing or planned area developments allow for some site design flexibility, though "cluster" development or open space designed neighborhoods weren't considered by staff as marketable on the island. Reduced setbacks for septic and houses were not seen as favorable techniques. Most housing requires cisterns, unless on water/sewer, and two-track or other porous driveway designs were observed. It was noted that a new housing neighborhood on

STX has downspouts that discharge to the yard.

- It was agreed that open space management in these neighborhoods is an issue. Staff agreed that buffer protection and maintenance, and limitations on clearing and grading were important. Currently there are no incentives during the site planning process (such as density bonuses) to encourage additional open space protection.
- Challenges for BSD are derived from owners and site designers not understanding limitations due to physical site characteristics, desire to maximize view, septic system requirements, clearing and grading issues, and steep slopes. Many owners, architects, and engineers are located in Florida or other off-island locations and may not necessarily visit the site.
- During the site redesign activity, staff found opportunities to improve ESC implementation by relocating brush berms outside of gut buffer; increase open space along floodplain by reducing lot sizes elsewhere on site; and capture and treat stormwater on site, particularly in parking lot landscaped islands. Staff agreed that this level of critique and conceptualization could be beneficial for pre-consultation meetings during the plan review/approval process.

Recommendations:

- Owners should be required to attend a pre-consultation meeting with plan reviewers and site designers to make sure better site design principles are employed where possible and that ESC and stormwater plans are designed to minimize impacts.
- Reconsider policy that may discourage cisterns on residences in areas where water and sewer are available. These areas are vulnerable to loss of water during power outages, require additional resources to desalinate drinking water, and add stormwater volume from rooftop drainage.
- When the Environmental Protection Handbook is updated, eliminate the Better Site Design principles that are not applicable to USVI and add others that are specific to USVI (e.g. steep slope designs).
- Consider adding a statute of limitations on site plans that are approved. Given the amount of time it takes for construction to occur, technologies and site design requirements are likely to change between the time of approval and on the ground construction.

1.5 Erosion and Sediment Control (see Section 2.0)

1.6 Stormwater Management (see Section 3.0)

1.7 Managing Non-stormwater Discharges

Findings

- Overall, preventing illicit discharges on the island may be a higher priority than watershed planning. Discharge detection and elimination is one of the requirements of the TPDES program. Staff considered marinas, septics, and sanitary sewer overflows (SSOs) as the most critical non-stormwater discharges of concern.
- There is a potentially high (yet unknown) rate of septic failure given physical soil limitations

and maintenance challenges (mainland estimates for septic failures average around 30%). DEP is in the process of conducting a septic inventory to get a handle on how many systems are currently in place and their location. Innovative septic designs are encouraged on the islands according to staff; DEP reported new performance standards for new systems were distributed last week. Old systems are not allowed in Tier I without soils test.

- Infiltration into aged sewer lines during rain events causes chronic sewage overflows in a number of locations on the islands.
- Live-aboard discharges and boat maintenance make the local marinas a target for discharge prevention. A new island-side clean marina program is up and running under WQ staff; so bringing the marinas on board will be key. A lot of the TMDLs involve reducing live-aboard discharge and enforcing no discharge zones.

Recommendations

- Need to complete the septic survey and start thinking about how to encourage regular inspections and pump outs. A product of the survey should be GIS map locating systems so hotspot (high density) areas or watersheds can be identified for maintenance pilot programs or other educational efforts.
- Chronic SSO issues need to be resolved. This should be a priority for the wastewater management authority and health department, but for DEP water quality program as well.

1.8 Watershed Stewardship

Findings:

- The USVI has a lot going for it from the perspective of watershed monitoring, education, restoration, and advocacy.
- CZM and DEP have coordinated education programs. Watershed education providers on island include SEA, CES, UVI, RC&D, TNC, The Ocean Conservancy, and Coral Bay Com. Council.
- There are examples of gut repair, stormwater retrofit, and mangrove restoration projects on the island already.

Recommendations:

- Need to fill the vacated USDA-CES educators position. CES and UVI are good resources for developing training and certification programs, demonstration sites, design manuals, and other technical projects beyond the scope of DPNR staff.
- DPNR should consider actively utilize watershed groups and other education providers to supplement outreach efforts with the community.
- These should be promoted in the media and used to involve and educate local communities, build staff technical capacity and inter-agency coordination, and generate political support for further watershed efforts.
- Consider adding sampling stations in strategic guts and wetlands to evaluate wet weather

flows.

