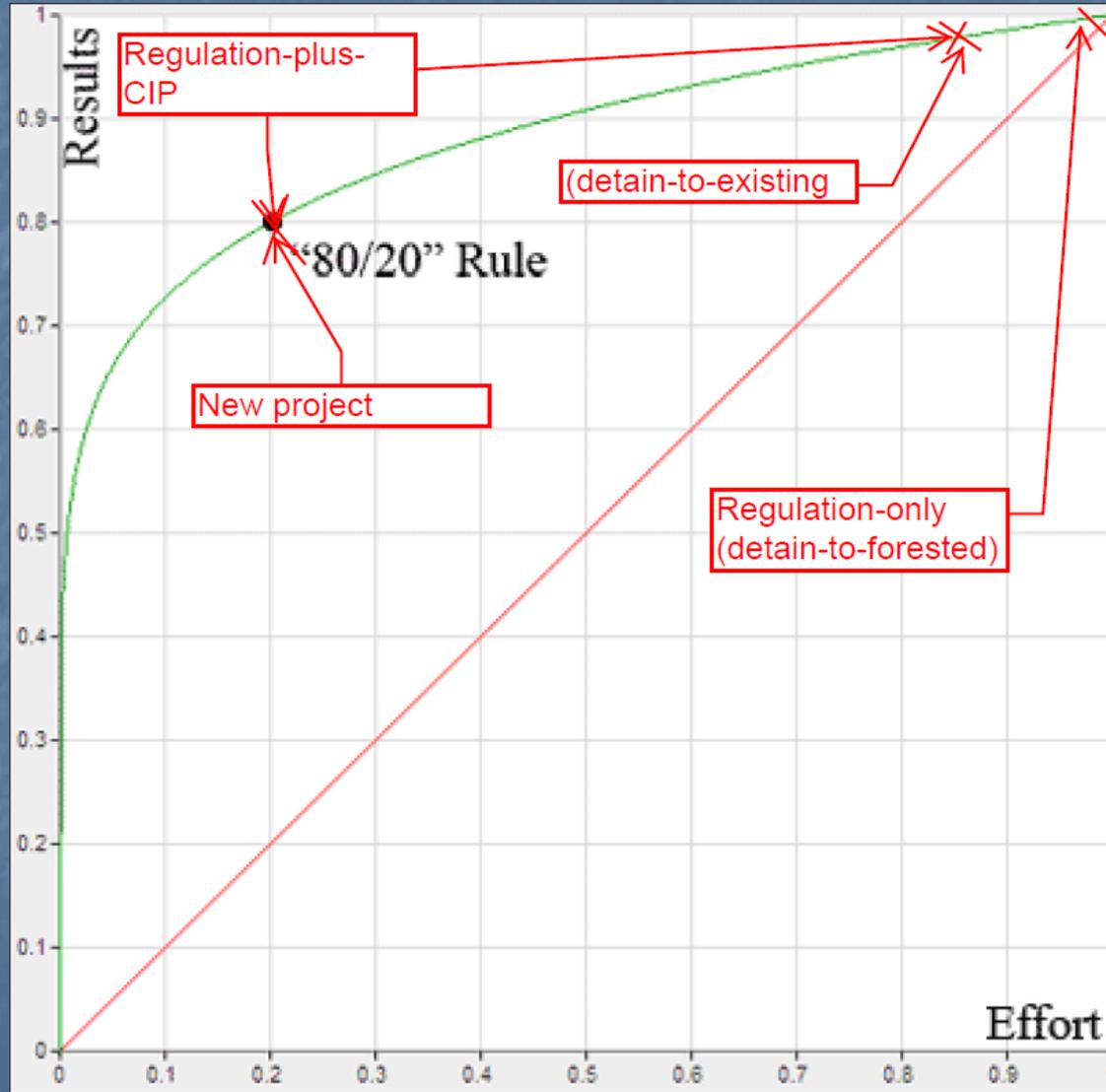


CLARK COUNTY WATERSHED MANAGEMENT:

Comparison of "Regulation-only" vs.
county's "Regulation plus CIP" watershed
management strategy

"REGULATION-ONLY" VS. "REGULATION PLUS CIP"



"REGULATION-ONLY" VS. "REGULATION PLUS CIP"

a. "Regulation-only"

The screenshot displays the WWHM3 software interface. The main window is titled "TDA1 Mitigated" and shows a schematic of a subbasin named "NEWDEV". The schematic is a grid-based diagram with various elements connected by lines. A legend on the left lists "SCENARIOS" (Predeveloped, Mitigated) and "ELEMENTS" (various icons). The right panel shows the "Available Pervious" and "Available Impervious" properties for the subbasin.

