TAC Charette Notes
WATER RESOURCES TAC
28 and 29 March 2006

Top Five Strategies for Interdisciplinary Roundtables

The following five strategies were among those developed by the Day 1 attendees (approximately 25), and found highest in value by the Day 2 attendees (approximately six).[1] The Day 2 attendees recognized that a vote by the full TAC might result in different priorities, but did feel that the overall results closely matched their sense of the discussion from Day 1. Commentary is added below each strategy as general explanation.

STRATEGY 1: Test, compare and evaluate a broad range of methods to assess remaining capacity of deficits for water availability for both ecological and human water needs. Both currently feasible and long-term method

> *The Highlands Council is currently using several methods (Low Flow Margin of Safety, Base Flow Recurrence Interval, Hydro-ecological Integrity Method). Additional methods should be tested to determine their appropriateness for either immediate or future use. Case testing would be useful – including field testing of some methods that involve ecological analyses. Methods suggested included Range of Values Analysis, New England Aquatic Base Flow, Tennant, R2 Cross and Stream Wetted Perimeter.*

Implementation Steps

- Identify inventory methods (see ideas on Problem Statement #2, plus others from academic researchers, states, USGS, The Nature Conservancy, etc.)
- Screening for potential applicability (need team with broad trust, funding, time, scientific skills)
- Test – need criteria, broad applicability, application to multiple conditions. Case studies and regional analyses
- Assess viability through feasibility analysis
- Transparency throughout process – defensibility is key to the process
- Stakeholder interaction should occur at all key points
- Rigorous peer review
- Resources and data needs

[1] Note: TAC members felt that the problem statements were mostly water availability and supply in focus, but attention also needs to be focused on water quality.

Inventory and screening – cheap, but technical
Major resources will be needed for testing the methods, with the amounts being method driven

- Examples and Case Studies
  See ideas and cited references on Problem Statement #2
  Eagle Ridge development – a case example of local ground water availability
  On-going USGS work in New Jersey and other comparable states

STRATEGY 2: Improve surface and ground water monitoring systems to support sound science, modeling and methods from #1, including flow, quality and ecological indicators.

The current monitoring system is part of a statewide network developed for statewide purposes. USGS has identified a number of watershed and subwatershed areas that lack sufficient water flow or quality data to draw direct estimates of water availability and quality, for both ground and surface waters. The Highlands Council should engage in a science agenda including a regional monitoring system that is developed to meet regional needs.

<u>Implementation Steps</u>

- Significant funding will be needed
- What is an "ideal" network? (e.g., number of locations, monitoring type, frequency)
- Phased implementation
  What is needed first?
  What is needed most?
- Monitoring system evaluation – is the current system working?
- Headwaters gauging stations needed – little is known about flow impacts in headwaters streams
- Scorecard system for public reporting needed
- Detailed objectives needed
- Emphasize stressed water resources
- Enhance reporting requirements for stressed water supply systems and react to the reports – management should address the issues raised
- Address both water quality (e.g. salts, nutrients) and water supply, and interactions

STRATEGY 3: Protect critical areas related to water resources, including through the use of model ordinances.

The Highlands Act requires the Highlands Council to develop implementation methods, including model municipal ordinances, which are needed for the protection of regional resources. The TAC emphasized the need for such tools.

STRATEGY 4: Develop a Highlands-specific aquifer and ground recharge method for delineation and quantification of recharge from various land areas.

The NJGS GSR-32 method estimates ground water recharge by land polygon. It does not actually connect its estimate of ground water infiltration (the movement of water past the root zone) to recharge of underlying aquifers, and it was developed using a statewide approach. TAC members want the Highlands Council to pursue a method that is specific and appropriate to the Highlands and results in estimates of aquifer recharge by land polygon.

Implementation Steps

- Specific ID of reasons why GSR-32 is or is not valid/accurate for Highlands
- Develop approach for relating infiltration to aquifer recharge

STRATEGY 5: Increase water supply system storage and capacity to increase yields.

This strategy focuses on the increase of water supply availability through enhanced surface or ground water storage, whether related to new facilities or the enhancement of existing facilities.

Interdisciplinary Roundtable: Reactions to Top Five Strategies

The following comments were received from the roundtables, by strategy.

STRATEGY 1: Integrate assessment methods with ecological indicators.

STRATEGY 2: Monitoring – tie in the local and ad hoc (e.g., project-specific) systems. Ecological monitoring needed. Need to link monitoring system to scale of the issues involved. Timeliness of resulting information is an issue.

STRATEGY 3: Agricultural community concerned about additional ordinances with regards to agricultural viability.

STRATEGY 4: Link to Strategy #1. Why is this needed? There is a benefit to assessing ground water infiltration to actual aquifer recharge. Need to link with soil compaction issues, as that can result in less than anticipated recharge in developed areas.