2.0 Erosion and Sediment Control

The morning of Day 2 was spent discussing the challenges of implementing an effective erosion and sediment control program in the USVI given limited staffing, large volume of active sites, and lack of enforcement. The clearing and grading phase of construction is one of the most critical and potentially harmful periods of the development cycle. CWP presented program elements that other jurisdictions are using that may be applicable in USVI. We also discussed various practices and techniques that should be used on USVI construction sites. Details on recommended approaches and practices, as well as photos illustrating ESC in USVI can be found in the two PowerPoint presentations developed for the workshop.

Findings:

- Based on discussions with staff and sites visited in the field, it is apparent that the USVI is not applying adequate erosion and sediment control measures on construction sites. ESC on construction sites > 1 acre disturbance is a requirement under the TDPEs. The table below compares ESC program elements for Tier I and Tier II earth change as reported by staff. Noting differences between process in Tier 1 and 2, Syed reported that a consistent application of ESC across both Tiers is the goal of upcoming TPDES program.

Comparative Summary of ESC Requirements Across Tiers		
	Tier 1 (CZM)	Tier 2 (DEP)
Disturbance threshold triggering ESC plan	<ul style="list-style-type: none"> • Technically every project (major and minor) with the exception of single residences. • Coastal commission can require single residences to have plan • Cost of construction often determining factor 	<ul style="list-style-type: none"> • No threshold, though smaller projects may not be required • Internal decision
Plan Review (how many staff; pre-design meeting; site walk)	<ul style="list-style-type: none"> • STT (3 staff) + 1 for major; STJ (1 staff); STX (3 staff) + 1 for major • 1 territorial wide for major; each division also gets opportunity to review and comment • There is a pre-design concept meeting • Generally do get out on site during review process 	<ul style="list-style-type: none"> • STT/STJ (1 staff); STX (1 staff) + 1 for major • Meet after review of proposal • Do go out to site if possible during review process
Average # of permits annually	<ul style="list-style-type: none"> • STT/STJ: 200 minor/20 major • STX: 60 minor/20 major 	<ul style="list-style-type: none"> • STT/STJ:? • STX: 500
Plan components	<ul style="list-style-type: none"> • Limits of disturbance and practice location and type included • Checklist available for major • Often get really vague plans from applicants ("there will be maintenance" vs "everyday will shovel roads") 	<ul style="list-style-type: none"> • Do have a new ESC checklist • Do see sequencing; phases; stockpiles, LOD, etc
Inspection (# inspectors; frequency)	<ul style="list-style-type: none"> • STT/WI: 2 major/ 2 minor • STJ: 2 major/1 minor • STX: 3 cover major and minor • 1 territorial wide • Reviewers are typically same staff as inspectors 	<ul style="list-style-type: none"> • 1 territorial • STX:1 (also reviewer)

Comparative Summary of ESC Requirements Across Tiers		
	Tier 1 (CZM)	Tier 2 (DEP)
	<ul style="list-style-type: none"> Also inspected by Building and Permits (STX 2; STT/STJ have 4); 1 Floodplain coordinator; enforcement officers (though rarely) Sites visited 1-2 times during life of project and then once again at final Respond to citizen complaints, no formal hotline 	
Enforcement	<ul style="list-style-type: none"> Can enforce conditions in permit and have flexibility to call out specific ESC in permit Inspectors cannot issue ticket, but can issue cease and desist order after one-day administrative turn around outlining mitigation and corrective measures 7 days for site to comply 	<ul style="list-style-type: none"> Relatively no tools to require as permit condition Can issue notice of non-compliance with Earth change permit on site 5 days to fix; if don't settle, it has to go thru the AG office Can't issue stop work order
Land clearing	Issue permits only for construction projects	Permits for construction as well as other land clearing (forestry) activities
This table is based on notes during workshop discussion and should be verified by DPNR		

