

RIEMC Prioritization of Monitoring Programs and Related Actions Outlined in its January 2005 Report (last updated 21 April 2005)

Table 1. Maintain and Enhance Existing Monitoring Programs (17 activities)		
	Monitoring Program/Activity	Notes/Comments
1	Bathing Beach Monitoring Program – coastal & freshwater beaches (lakes)	<ul style="list-style-type: none"> • Addresses critical data needs in waters not otherwise sampled • Important public health effort • High Priority: EPA has advised that all funding will stop on September 30, 2006. This must be a priority for the 2006 legislative session or all funding for beach monitoring will be gone. • Critical • Consider publishing map-based results over the internet for public
2	Shellfish Growing Area Monitoring	<ul style="list-style-type: none"> • Expensive! yet only important for the shellfish distributors to allow interstate sales - state should investigate a partnership w/ distributors to help defray these costs in order to allow DEM to cover more critical environmental monitoring. • High priority
3	Fixed-Site Monitoring – Maintain existing network (13-14 stations- Narragansett Bay) – time-series data	<ul style="list-style-type: none"> • This is an important piece of the Bay monitoring network. • Critical Monitoring – but are there really 13 stations funded under this? • Expand monitoring sites and improve data access • This should be a high priority and it is a critical need • Should also monitor currents and nutrients • Needs additional QA/QC
4	Rapid dissolved oxygen surveys in upper Bay- monthly in summer	<ul style="list-style-type: none"> • Critical Monitoring • This should be a high priority, and is important in supplementing the fixed-station buoy data. • An important piece of the Bay DO monitoring program • Expand spatially and temporally
5	Providence & Seekonk Rivers –pathogens – fixed-stations	<ul style="list-style-type: none"> • Essential element • Unclear why important if just fecal and no shellfishing etc. here – seems would be more cost effective to merge this w/ other parameters (nutrients/DO etc.) to help w/ monitoring costs • Expand to other areas in NB • Does this, in fact, refer to the DO instrumentation? If so, that does not measure pathogens, as far as I know. If this does not refer to the DO instruments, how does it differ from 7 below? Table 15 in the DEM Strategy describes only 7 below. Nothing else in that report appears to correspond to the description here.
6	Bay & Tributary Nutrient Monitoring (Providence & Seekonk, five tribs to upper Bay)	<ul style="list-style-type: none"> • Essential element • Critical –should be monthly frequency at a minimum • What is this? Is it described in the DEM plan? If so, where? • incl. Taunton R./Mt. Hope Bay? • In the DEM strategy, isn't this listed as a NBC task? It is an important supplement to the fixed-station buoy data