Subbasin Name: NEWDEV

Flows To: Surface: rain to forested pond; Interflow: rain to forested pond; Groundwater: [empty]

Area in Basin: Pervious Total: 3 Acres; Impervious Total: 17 Acres; Basin Total: 20 Acres

Available Pervious	Value
SG2, Lawn, Flat	0
SG2, Lawn, Mod	0
SG2, Lawn, Steep	0
SG3, Forest, Flat	0
SG3, Forest, Mod	0
SG3, Forest, Steep	0
SG3, Field, Flat	0
SG3, Field, Mod	0
SG3, Field, Steep	0
SG3, Lawn, Flat	3
SG3, Lawn, Mod	0
SG3, Lawn, Steep	0
SG4, Forest, Flat	0
SG4, Forest, Mod	0
SG4, Forest, Steep	0
SG4, Field, Flat	0
SG4, Field, Mod	0
SG4, Field, Steep	0

Available Impervious	Value
ROADS FLAT	17
ROADS/MOD	0
ROADS/STEEP	0
ROOF TOPS/FLAT	0
DRIVEWAYS/FLAT	0
DRIVEWAYS/MOD	0
DRIVEWAYS/STEEP	0
SIDEWALKS/FLAT	0
SIDEWALKS/MOD	0
SIDEWALKS/STEEP	0
PARKING/FLAT	0
PARKING/MOD	0
PARKING/STEEP	0
POND	0

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"REGULATION-ONLY" VS. "REGULATION PLUS CIP"

b. "Regulation plus CIP"

The screenshot displays the SWMM5 software interface. On the left, a grid shows a basin layout with various elements like ponds and structures. The right panel, titled 'Basin Properties', is configured for a subbasin named 'REGDEV'. It shows flow options for surface, infiltration, and groundwater, all set to 'Contain to existing pond'. The 'Area in Basin' section lists 'Available Pervious' and 'Available Impervious' materials with their respective area values. The 'Permeable Total' is 0 Acres, 'Impervious Total' is 17 Acres, and the 'Basin Total' is 17 Acres. The interface also includes a 'SCENARIOS' panel, 'ELEMENTS' panel, and a 'Move Elements' panel.

Basin Properties

Subbasin Name: REGDEV Designate as Basin for MSD

Flows To: Surface: Infiltration: Groundwater:

Area in Basin Show Only Selected

Available Pervious		Available Impervious	
<input type="checkbox"/> 001 Lawn_Steep	0	<input checked="" type="checkbox"/> ROCKFLAT	17
<input type="checkbox"/> 003 Forest_Flat	0	<input type="checkbox"/> ROADGRADE	0
<input type="checkbox"/> 003 Forest_Mod	0	<input type="checkbox"/> ROADSTEEP	0
<input type="checkbox"/> 003 Forest_Steep	0	<input type="checkbox"/> ROOFTOPFLAT	0
<input type="checkbox"/> 003 Field_Flat	0	<input type="checkbox"/> DRIVEWAYFLAT	0
<input type="checkbox"/> 003 Field_Mod	0	<input type="checkbox"/> DRIVEWAYMOD	0
<input type="checkbox"/> 003 Field_Steep	0	<input type="checkbox"/> DRIVEWAYSTEEP	0
<input checked="" type="checkbox"/> 003 Lawn_Flat	1	<input type="checkbox"/> SEWLINEFLAT	0
<input type="checkbox"/> 003 Lawn_Mod	0	<input type="checkbox"/> SEWLINEMOD	0
<input type="checkbox"/> 003 Lawn_Steep	0	<input type="checkbox"/> SEWLINESTEEP	0
<input type="checkbox"/> 004 Forest_Flat	0	<input type="checkbox"/> WALKWAYFLAT	0
<input type="checkbox"/> 004 Forest_Mod	0	<input type="checkbox"/> WALKWAYMOD	0
<input type="checkbox"/> 004 Forest_Steep	0	<input type="checkbox"/> WALKWAYSTEEP	0
<input type="checkbox"/> 004 Field_Flat	0	<input type="checkbox"/> POND	0
<input type="checkbox"/> 004 Field_Mod	0		
<input type="checkbox"/> 004 Field_Steep	0		
<input type="checkbox"/> 004 Lawn_Flat	0		
<input type="checkbox"/> 004 Lawn_Mod	0		