- Staff felt like the biggest hurdles to better ESC implementation were: not enough inspectors to get to sites; need for inspectors to have more authority on-site to issue violations; lack of knowledge on the part of machine operators; lack of general public information about what we need to be doing; and a lot of work occurs on the weekend when enforcement staff are not around.
- Funds from plan review fees and permit violation fines are not directed back into earth change program.
- A new media campaign promoting importance of ESC is being developed by DEP.
- While Tier 2 makes up the majority of island area, sees 2-3 times more permit requests annually, and has a shorter review period (is this true?); they have significantly fewer plan review and inspection staff than Tier 1. Tier II does not have a public notification unless it's a big project. Tier 2 does not have the same amount of authority to require specific ESC practices as a condition of permit as in Tier 1. This coupled with the lack of authority of inspectors to issue stop work orders or levy fines immediately on-site adds to susceptibility of ESC failure island-wide.
- If staff does not approve/deny permit within a designated time period (30-60 days?), the plan is automatically approved regardless of the quality of the project.
- The target frequency of site inspections was reported by staff to be at least 2-3 times during the life of the project. Other communities are requiring inspection frequencies every 14 days or within 7 days of a large storm event. It is clear given current staff capacity that an inspection frequency such as this is highly improbable.
- Options discussed for improving implementation included: educating local leaders; adopting detailed ESC ordinance, increasing inspection capacity; providing compliance incentives; provide training and institute a certification program; demonstrations on public projects; and consider developing watershed-based criteria. The use of performance bonds and private

certified inspectors for ESC was generally accepted as feasible, particularly because there is precedence for both in Building and Permits division.

- There is a general lack of awareness as to who and when tickets can be written. Some inspection staff feels that more authority to enforce would be beneficial.
- Staff agreed that the most effective way to prevent sediment loads from leaving construction sites is to preserve as much vegetation on site as possible through clearing restrictions, site fingerprinting, phased clearing, and waterway protection (buffers).
- Most common ESC practices observed in USVI include: brush berms (not listed in manual because of poor performance), silt fences (reported to rarely be installed properly), block inlet protection, and erosion control mats. CWP observed a silt curtain boom deployed off of Frenchmen's Bay construction site, and noted that construction pad entrances were often not maintained, if installed at all.
- In addition to the practices highlighted by CWP as important for USVI (i.e. perimeter control, temporary seeding, roadway drainage and slope stabilization), staff added diversion dikes and traps and basins (CWP didn't see any of these practices during recon trip). The 2002 USVI Environmental Handbook provides clear design and installation guidance for a wide range of practices that have been adapted from mainland designs to fit island conditions. Most DPNR staff present had read this manual.
- Since dirt roads have been reported to contribute a significant amount of sediment to downstream areas, a variety of options (i.e. paving, water bars, broad-based dips, and open and closed cross-drain culverts) were discussed. Staff requested a design recommendation for steep dirt roads/driveways serving as construction site entrances. A number of alternatives for stabilization were discussed including use of 6x6 lumber to hold gravel in place (5-6 spaced 8-12 ft apart across roadway and held in place with rebar). Use waterbars or cross drains above gravel pad to reduce sediment/stormwater volume contributions from upslope. If room is available, addition of sediment trap(s) at base of road to collect runoff from side ditches and rock pad may be helpful.
- On Day 3, the ESC plan for a residential subdivision was reviewed. The plan showed improper placement of brush berms across a floodplain/gut, did not include a stabilized construction entrance, nor did it provide construction sequencing or ESC maintenance planning.

Recommendations

- DPNR staff should make an effort to educate directors, commissioner, and elected officials by taking them on site inspections to show them first hand how ESC is being implemented (or not implemented) at construction projects. UVI is developing a legislative handbook for environmental issues. Another opportunity to educate elected officials is at the upcoming Coral Reef Task Force meeting in October. A presentation simply illustrating conditions on the ground would be eye opening. In addition, there was a HI Supreme Court decision recently supporting government authority over earth change operations.
- USVI would benefit from uniformity between Tier 1 and Tier 2 permitting and review process, ESC plan requirements, and ESC inspection and enforcement. As part of Susan and Anita's

effort to outline the permitting process, consider adding a flow chart clarifying the various agency roles/procedures for inspection and enforcement and where the differences are between Tier 1 and 2 (start with above table). DPNR is currently viewed as roadblock to development (according to staff). Any chances to review process should be framed as an effort to streamline the process and provide tools for developers and others to minimize impacts to our valuable resources while protecting private property rights.