STRATEGY 5: Increased capacity

- ASR (aquifer storage and recovery) and mine storage are being considered
- Address the impacts of interbasin transfers in/out
- Morris County water supply study ongoing – make use of it
- Capacity thru efficiency of water use and transmission

Other comments received include:

- Water quality issues not addressed
- The Regional Master Plan needs more time

Suggested Strategies for Water Resources

The following strategies are listed by problem statement.

Problem Statement #1: Is the subwatershed-based screening approach to water resource assessment adequate to identify the most critical water resource issues for planning purposes? What other approaches can we utilize/develop to quickly improve the assessment of water resources and develop a water resource management strategy that addresses water supply, ecological, recreational and other critical, and sometimes competing, water concerns over time?

Note: there was a general feeling that old or external data should be looked at cautiously.

1) Need to look at whole series of HUC levels to get accurate picture (e.g., HUC14 as subwatersheds, HUC11 as watersheds, HUC8 as river basins)
2) The HUC14 assessment is a screening method, not a final answer
3) Preservation for water supply – balances with accommodating the needs of people for water to use
4) Use work already done in other areas to inform process
5) Use watershed management criteria for land preservation
6) Reevaluate safe yields of surface water supplies

Problem Statement #2: Are there other measures/methods beyond those included to date that could be used to help determine water capacity taking both the need for potable water supply and ecological integrity into account?
Problem Statement #4: What indicators and systems are appropriate to measure and assess progress toward meeting water budget and water quality objectives?

(Note: These two problem statements were discussed together, as they were felt to be closely related.)

STRATEGY	OPTIMISTIC VIEW	CAUTIONARY VIEW
1) Range of Variability Approach (RVA) using variability of flows	Looks at full range of flows Instructive to look at, at the right time, with data	
1.5) Test and compare various availability assessment methods (incorporates Strategies 1, 2, 8, 12, 14)	(See comments on individual methods)	(See comments on individual methods)
2) Tennant method	Instructive to look at, at the right time, with data	
3) USFS 2002 study – includes analysis of base flow as a percent of stream flow		
4) Flow reconstruction (e.g., USGS project in Passaic River Basin)	Great concept Need more information Longer term study needed	
5) DRBC – uses 25 year base flow recurrence interval (a fairly dry period) as indicator of available water		May be flawed for Highlands purposes Need "healthy" flow – what it should be – this gives "what is"
6) Include agricultural water uses as a legitimate use for "available water"		
7) "Sprawl" vs. undisturbed area water quality comparison – multiple subwatersheds with development of fairly uniform	Gets at the question of whether the existing regulations work	Long period of record Finding comparable watersheds

STRATEGY	OPTIMISTIC VIEW	CAUTIONARY VIEW
ages, to determine differences in watershed impacts based on improvements in development regulations		
8) New England Aquatic Base Flow	Great approach. Easy to use, applicable, not data intensive, calculates "needed flows"	Check need for "tweaking" to be valid for Highlands conditions
9) Impervious Cover as surrogate indicator	Existing data sets – up-to-date, links to pollutants	Not equal effect everywhere – BMPs and other factors may modify impacts Simplistic indicator Data lag
10) Recharge capability – Highlands specific method. (Note, DEP rules include use of GSR-32 for recharge)	Done for Morris by NJGS – expand? Reflects LULC change	
11) Climate change	Rutgers Center for Environmental prediction – addresses base flow impacts and change Nature of droughts changing	Uncertainty
12) Wetted perimeter method	Addresses riffles – stream integrity down to ecological level Highly accurate Cross check with other methods	Data intensive Do later, but not much later
13) Stream order – sensitivity of headwaters versus other streams	Gets to headwater/avoids masking of large Scale analysis New hydro allows mapping	
14) R2 CROSS method	Addresses riffles – stream integrity down to ecological level Highly accurate Cross check with other methods	Data intensive Do later, but not much later

STRATEGY	OPTIMISTIC VIEW	CAUTIONARY VIEW
15) Increase ground water monitoring	Methods known Already have some data – need to integrate	Just need $$ Quality and Quantity Never enough Creates pinholes in aquifers
16) Fracture trace analysis	Alec Gates (Rutgers-Newark) – big issues in northern Highlands – started already. How do fractures affect availability?	How are fractures connected, and how permeable are they? Not all fractures transmit water well
17) Monitoring system to support sound science and modeling	Well established methods	Need $$
18) Water reuse and conservation impact on availability and reintroduction of water	Council has legal authority	Reuse – reevaluation lacking for exported use reuse (going outside Highlands) Locality – specific – municipalities Interbasin transfers Not directly relevant to water capacity Drought conservation and SOP with new construction and retrofitting
19) Approach to deciding acceptable and unacceptable impacts for ecological and water flow/science plus policy	Balances the needs	Need to do it right or we meet none of the goals – need clean, adequate water supply

Problem Statement #3: What land use management approaches are appropriate and feasible for ensuring that water uses remain within acceptable levels (as defined through the water capacity analysis?
Problem Statement #5: What are useful methods for understanding the relationship between land use management and other implementation strategies to protect critical water and water-related resources and environmental change?