Permeable Total: Acres Impervious Total: Acres

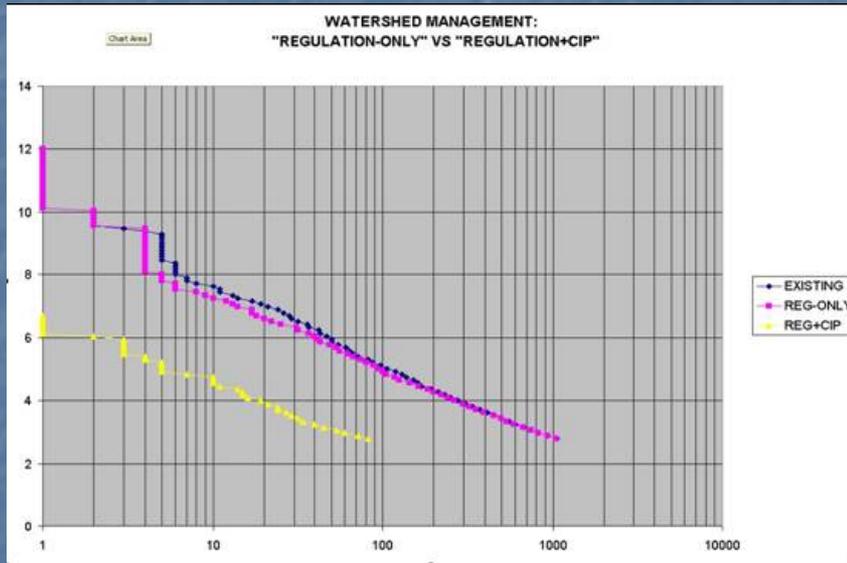
Basin Total: Acres

Default Desc Select By:

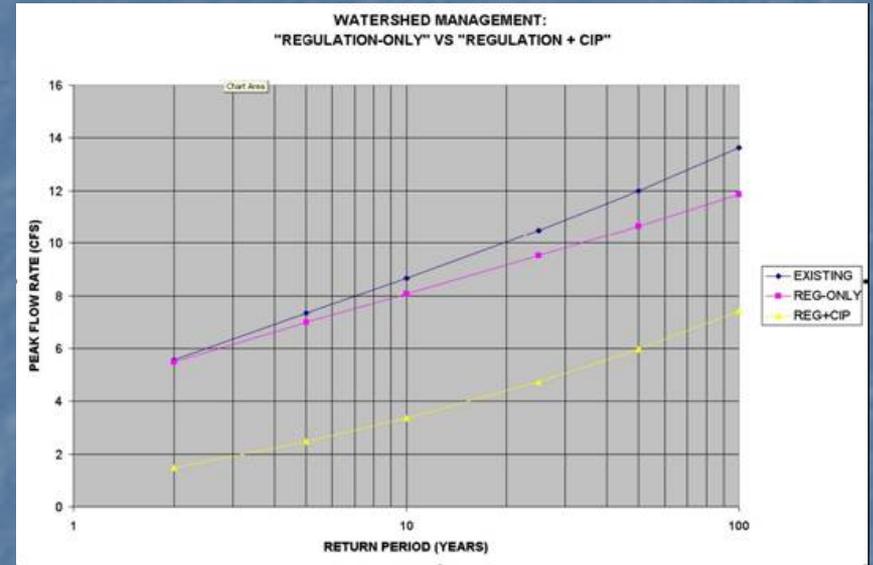
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"REGULATION-ONLY" VS. "REGULATION PLUS CIP"

Results:



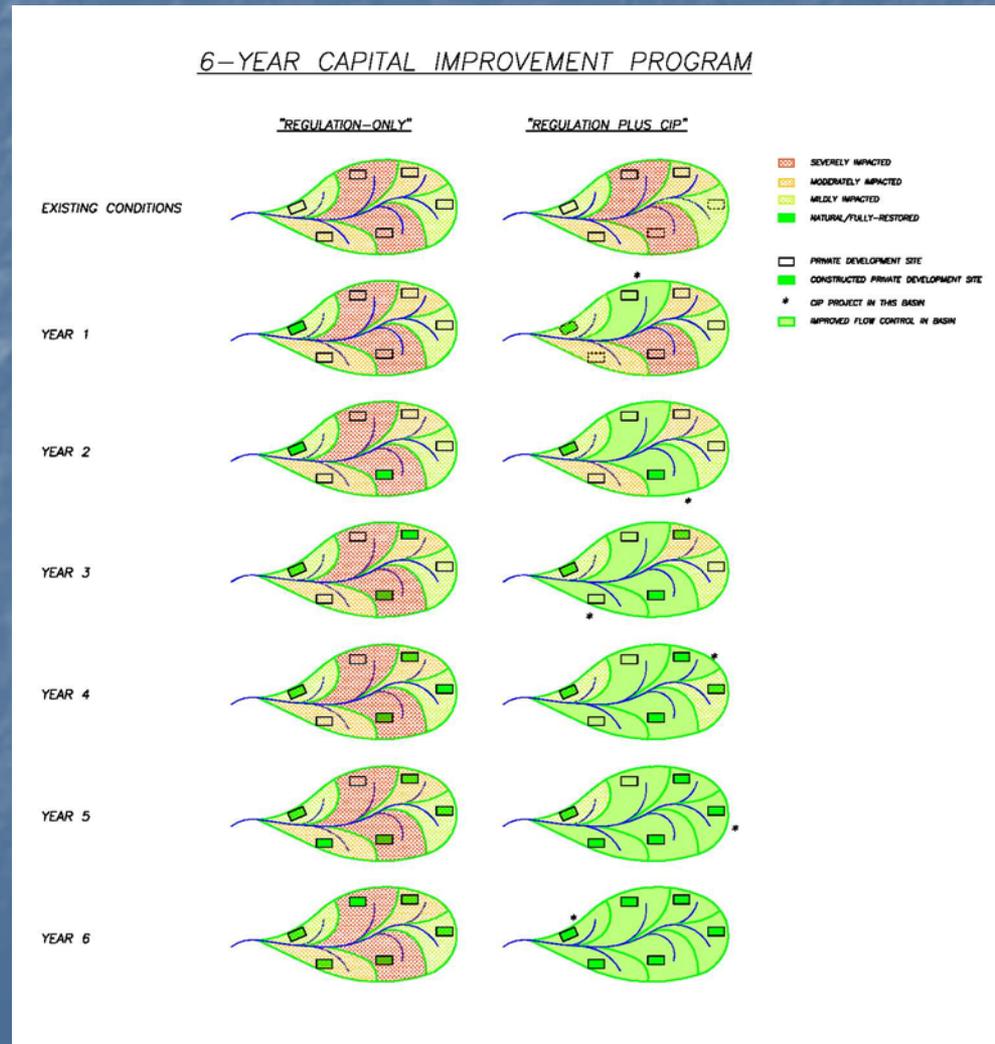
FLOW-DURATION



FLOW-FREQUENCY

"REGULATION-ONLY" VS. "REGULATION PLUS CIP"

6 year CIP period



"REGULATION-ONLY" VS. "REGULATION PLUS CIP"

Reasons for improved performance

- The recent increases in stormwater detention volumes are used to make flow control improvements in key, targeted watershed locations rather than randomly (i.e. wherever new development occurs)
- The *differential* detention volume produces only marginally improved flow control for the "regulation-only" alternative("80-20 rule", "pareto principle"); those same storage volumes are utilized more often and more effectively when included in targeted watershed improvement projects
- The WWHM model set up and "passing" criteria is fairly conservative; because of this, facilities designed to "match" existing peak flow and duration may actually produce a significant improvement over existing flow conditions over much of the stream's hydrologic regime. This allows the county's approach to make significant flow control improvements in two stream locations rather than one
- By developing Infiltration Zone mapping, and emphasizing an infiltration-retention-detention hierarchy for stormwater runoff, the county's selected projects can provide better flow control than a similarly sized project in many new development locations
- In marginal infiltration areas, but where flood risks are shown to be minimal, *public* projects that utilize infiltration or retention of stormwater runoff can be built; a regulation-only approach would require the use of detention ponds for private developments in those same locations.
- A "regulation-only" approach may be unnecessarily over-controlling flows releasing to stream channels that have already adjusted over a long period to a pasture condition; this is common in much of the agricultural area of Clark County.

"REGULATION-ONLY" VS. "REGULATION PLUS CIP" Additional Environmental Benefits

The following additional benefits may also result from sustained use of the county's watershed management strategy over time:

- Significant watershed improvements are constructed concurrently with new development
- In addition to improved flow control, the county's strategy provides significant additional watershed and environmental benefits
- The county's offsite flow control mitigation projects can include additional *water quality* treatment components at little additional cost
- The development of "multi-use" projects, and cost-sharing between county departments can leverage Stormwater CIP funds to improve the cost-effectiveness of the Stormwater CIP still further
- The county's holistic watershed management approach improves the "sustainability" of the county's water resources and natural resources
- The cost-effectiveness of the county strategy also improves the *economic* sustainability of the county's water resources, salmon-recovery, and environmental programs.