- What is a good ratio for # staff/permits? If additional inspectors can not be hired, a variety of alternative approaches to increasing inspection capacity should be considered:
 - Continue to take advantage of the variety of site inspections that occur on a site (building, flood, ESC, etc). Improve interagency coordination and communication to get all inspectors on a site trained to recognize ESC problems and follow up with appropriate enforcement agent.
 - Enforcement division staff needs to be utilized for site inspections as their focus has shifted away from enforcing earth change permits unless specifically requested to serve papers. Does CCZMP have any plan review authority? Is there a way to bring them on board to enhance review capacity? This would involve education and likely a reallocation of department goals.
 - Prioritize sites to inspect based on factors such as erosion potential, downstream resources, bad actor contractors, coral spawning periods, rainy season, etc
 - Consider developing a private inspector certification program. Many communities moving towards this type of program because they cannot keep up with # active sites given # of municipal staff. Developers would be required to hire 3rd party inspectors who hold a DPNR ESC certification and reports weekly to designated DPNR staff throughout construction process. Certification will be pulled if site does not meet approved ESC standards.
 - Encourage local “watchdogs” to report potential violations based on readily observable failures (i.e. sediment tracking onto public roadway, failing perimeter controls, excessive sediment downstream). Establish a clear protocol for non-inspection staff, other agencies and community stakeholders to report complaints. There is no current hotline for reporting ESC failure, and non-DEP/CZM staff reported difficulty in getting adequate response.
- Reinstate ESC training program to certify plan review staff, inspectors, and operators on proper ESC techniques, terminology, and enforcement procedures. Staff and operators may be required to renew training certificate every three years. USDA CES used to offer a training program, but it was canceled during recent administrative changes.
- Return a portion of permit fees and fines from violations to the Earth Change program rather than all to general funds or enforcement division. This would allow for staff capacity to increase proportionally to the number of permits being requested. Consider collecting performance bonds to cover the cost of maintaining practices if necessary.
- Investigate potential to require stringent ESC and/or certification as condition for eligibility for bidding on government construction contracts.

- At a minimum, require site operators and subcontractors to sign off on ESC prior to starting work. Plans should be posted on site at all times so operators, inspectors, and enforcement officials can review regularly.
- DPNR has to get serious about enforcement, which will require political support for more stringent permitting conditions, issuing violations, and giving inspectors more meaningful enforcement authority. A 5-7 day period before a stop-work order can be issued does little to prevent additional sediment loss or create incentive for immediate compliance. Investigate potential to utilize water pollution control act, water quality certification, or other enforcement mechanism when processing violations under earth change provisions is too burdensome or slow.
- Consider lengthening the review period for site plans to remove burden on the local plan reviewers and prevent bad plans from being approved. In addition, is there a statute of limitations for approved site plans? If not, consider adding one as technologies and watershed conditions may change over time.
- Use the guidebook, it's relatively recent and was put together pretty well. Come to consensus as a staff on the acceptability of using brush berms (not recommended) and practices outlined in the Handbook (e.g. silt fences).
- Require watershed names on earth change permit applications so you can use # of permits as an indicator of future watershed buildout.
- Continue to invest in demonstration projects similar to USVI/CES hydroseeding project. Make a commitment to showcase innovative and outstanding ESC on public construction sites (including DPW facilities and projects).
- Staff should consult with development community to identify appropriate incentives for compliance such as fast-track review for complete ESC plans, partial funding for innovative ESC practice installation, or an awards program for good actors.

3.0 Stormwater Management

On Day 2, we discussed the state of post-construction stormwater management on USVI. DEP is responsible for TPDES program and is currently in the process of crafting a new stormwater ordinance. We discussed elements of an effective stormwater program, as well as some design adaptations of common practices seen on the mainland to fit island conditions.

Findings:

- The USVI post-construction stormwater program is still in its infancy. Administration of a comprehensive program is going to require a significant increase in DPNR staff effort, technical engineering capacity, and budgetary resources than currently allocated.
- There are no plans in the works for funding the stormwater program (ie. stormwater utility/users fees, tourist tax).
- Most stormwater, with the exception of residential rooftop drainage, is currently untreated and discharged directly into guts, wetlands, and harbors. Most residential rooftops drain to

cisterns. Staff reports only a handful of stormwater practices on the ground in USVI: geoweb and paving blocks; oil and water separators; bioretention, and ponds. Oil/water separators don't work, sorry.