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7	Pathogen monitoring in rivers subject to CSO discharges	<ul style="list-style-type: none"> • Essential element • Unclear why DEM should use its minimal monitoring funds for this...should be covered by the owner of the CSO discharges • High priority where this impacts shellfish or beaches.
8	Volunteer-based monitoring coordinated by Watershed Watch (lakes, streams, coastal)	<ul style="list-style-type: none"> • The center piece of our water quality monitoring program • Absolutely essential • \$ is from multiple funding sources • Seems important but not enough info to objectively know • Expand program, publish results to public over the internet graphically • A good model that could be adapted to other monitoring efforts?
9	Marine fisheries surveys: Finfish, juvenile finfish, shellfish, lobsters, horseshoe crabs, ichthyoplankton	<ul style="list-style-type: none"> • Non-negotiable. These are critical data for fisheries management. Let's get the data out for the community to see and use. We need Internet access to the DEM marine fisheries survey data • Critical – but seems very expensive- should be examination of efforts to coalesce water quality monitoring (diss.oxygen, nutrients,chlorophyll) with these types of efforts for cost savings • Enhance public access to results
10	Bioinvasives – rapid surveys – marine waters; Mgt. plan being developed aquatic waters	<ul style="list-style-type: none"> • This program appears to have gone into deep hibernation and has too narrow a focus. We need a comprehensive, multiecosystem monitoring program for invasives. However much it costs to get this going is trivial to the cost of getting rid of nuisance aliens once they establish. The CRMC rapid surveys are a nice idea but we need the bigger picture. • Need for fresh water too! • Very important • Coordinate with RINHS bioinvasives plan. • This number seems wrong; from SK's email, I assume this is 6K for planning to do monitoring, not for monitoring itself? • Needs coordination with Supplemental #8
11	PORTS & weather stations – meteorological & physical measurements (currents, tides)	<ul style="list-style-type: none"> • Wow, this is expensive. Do we get \$250K of value from PORTS • Mainly useful to shipping industry (Davisville & Providence ports) – state should pursue cost-sharing agreement with the industry using the system- it is not all that useful for water quality info etc. • This appears to be a NOAA program. Is 250K the whole cost or RIDEM's contrib to the whole cost?
12	Fixed-sites on large rivers – monthly at 8 sites on the Blackstone, Pawtuxet, Pawcatuck Rivers	<ul style="list-style-type: none"> • Very important • This program should definitely be at least restored, and expanded if funding is available. • Critical monitoring – should be monthly frequency at minimum • Does this cost include restoration of regular benthic macroinvert monitoring at each site? or just physical/chemical • Needed for contaminate load calculations and trends analysis
13	Institute rotating basin approach for monitoring all other rivers and streams (5 year cycle) – replaces existing fixed-station network for small rivers and streams	<ul style="list-style-type: none"> • This should be a priority • Seems critical • The implementation plan in the mon. strat. is good and the budget seems lean but sufficient • \$350K is a much large amount than identified in Table 15 of the DEM Strategy report. Is there a description or breakout of funding? Is the effort larger than or different than that described in the DEM Strategy report? • High priority

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14	Freshwater fishery surveys: American Shad & River herring; largemouth bass – lakes & rivers	<ul style="list-style-type: none"> • Very important – more so for the anadromous species vs lake bass (should pursue cost sharing or volunteer efforts w/ bass angler associations for lakes) • This seems high compared to other monitoring components (although that may reflect their underfunding, not a problem with this item; however, its hard to tell because this item does not appear to be described in the Mon.Strat. as a discrete activity) • Any way to use volunteers to cut down on costs?
15	Streamflow gage network – maintain existing network	<ul style="list-style-type: none"> • Need to expand • Should be expanded • Seems important but unclear why + if related to water users there should be cost-sharing w/ users and Water Resources Board • Needed for contaminate load calculations and trends analysis
16	Continue implementation of public drinking water monitoring program (Lakes)	<ul style="list-style-type: none"> • Should be cost-sharing w/ drinking water companies/owners who sell the water and Water Resources Board • High priority
17	Update statewide land use coverage	<ul style="list-style-type: none"> • High priority. This dataset serves more audiences than any other single information product the state produces • Great if can get the necessary resolution at this low cost for the whole state • Develop a 5-year repeat interval and adhere to schedule. Develop improved techniques for classification that are standardized and repeatable. Include land cover categories and wetlands. Delineate to an ortho-rectified basemap • Seems like a low price for such a large task

Table 2. Monitoring Program – New Initiatives (15 activities)

Expand baseline monitoring capacity – as specified in the RI Water Monitoring Strategy

Y=Yes, N=No, B=Left Blank

	Monitoring Program/ Activity	Program Status	Need Yes/ No	Value Yes/ No	Effectiveness Yes/ No	Highest Priority (X)	Notes
1	Rotating assessments of coves and embayments – time series & fixed stations	New	10Y 3B	8Y 2N 3B	8Y 1N 4B	3/13	<ul style="list-style-type: none"> • Addresses critical data needs in waters not otherwise sampled • There needs to be in depth investigation in problem areas to identify and eliminate the sources of contamination. • Need more information to judge • See p. 52 and Table 15 in DEM Strategy report. This is described as covering 7 coastal ponds and roughly a dozen coves and embayments. Costs are listed to support 1 FTE, seasonal, laboratory, operating, and equipment costs and extended volunteer monitoring.