(Note: These two problem statements were discussed together, as they were felt to be closely related.)

This discussion began with an assumption (for the sake of discussion) that the available water capacity would be estimated in a defensible, "correct" manner, and that we were looking for strategies that use the results within the Regional Master Plan. The following strategies were suggested.

STRATEGY	**OPTIMISTIC VIEW**	**CAUTIONARY VIEW**
1) Smart growth (opposite of "sprawl" which is spread out, inefficient use of land)	Strong support exists Implement by decision makers	What is smart growth – definition issue People do know – don't accept it Unproven or large scale over time Threshold for "sprawl" impact on streams
2) Integrate water reuse in new development (e.g., CA Title 22 – purple pipe system)	Recycling at its best Decrease infrastructure costs What will the saved water be used for?	Impacts on water qulaity Increase costs Discomfort Still consumptive use – impacts? System reliability What will the saved water be used for?
3) Septic system management	Needed for water quality Decrease public health Increase recharge Increase accommodates people	Cost and public acceptance Need use of alternate systems (Pinelands) Recharge as baseflows?
4) Where a deficit occurs, place a cap on growth		Review allocations (historic) Opposed by pro-growth forces Water capacity not linked to local growth control

STRATEGY	OPTIMISTIC VIEW	CAUTIONARY VIEW
5) Municipal participation required -- Master plan should address water supply	Partnership with Council that meets legislation mandate Helps make water supply critical at municipal level	Home Rule Assuring enforcement Potential use of bad science Conflicts between users of water Conflicts with Fed Ag programs
6) Open space master plan for Highlands aggressive acquisition	Preservation helps assure water quality and water quantity Public support Need stewardship	$$$ Common sense doesn't always prevail Preservation vs. use of the land Need stewardship
7) Reexamine safe yields – is the safe yield safe?	Overdue? Being done?	
8) Supply vs. demands – address both among water users		
9) Water uses within Highlands or exported to other areas – how they fit into RMP	Critical to making everything else work Little support for conservation in urban user areas Legislation needed Limited Council authority outside the Highlands	
10) Highlands water supply plan has to be integrated with State water supply plan	Better plans overall Regional approach helps inter-municipal conflicts Connects to state funds	Highlands Plan, if flawed, will hurt State Plan and vice versa
11) Impervious cover limits	Lots of info and case studies on its use as an indicator in the literature	Applicable to existing development? (New BMP requirements exist) Requires education and maintenance and implementation

STRATEGY	OPTIMISTIC VIEW	CAUTIONARY VIEW
12) Promote recharge (e.g., Low Impact Development, LID)	Can recreate recharge	Acceptability by market
13) Waste water return flow management integrate waste water planning into water supply	Technology is available	
14) Increase water supply capacity/new and existing storage and infrastructure	Accommodates needs of people Sizing?	Cost and location Sizing?
15) Forest cover/health in developed areas	Increase recharge Decrease runoff provides habitat	Encourages sprawl
16) Transfer of Development Rights (TDR)	Essential component Shifts demands	Rearranging deck chairs on Titanic Shifts demands
17) Redevelopment (low impact redevelopment, or LIRD)	Huge potential	Urban acceptance?
18) Reversion to natural state (brownfields to greenfields, reduce impervious cover)	Bring back buffers – fix past mistakes	
19) Ordinances: wellhead protection, stream buffer, stormwater on a regional basis	Council-recommended ordinances will be defensible, cheaper, etc. State support helps municipalities	Enforcement Issues Potential court action – be defensible
20) Encourage watershed based concept and process	Glue to make it work Needed to integrate interests Education helps	
21) Educate public	Yes	
22) Include high density growth areas in smart growth	Moving on	
23) Farmland preservation	Support agricultural sustainability	Agricultural impacts on water Need funding to support agriculture
24) Farmland management/stewardship	Need management plans Promote water-friendly practices	

STRATEGY	OPTIMISTIC VIEW	CAUTIONARY VIEW
25) Redevelopment in urban areas uses more Highlands water by increasing demands		Coordinate with State Plan Infrastructure problems/adequacy Increases combined sewer overflows
26) Right to farm vs. water resources and other regional provisions	Mediation process established Some mitigation – not a blank check	Right to Farm ordinances and regulations can be in conflict with water constraints
27) "Green energy" (renewable sources) related to land use	Relates to climate change Renewable resource	

Additional Issues:

The following issues were raised during the discussion as “burning issues:”

1) Develop relationship with education/research communities
2) Warren County soil survey is being updated and improved
3) Need to revisit Problem Statement #1
4) Water and waste water inefficiencies
5) Rutgers Eco-complex is a possible partner
6) What’s our metric for use – function served vs. gallons delivered?