- Stormwater challenges on the island include variable rainfalls from east to west ends, lack of demonstration projects; and little design guidance for mainland practices that have been adapted to local USVI conditions. CWP presented some design adaptations for bioretention, swales, and other practices. Additional challenges include infiltration into the sewage system, maintenance (no funding or resources); disposal of contaminated wastes; and no practice inspectors.
- Additional stormwater priorities for USVI (other than water quality and flood control) include saving topsoil, reducing costs, and preventing gut erosion.
- CWP observed lots of opportunities for retrofitting, particularly along streetscapes and in parking lots of urban areas on STT and STX. Staff was particularly interested in infiltration and bioretention practices and seemed to think that porous pavers were a feasible alternative.

Recommendations:

- Syed should go through the post-construction program questionnaire provided by CWP to identify program elements that should be incorporated in the TPDES program and stormwater ordinance. DPNR needs to start now thinking about how to fund the program as capital costs and man power (design review, inspection) can be expensive.
- The stormwater ordinance will need to include specific treatment criteria, reference a design manual, and include meaningful inspection and enforcement authority. As program becomes more established, consider developing variable criteria based on island rainfalls patterns and specific watershed concerns. The 2002 Environmental Handbook should be reviewed and updated to include design adaptations for mainland practices that are better adapted to suit the USVI.
- As with ESC, DPNR should strive for a single tier system for sizing criteria, review process, and enforcement procedures for long term post-construction stormwater program.
- Many communities have to go back and inventory hundreds of practices because they had no idea how many facilities had been installed, where they are located, or how well they are being maintained. DPNR should start now while the list is fairly short creating a tracking system for mapping stormwater facilities. This system should record year installed, type of practice, ownership, maintenance schedule, etc.
- Before approving practices, DPNR needs to establish a mechanism for ensuring long-term practice maintenance. This may involve design features (maintenance access, pre-treatment, or native vegetation requirements), performance bonds, and long-term maintenance contracts. What's the plan for removing dredged materials from ponds?

4.0 Watershed Planning

Day 3 focused on effective watershed planning. The group discussed reasons why watershed plans typically fail, the various planning efforts USVI has, and planning tips for improving chances for implementation. We talked about the Salt River Bay Watershed as an example of how to move forward with watershed planning, and then in small groups devised a ranking scheme for deciding which watersheds should be priorities. Additional information on recommended approach to watershed planning can be found in the presentation prepared for the workshop. An initial attempt at summarizing known information for USVI watersheds as well as a map of those watersheds was also provided as workshop material.

Findings:

- The USVI has a lot going for it in terms of watershed planning: small watersheds already delineated (could move to a larger HUC 14?); existing plans to launch from; and extensive GIS, water quality, and natural resource data are readily available. The missing pieces are adequate stakeholder involvement; on-the-ground identification of restoration and protection opportunities; and long-term implementation strategies.
- DPNR has a history of watershed planning efforts including APCs and LAS by CZM, and Watershed Restoration Action Strategies (WRAS) and TMDLs by DEP. Each process has its own mandate, goals, and established list of priority watersheds and is not necessarily coordinated between DPNR divisions or with other agencies.
- There are 18 APCs (does each have its own plan?), which are not necessarily at the watershed scale. There is a document outline an approach to completing WRAS; there is one completed WRAS for the Fish Bay watershed, which hit an implementation snag very early. There are 8-10 TMDLs completed to date, and a schedule for completing more, however implementation of the recommended measures has not been clearly defined. The recent TMDLs are generated by models and often lack specific on-the-ground projects for reducing watershed contributions. The APC's and the WRAS to date have not had much implementation success; however they provide a ton of data and recommended management approaches for many of the watersheds.
- Implementation seems to fall short for a number of reasons: lack of political support; lack of interagency and stakeholder involvement upfront in the planning process; loose recommendations without an implementation strategy (who what when where how \$); lack of a designated coordinator to shepherd long-term implementation; and lack of demonstration or easy projects to build confidence and support. Staff expressed concern that previous planning efforts that never went anywhere would turn frustrated community stakeholders away from further participation.
- There are currently three independent DPNR watershed efforts: APC, TMDL, and WRAS. These efforts are not necessarily coordinated between CZM and DEP, though CZM and DEP have an informal agreement to coordinate; starting with the creation of an intra-agency working group. Staff agrees that DPNR needs to get its own house in order before pursuing additional watershed planning efforts. This involves a couple of key decisions:
 - Who should be leading this effort, and why does it need to be done?