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							<p>This concept addresses a need but should be developed further. Coves and embayments need to be defined and enumerated. A pilot project might be in order. EPA/Narragansett data should be examined as well as Salt Pond Watchers and other available data. Fixed station time series may or may not be the best way to go.</p> <ul style="list-style-type: none"> • Should coordinate with WR shellfish program • Critical , but important to do at critical periods
2	Monitoring of unassessed lakes (not monitored by volunteers)	Expansion of URI-WW Program	8Y 1N 4B	6Y 3N 4B	7Y 2N 4B	3/13	<ul style="list-style-type: none"> • Critical • Should be done by volunteers • Prioritize based upon use. If there is little use, don't sample. • Seems the state has good coverage – appears to be mainly for sake of making the federal agencies say 100% assessment • Expand volunteer network • See pp. 72-73 and Table 15 in DEM Strategy report. Use volunteer monitoring to cover 46 presently unassessed lakes greater than 20 acres in area at \$1,000 per lake. • Not as high a priority as the Bay
3	Expand the network of stream gages by 5 locations	Expansion of existing network	7Y 1N 5B	6Y 2N 5B	7Y 1N 5B	5/13	<ul style="list-style-type: none"> • Water withdrawal/use issues a growing management challenge; more data are needed • Critical need • These data are high on many lists • Should coordinate with F&W fishways • Unclear need – Water Resources Board should partially fund + if mainly for water users (irrigation etc.) then users should cost-share w/ the state since they get the resource free of usage charge beyond extraction costs • See pp. 67-69 and Table 15 in DEM Strategy report. Add 3 gages on Pawcatuck, plus one each on the Hunt and Beaver Rivers. Cost is listed as \$180K vs. \$140K in DEM Strategy report.
4	Fish tissue contamination in rivers and streams & lakes	New	10Y 1N 2B	9Y 1N 3B	8Y 1N 4B	10/13	<ul style="list-style-type: none"> • Public health issue; more data absolutely needed • We have a responsibility to inform the citizens of the state whether the fish they catch and consume are safe to eat. • Coordinate with DOH • No monitoring currently, program needs to be supported • See p. 70 and 74 and Table 15 in DEM Strategy report. Program in rivers and streams described differently and listed in table as separate from program in lakes. No clear reason why these should not be combined. Rivers and streams would cover 24 locations in 2 basins in

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							<p>conjunction with the rotating basin approach. 5 species would be gathered at each location giving a total of about 100 samples to be analyzed by a contractor at a cost of about \$1,000 each. This method was demonstrated on the Wood River. 10 lakes would be covered but less detail on how. DOH would be involved in both programs. Rivers and streams was estimated at \$130K in the DEM Strategy report while lakes was estimated at \$50K. The \$180k total is less than the \$200K listed in the priorities table.</p> <ul style="list-style-type: none"> • Unclear need – VERY costly, with unclear return since will always be limited coverage
5	Fish tissue contamination in coastal waters – review existing data and develop specific recommendations	New	7Y 3N 3B	4Y 3N 6B	4Y 3N 6B	3/13	<ul style="list-style-type: none"> • Less of an immediate needs; can be phased in after reviewing existing (EPA) data • More information needs to be provided to judge the need and importance of this. • Unclear need – very costly w/ unclear return and unclear what you can do if find e.g., high PCB levels other than generic “don’t eat more than 1x/mo” directives • The DEM Strategy left this to be determined – noting “no costs anticipated until after FY2006”. No approach or cost estimate has been developed. EPA’s NCA data need to be examined as well as other information such as previous mussel and sediment data.
6	Expansion of beach monitoring in freshwater lakes – (implement risk-based approach)	Expansion of existing program	7Y 3N 3B	4Y 5N 4B	6Y 3N 4B	2/13	<ul style="list-style-type: none"> • Needed for public health protection • Coordinate with DOH • Unclear need + expensive ! – if for non-general public beaches (lake assoc., YMCA, etc.), they should pay for this themselves vs state cost • Not as high a priority as the Bay • Coordinate with neighborhood and beach associations • See p. 74 and table 15 in the DEM Strategy report. No detail of need or costs are provided. • \$213,000 EPA funding for all beach monitoring will stop on September 30, 2006. This amount plus the \$100,000 indicated will be needed at that time.
7	Implement monitoring as recommended in plan for aquatic bioinvasives (Plan is being developed; specific strategies to be determined)	New	8Y 5B	2Y 1N 10B	0Y 2N 11B	4/13	<ul style="list-style-type: none"> • Need further discussion on how to do this to build a consensus • The RINHS proposal is much further along. I have seen no sign of activity within DEM on moving this forward. The RIEMC and CT should demand a partnership on this. Since DEM has not been able to get a comprehensive invasives program off the ground, let the RINHS take it