- Do we want to align our planning efforts? If so, how do we reconcile divergent program drivers and priorities that are already established?
 - Can we get a formal commitment from DPNR directors and commissioner not only for planning but also for support of long-term implementation?
 - Do we embark on new planning efforts, on implementation of existing (and potentially outdated) plans, or some combination of the two?
 - Do we designate a formal watershed coordinator, department, or interagency committee to coordinate watershed management efforts? If so, who internally and externally needs to be involved? How does this participation list change on a watershed basis?
 - How do we approach the community, particularly in light of past planning efforts that have not resulted in implementation?
 - Are there separate approaches for island-wide implementation vs. watershed-specific recommendations?
 - Do we develop a new process for watershed planning based on a pilot watershed, or do we use approach outlined by WRAS?
 - While watershed delineations have already been done for the islands, decide what scale we want to approach management over the long-term. Options may include: TMDL divisions, HUC 14, or watershed clusters (all urban watersheds, all rural watersheds, all to-be-developed watersheds).
- Within DPNR, a representative from CZM, DEP, Building and permits, DFW, CCZP, etc need to be at the table as a core planning team or advisory working group. A larger island-wide inter-agency committee that includes Parks, Dept of Ag, Wastewater management authority, NRCS, WAPA, ACoE, UVI was discussed. At the watershed scale, non-government interests like marina owners; prominent developers, environmental groups and civic associations will need to be involved.
 - Staff liked the idea of having an objective, quantitative method for ranking watersheds as priorities for future planning/implementation that can be used to justify choices to officials and the public. Overall they felt like we should start with the easy; least controversial watersheds first (which ones are those?). Protection-oriented watersheds (still sensitive) should be priorities before restoration-oriented (already impaired). Factors the group considered as potential candidates to compare watersheds are summarized in the table below:

Recommendations:

- Before we can recommend a watershed planning approach, DPNR needs to address many of the questions listed above. Continue with an interagency working group to get DPNR house in order and obtain commitment for watershed planning approach BEFORE opening up to other agencies and involving public. Need to develop a clear message to managers and officials as to why watershed management is worth the staff effort.
- In the meantime, we recommend completing an inventory of existing monitoring data, reports, and recommendations organized by watershed. This inventory should provide baseline information and metrics on each watershed that can be used to (1) rank watersheds for future

planning and implementation; (2) identify easy projects/actions for immediate implementation; and (3) identify larger island-wide actions that will need to be revisited in order to develop an effective implementation strategy. This inventory can also be used to evaluate what progress has been made on implementing previous plans and where the gaps are in other watersheds of concern. At a minimum, an island-wide baseline characterization can help bring important information regarding water resources into the comprehensive planning process, rezoning decisions, and earth change.

Example ranking factors and scoring mechanisms			
Factors		Example scoring	
		Restoration	Protection
Land use	<ul style="list-style-type: none"> - Dominant land use (% developed; com, ag) - Dominant land cover (ie. % IC, % forest cover) - Growth potential (% undeveloped; # permits issued; zoning; % future IC) - % public land - population density 	More points for urban land uses; % IC >20%; and high public lands. Lower points if more development expected	More points for: <ul style="list-style-type: none"> - less intense land use - > undeveloped land - % IC close to 10%; - expecting lots of development in future
Soils	<ul style="list-style-type: none"> - Groundwater resources (# wells; % recharge areas) - Erosion vulnerability/potential - % steep slopes 	More points for high erosion potential, steep slopes and groundwater supplies	
Existing Impairments	<ul style="list-style-type: none"> - 303(d) listing; TMDL - Septic density - TPDES permits and point discharges - # dump sites - # marinas - Flooding complaints - Chronic SSOs; sewer line density - Density or miles of dirt roads 	<ul style="list-style-type: none"> - Presence indicates higher restoration potential (unless too far gone for restoration) - Use TMDL rankings of H, M, L to score 	Generally increased presence indicates protection efforts too late
Natural Resources	<ul style="list-style-type: none"> - Coral reef presence - RTE plants/animals - Biodiversity ranking - Ecotourism potential - % open space 	<ul style="list-style-type: none"> - Higher score as value of resource increases (mangroves, wetlands, rainforest, species, etc) - Coral reefs can be scored along a no reef, degraded, healthy, healthy and protected continuum. 	
Cultural resources	<ul style="list-style-type: none"> - How many sites - Significance - Vulnerability to development 	<ul style="list-style-type: none"> - Ecotourism can be scored H, M, L based on presence of cultural/enviro resources 	
Community support	<ul style="list-style-type: none"> - Organized stakeholders - Presence of watershed association - Schools or churches present - # HOAs and distinct communities 	Higher score if community support available; based on activity, number of groups, etc (a bit subjective)	
Size	<ul style="list-style-type: none"> - # stream miles - Size of watersheds - Which island is it on - # of estates or landowners 	Larger the watershed the lower the points (restoration efforts need to be focused); more landowners = fewer points	Larger the coverage the better as most protection plans are regulatory or programmatic in nature
Available data	<ul style="list-style-type: none"> - # plans already - Available data (monitoring, TMDLs, etc) - Existing restoration projects; conservation easements 	The more existing plans, the more difficult stakeholders may be, but more data and experience to jumpstart from	

Table summarizes potential ranking factors identified by groups

- Start implementing easy projects previously identified either through the APC, WRAS, or TMDL processes. Many of these plans fell short because some recommendations required legislative action or were too big. If smaller projects have been identified, go ahead and put them in the ground. Establish a tracking system to keep a running list of projects so progress towards meeting watershed goals can be reported.
- If and when DPNR is ready to move forward with additional planning, CWP feels like USVI is not far off from having implementable plans in place. At a minimum, commitment and early participation of key implementation stakeholders (i.e. agencies, elected officials, marina operators, developers, relevant watershed associations and civic groups, university) within the watershed is critical to its success.
- Conduct ranking process to identify which watersheds should be the focus of future efforts. Conduct an analysis to identify which watersheds are going to be experiencing significant land use changes over the next 5-10 years. Consider taking 1-3 watersheds (a protection-oriented watershed and a restoration-oriented watershed) and piloting a unified watershed planning process to see how to best build on previous planning efforts, involve the public, and implement projects, and inform a strategic planning process. It is critical that as part of this process, all guts and roadways are walked to identify on the ground restoration and protection opportunities and talk with local residents.
- Consider hiring a watershed coordinator (CZM NPS coordinator for example) to take the lead on coordinating DPNR planning and implementation efforts. Consider delegating overall planning authority to CCZP. Are they hiring someone to do a watershed plan for East End??
- It is important to distinguish between watershed recommendations that are island-wide (such as regulatory or programmatic changes), versus those applicable to a group of watersheds (protection or restoration watersheds); or others that are watershed specific. DPNR can get started on the island-wide recommendations (like those discussed in Sections 1.0-3.0 of this memo) right now without waiting for a watershed plan.

5.0 Priority Next Steps

Recommendations for DPNR to improve implementation of erosion and sediment control, stormwater, and overall watershed protection and planning were outlined in the previous sections of this memo. In summary, immediate next steps for DPNR may include:

- Susan and Anita should include the site inspection process and enforcement mechanisms for ESC and stormwater management as part of current effort to map out the departmental permitting process for both Tier 1 and Tier 2 developments. Use information derived from this workshop as a basis for that flowchart.
- DPNR staff and managers need to actively support adoption of comprehensive plan by identifying benefits of planning for water resource management, predicting departmental staffing and budgetary needs, and empowering CCZP. Use the upcoming Coral Reef Task

Force meeting as one of many opportunities to publicly demonstrate the link between land use planning, watershed management and coral reef protection. This effort can also be assisted by conducting a rudimentary build out analysis by CCZP, which would help illustrate the need for comprehensive planning.