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							<p>on. The DEM has a major role to play (esp forest division) but the DEM plate is very full</p> <ul style="list-style-type: none"> • Should be done with volunteers if not public beaches • No description or estimate is provided in DEM Strategy report. The priorities table notes that “Plan is being developed; specific strategies to be determined” and gives costs as “to be determined”. Rapid assessment surveys are conducted as an existing program. A supplemental bioinvasives monitoring program is proposed in the EMC report. These proposals need to be better developed. Previous plans (ballast water) should be reviewed and current plans need to be completed. • Unclear need – if finding major problems w/ aq. invasives, should work w/ volunteers • From SK’s email this sounds like its at the planning stage, not really a monitoring program; there are no details available with which to assess value or effectiveness
8	Bioinvasives – monitoring program development	Supplemental /RIEMC	8Y 5B	6Y 7B	6Y 7B	5/13	<ul style="list-style-type: none"> • Topic is important. Proposal should be refined. Need further discussion with management agencies about how to move forward; need discussion of mgt. agency response to data • This is the best, most comprehensive game in RI. • Should be done with volunteers if not public beaches • May be needed but unclear if cost effective – seems fairly expensive + should definitely be joined up w/ any aq. bioinvasive efforts (#7 above) • Plan is well developed. DEM plan for aquatic bioinvasives should be coordinated with this. • RINHS proposed a minimum level of statewide coordination for invasive species monitoring and response, the key to this approach is comprehensiveness across marine, coastal and aquatic, and terrestrial habitats and the program's integration into existing regional efforts

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9	Riparian Buffers – remote sensing	Supplemental/ RIEMC	7 Y 1N 5B	6Y 2N 5B	4Y 2N 7B	4/13	<ul style="list-style-type: none"> • Need to further develop how data will be actually used; other efforts underway to map buffers, impervious surface; need to resolve perceived duplications • If we are to take a "watershed" view seriously, we need to know landuse, imperv surface, and condition of riparian buffers in the whole watershed. Otherwise we are giving "the watershed" view lip service at best. • Unclear what true management value this fairly costly effort will provide at the rough resolution level suggested by a watershed-wide assessment of impervious areas ,etc. + what is maximum amount of buffer area likely to be uncovered? (i.e., still available) + seems it will not achieve resolution needed to advise state where to make decisions for state/town purchasing or usage agreements w/ landowners (plat level) – willing to give it a chance if can clarify outputs useful to state/town land-decision needs are clarified vs “research” outcomes • Monitoring the extent and condition of riparian ecosystems is important. Trends should be analyzed against other baywide indicators • Not clear what distinguishes that proposal from the one above. • Systematic rip. buff. monitoring is needed and this prop. would certainly do the job; however other approaches would too and there is disagreement on precisely the right technical approach
10	Benthic Community Structure	Supplemental/ RIEMC	8Y 2N 3B	8Y 5B	7Y 1N 5B	4/13	<ul style="list-style-type: none"> • Need to further discuss how on-going efforts relate to this proposal; integrate F& W as appropriate • A solid component to Bay monitoring • Should coordinate with F&W shellfish surveys • Very important – seems underfunded – should consider expanding the number of stations within the Bay • while I'm sure this will yield interesting data, I'm not sure whether this approach will yield useful results for water quality as quickly as others, like zoopl. and bivalves • This study will be important