- If additional permit requirements or enforcement authority for erosion and sediment control at construction sites cannot be obtained in the short-term, at least re-establish ESC training/education program for reviewers, inspectors, enforcement officers, and operators. This would help to ensure that plan reviewers are recommending more adequate ESC controls, inspectors are on the same page in evaluating site conditions, and operators are aware of their responsibilities. Test the waters to see if a private certification program is feasible which would shift a large part of the inspection burden back onto the development community.
- Finalize and adopt new stormwater ordinance, and update stormwater design manual with island specific design adaptations.
- DPNR inter-agency watershed working group needs to meet and begin to answer the questions posed in Section 4.0. This group may want to begin compiling and summarizing watershed data, identify watershed priorities, and complete a detailed 8 tools audit to identify tools available (as well as gaps) for watershed management. A family-tree outlining departments, divisions, and other agency roles relevant to watershed protection would be useful, particularly for VITEMA, Waste Management and Environmental Health, Enforcement, and Public Works who were missing from the workshop discussion.
- Consider completing a pilot assessment and planning project in one or two watersheds as a means of informing DPNR's strategic watershed planning process. In 3-6 months, field assessments, mapping analyses, and preliminary public involvement could be completed. This effort could be used to test potential for integrating APC, WRAS, TMDL processes as well as inter-agency implementation.
- Continue to increase public and elected official education efforts on water resource protection topics through media campaigns, utilizing watershed/community groups as education providers, site visits, and demonstration projects.

6.0 Workshop Evaluation

A total of 12 evaluation forms were completed and returned to CWP. Summary of those evaluations is provided below:

1. Did the workshop meet your needs? (check box)

1	2	3	4	5
Fell short of expectations				Exceeded expectations
			7 out of 11	4 out of 11

Comments:

- Excellent presentations; could have been another day
- Wish we had opportunity to do a site visit
- Less lecture more hands on
- Sessions helped open our eyes to better practices

2. Please rate the workshop on the following topics (check box):

Session	Poor	Fair	Adequate	Very Good	Excellent
Day 1 Adapting Watershed Tools				10 of 11	1 of 11
Day 1 Stormwater Program Priorities				10 of 11	1 of 11
Day 2 Erosion and Sediment Control Program and Practices				8 of 11	3 of 11
Day 2 Stormwater Program and Practices				9 of 11	2 of 11
Day 3 Watershed Planning				7 of 12	5 of 12
Day 3 Site Design				4 of 9	5 of 9

Comments:

- Follow up needed
- Adapting stormwater practices to island environments was very helpful session showing us different techniques that can be used in USVI
- presenters/CWP was very prepared to answer questions and great presentations

3. Please rate the workshop from the following perspectives (check box):

	Poor	Fair	Adequate	Very Good	Excellent
Written Materials			2 of 11	7 of 11	2 of 11
Session Set-Up (room, AV)			3 of 11	5 of 11	2 of 11
Workshop Organization				6 of 11	5 of 11
Luncheon & Breaks		1 of 11	1 of 11	5 of 11	3 of 11

Comments:

- Luncheon and breaks- it was great having lunch on site

4. What were the most valuable aspects of this workshop to you?

- I also enjoyed the interactivensess of the discussions. A lot was learned from the staff of other divisions regarding their initiatives
- The recommendations given for effective post-construction stormwater programs
- Good/bad stormwater practices (2)
- Watershed planning (2)
- Better site design (4)
- Creating new site design measures
- Breakout sessions and discussions from presentations
- Hearing input from CWP and other agencies
- Coming up with factors for ranking watersheds

5. What things would you change and why?

- None
- Another day
- Have more hands on demonstration (2)
- The length of workshop, too little time and too much material (2)
- Have more than one case study for different watershed areas

6. Are there any resource materials mentioned during workshop that you would like?

- HI stormwater manual; methods to develop restoration plans for small urban sheds
- Site design techniques (2)
- Techniques book and Urban Subwatershed Restoration Manuals

7. Thinking ahead to future CZM workshops, what TWO subject areas would be of greatest interest to you?

- More emphases on the impacts of land use or stormwater and watershed management
- Stormwater issues and site planning
- Coastal protection; drainage practices
- Developing a watershed plan; watershed factors to consider
- Erosion Control Certification
- Water quality monitoring
- Education and outreach for stormwater and ESC

8. Is there additional work you think CWP could help with?

- No
- Training and outreach to construction industry
- Assisting with watershed plan development
- Just have more information on each topic
- Much of the same
- Development of specific watershed plans/implementation plans for the VI as a teaching tool
- Conducting meetings with community groups when getting watershed planning efforts going

9. Any other comments?

- Great workshop, very informative
- More hands on practices and less lecture. It should be 50/50
- Thanks for sharing worthwhile concepts with us
- I loved the interactive type seminar. Getting input from the other departments was very helpful