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11	Zooplankton	Supplemental/ RIEMC	6Y 4N 3B	8Y 5B	5Y 2N 6B	3/13	<ul style="list-style-type: none"> • Topic is important. Proposal needs to be refined. Better links to management tools/decision-making needed. Technical issues need to be further discussed/resolved. • This is very good idea. These zooplankton are a reliable indicator of system-wide stress. • Should coordinate with F&W Ichthyoplankton project • Critical, but need to put stations further up-Bay (lower Prov. River) and deeper into Greenwich Bay- west side vs mouth • Another approach to productivity; regular zooplankton monitoring might help with bioinvasives, too • Interesting, but not as important as other biological indicators • Should coordinate with Fish and Wildlife
12	Secondary Productivity: quahogs	Supplemental/ RIEMC	9Y 1N 3B	6Y 2N 5B	4Y 3N 6B	4/13	<ul style="list-style-type: none"> • Need better links to how data will be used by state. • This is especially useful because it provides a time series assessment of secondary productivity. It is an exceptional bargain • Should coordinate with F&W shellfish work • Seems useful idea- but how well proven as a technique?- seems at level of research question for technique development – can management get clear answers from the results? Willing to go along if clear on how results could be directly used by managers • Secondary productivity is important to monitor and quahogs are a good target for several reasons • Need to coordinate with DEM
13	Secondary productivity: flounder	Supplemental/ RIEMC	6Y 4N 3B	5Y 3N 5B	2Y 5N 6B	1/13	<ul style="list-style-type: none"> • Need better links to how data will be used by state. • Should coordinate with F&W surveys • Seems very similar to work already being done by J. Collie and L Buckley, URI • While secondary prod. is an important monitoring metric, I'm not sure the case has been made for flounder in distinction to another species

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14	Submerged Aquatic Vegetation (SAVs)	Supplemental/ RIEMC	8Y 2N 3B	2Y 4N 7B	2Y 4N 7B	3/13	<ul style="list-style-type: none"> • Topic is of interest; Need further discussion to clarify how data will be used. • SAV monitoring is an essential component. We need to prepare a more comprehensive plan. • Merge with macroalgae, this is just eelgrass not all SAVs • Costly for first year, but only big \$\$\$ every 5 years due to need for overflight- there is a clear need for the state to develop regular mapping effort like other coastal states already do (MD, VA etc) – I would move Prud Is monitoring site to west side of island if transplanted bed still exists there so can check health of west passage w/ nutrient controls- would be good to merge w/ other efforts that can use aerial photog. (e.g., macroalgae below) • Several aspects of the technology for this seem still in development • CRMC funding secured, should be happening this summer • Should be merged with #15 into one project and more rigorously reviewed.
15	Macro algae monitoring	Supplemental/ RIEMC	9Y 1N 3B	7Y 2N 4B	6Y 7B	5/13	<ul style="list-style-type: none"> • Topic is of interest but technical approach needs more discussion; use of data needs clarification. • This is a serious issue and we need to get on it • Should coordinate with SAV effort • Merge with SAV/eelgrass to make more comprehensive • Important , some aspects can be likely merged w/ SAV aerial work (above) • Its cheap and there would be a lot of public support for this • Critical need even though it has proven a difficult parameter in the past to quantify • Should be merged with #14 into one project and more rigorously reviewed.

Table 3. RIEMC Coordination/Strategy Refinements (7 activities)

Y=Yes, N=No, B=Left Blank

	Monitoring Program/ Activity	Existing/ New/ Supplemental	Need Yes/No	Value Yes/No	Effectiveness Yes/No	Highest Priority (X)	Notes
1	Additions to the RI Water Monitoring Strategy – wetland bioassessment, sediments & groundwater	Existing & planned	9Y 1N 3B	3Y 3N 7B	2Y 2N 9B	3/13	<ul style="list-style-type: none"> • DEM will have to do this work. • How can we rate this if we have no idea what it is about? • In priority high impact areas. • Does not appear in EMC report or in DEM Strategy except as reserved sections • I interpret this to leaving the doors open for further plan modifications including additions? • Critical , but important to do at critical periods • Unclear needs • Hard to judge effectiveness without an actual plan, but a plan does need to be developed • It is hard to know what value this represents or how effective it will be; many of the individual items are needed and could be very valuable to monitoring • Can't evaluate • Groundwater/Sediment quantity and quality network
2	Disaster response and damage assessment data development	Supplemental/ RIEMC	10Y 1N 2B	11Y 2B	10Y 1N 2B	6/13	<ul style="list-style-type: none"> • A small investment here will almost assuredly repay itself 1,000 fold in damage assessment reparations at some point in the future • Should coordinate with BART & Mulhare's group • I thought this name was changed to Disaster Information needs • Seems the state has good coverage – appears to be mainly for sake of making the federal agencies say 100% assessment • Seems important and seems very reasonable cost • This is a small amount of money that could be extremely valuable to RI in the long run

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3	Data management planning	New / DEM	13Y	9Y 1N 3B	8Y 2N 3B	8/13	<ul style="list-style-type: none"> • Constitutes a start. Further investment in data management is required. • Not enough info given • Definite need and very important to the dissemination and usage of monitoring data • Coupled with next item • Does not appear in EMC report or table of total budget recommendations on page 8 • Should make sure the staff/contractor has adequate technical capability for this critical task • The concepts outlined in the DEM plan for data management should be refined, developed and funded at a higher level • Does it follow from the manifest importance of this activity that it should take place at DEM? RINHS, CI, and others are working to provide this functionality for the state. If only very limited funds become available, I would think the best use could be in the three data management categories, rather than in picking just one or two monitoring activities to do in isolation
4	Internet access to data & distribution assessment	Supplemental / RIEMC	12Y 1B	9Y 1N 3B	9Y 2N 2B	7/13	<ul style="list-style-type: none"> • We need to engage the new CIO in this. Should hold off until she can participate • Definite need and very important to the dissemination and usage of monitoring data, although not sure how it differs from 3 • Coupled with previous item • key aspect for the state's needs • This is a key final step in all program activities. Sharing among the research community and informing the public is critical • If only very limited funds become available, I would think the best use for them could be in these three categories, rather than in picking just one or two monitoring activities to do in isolation

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5	Communications	Supplemental / RIEMC	12Y 1B	8Y 1N 4B	9Y 4B	4/13	<ul style="list-style-type: none"> • If we don't invest here we are wasting our time. • Coupled with previous item • Is this same as outreach? If yes- then a critical task in order to maintain interest of RI citizens + political leaders • More PR funding should be invested • Definite need • If only very limited funds become available, I would think the best use for them could be in these three categories, rather than in picking just one or two monitoring activities to do in isolation
6	RIEMC administration	Supplemental / RIEMC	12Y 1B	12Y 1B	12Y 1B	10/13	<ul style="list-style-type: none"> • The RIEMC good will gas tank is approaching "E" • Seems key if the RIEMC is to continue existence • This is imperative for coordinating this organization. Increase funding by 30k • If RI determines the EMC is the right way to improve coordination, then it should fund it • Absolute need for continuation of RIEMC
7	Monitoring grants program	Supplemental / RIEMC	9Y 1N 3B	8Y 5B	5Y 1N 7B	5/13	<ul style="list-style-type: none"> • Unclear until details are worked out what the value of this potential investment will be; not as high as priority as properly supporting the functions of the RIEMC • Let's have the courage to break new ground. This will help us do that. Do we want to be leaders or followers? Gov Carcieri boldly declared RI to be a leader in monitoring to the White House cabinet this week. Let's show the country we mean business. • Most essential in light of shrinking budgets • Critical in order to fill gaps-requires careful review / thought in funding decisions • Target grants at reducing fish kills and beach closures and opening closed areas. • R&D is a necessary part of growing the effectiveness of this program. Propose increase in grant funding 2x • Effectiveness long term would depend on how the grants were administered, RINHS could administer such a grant program