

Impervious Cover Indicators Workshop Summary
Recommendations and Major Findings
September 14, 2010

**What metrics should we use for the
Impervious Cover (IC) Indicator?**

1. We agreed on the following metric (for release April 22, 2011)

- We will use the data that Paul Jordan has already pulled together for RI and MA – GIS based impervious cover for the entire watershed. We will also present % IC by town. We should also include a map on the web that allows users to zoom in, giving them the detailed local information that we have identified as important.
- Our presentation needs to resonate with decision makers (think about Mayor Fung and the communication opportunity presented by the floods of the spring 2010). The photos¹ showing stream changes at different IC levels are very compelling and can help tell this story.
- Although we recognize the importance of effective IC, other states have used IC from current GIS. We will start with the data that we have, and use the impact thresholds from the Center for Watershed Protection based on other studies while RI is developing better metrics (effective IC and RI specific IC/water quality relationships).

2. Effective impervious cover vs. impervious cover from GIS

Effective IC is the more accurate measure of IC. There are many factors that affect how water is absorbed or runs-off a land area. Undisturbed forest lands absorb more precipitation than lawns and golf courses. In developed areas, implementation of LID and stormwater management will capture water and provide for on-site infiltration, reducing the effective IC.

Our long term goal is to have a measure of effective impervious cover. The effective IC will consider the presence of BMPs, detailed topography, connectedness, soil compaction and other parameters. Researchers at URI and elsewhere are working on developing this metric.

3. Connections between IC and water quality

The connection between IC and water quality is also a future metric of interest. DEM is doing the research to connect % IC to water quality parameters. This work will fine tune the Center for Watershed Protection's relationship between % imperviousness and environmental quality².

¹ "The Need to Reduce Impervious Cover to Prevent Flooding and Protect Water Quality", Figure 2

² Ibid, Figure 3

4. Scale and Geography

When considering management alternatives, IC needs to be viewed at small scales. When summarized over a large area, you lose the ability to identify areas that have the most impact on downstream water quality and areas that are serving to protect downstream water quality. The NHD dataset has delineated watersheds at a relatively small scale. This winter USGS will fly LiDAR creating a new terrain model of 1 foot (possibly 2 ft) contours. Even parcel level analyses might be possible. However, this type of analysis would not be appropriate for an IC indicator where simplicity of message is important.

We need to distinguish rural areas from urban areas. The strategies for managing IC are different. In rural areas, we want to encourage compact development with limited road widths etc. In urban areas, we want to mitigate existing impervious cover with green roofs, street trees, etc. The metric we select needs to distinguish between these two areas.

5. Suggested Future Metrics

- An index of effective IC and tree canopy
- Ratio between IC and effective IC
- Connectedness/effectiveness of buffers (based on work in Ches Bay)

What is our monitoring strategy?

1. For now, we have our current monitoring:

- IC data generated remotely. Data will likely be available every 5 – 10 years. It is unlikely that we will see significant (average) change in 2 – 3 years, but local impacts will occur.
- MA data collected, with differences in scale, both time (1 – 2 years) and physical scale (2 ft vs. 3 meter)
- 5 years is a good interval for land use and IC data collection. We can use 2003/4 (1 meter) data as baseline.
- DEM is assessing the connection between IC and water quality using the rotating basin studies which are done on a 5 year frequency. Watershed IC associated with sites is calculated from GIS.

With the request to identify sensitive areas where IC will be monitored on a shorter time frame.

2. Future strategies to explore:

- In the past, RI has not had a monitoring/evaluation plan for IC. We have been opportunistic. In the future, we need to lobby to get an impervious analysis every time a new flight is done (this costs ~\$60K).
- We need to have a solid baseline of topography to work from and the upcoming LIDAR flight (1m) could be used.
- Can we align IC data collection with Land Use data collection? We need to lobby for IC as add-on to other data collection efforts.
- With climate change, there is more interest in acquiring land use data by federal agencies.
- We recognize that we need data at a local level – stormdrain scales, as well as a broader scale for development of a TMDL.
- Can we ask towns to require developers to report data collected as part of the development review process (building footprint, roads, driveways) to DEM? This is problematic for towns that do not have staff. Future work needs to recognize the real differences in capacity that exist among towns. The suggestion was made to keep the requirements very simple.
- Should we develop a strategy for using the stormwater manual checklist as data source?
- DEM Wetlands receives pre and post-development impervious data for projects that they review. These data are in consultant reports, but are not computerized.

Should we develop a metric to measure progress towards improved IC management?

1. **Yes.** A working group including Scott Millar, Nancy Hess, John Flaherty and others who are interested will develop the metric for this first release. We are charged to distinguish between rural and urban areas as the management strategies are different. Our goal for rural areas might be: “no net change” for urban areas, “reduce IC”. We need to remember to include MA in these discussions.
2. **A variety of recommendation were made, including metrics based on data that are currently available:**
 - What is available from EMA? Do they have data/metrics for measuring flood risk that we could use?
 - Can we evaluate % IC against risk levels (10 %, 25 %, etc)
 - Municipal adoption of ordinances that address affects of IC (LID, NPS BMPs). Municipalities that are subject to the stormwater phase II permits do report these activities to DEM. (the number of municipalities covered by Phase II will increase in 2011)

- Outside the Urban Services Boundary, we could report on the number of new housing units and the acres of forest coverage lost.

And metrics based on data that would need to be developed:

- Implementation of TMDL recommendations
- Can the data provided to DEM wetlands be automated and then used for tracking progress?
- Application of porous pavement (perhaps get information from vendors who sell porous pavements)

Additional recommendations

- Give presentations to local boards/commissions about impervious cover and impacts to environmental quality. Scott Millar is planning a series of workshops.
- Incorporate IC information into existing education programs (Denise Poyer trainer for the RI Environmental Educators plans to incorporate more information on IC in future classes).
- Could we use the URI Green initiative as a case study? Use the web to show current IC (with %) then track changes over time as IC is removed or remediated.
- Caution against making statements about most effective zoning patterns—every town should define the patterns most effective with the space they have.
- If the stormwater is developing automated reporting can this data be available on the RIGIS website?

Next steps for Indicator Project

Web site: Coastal Institute will host the Indicators website. Workshop information data and final indicators will be available at this site. Anticipated date: early October, 2010

Upcoming workshops:

Beach closures: October 12, 2010 at the Warwick Public Library.

Flow: November 19, 2010 at DEM room 300.

Terrestrial invasives: December 7, 2010, place TBD.

Public release of indicators on Earth Day (April 22, 2011)

Make sure this information is in the transition documents for the new governor

Attendees:

First Name	Last Name	Organization
Jane	Austin	Save the Bay
Rachel	Calabro	Save the Bay
Connie	Carey	RI DEM, Office of Water Resources
Ames	Colt	RI DEM, RBW Coordination Team
Kathleen	Crawley	Water Resources Board
Chris	Deacutis	Narragansett Bay Estuary Program
Katie	DeGoosh	RI DEM, Office of Water Resources
John	Flaherty	Grow Smart
Alison	Hamel	Department of Transportation
Nancy	Hess	Department of Administration
Tricia	Jedele	Conservation Law Foundation
Paul	Jordan	RI DEM, Information Management Unit
Q	Kellogg	University of Rhode Island, Coastal Institute
Meg	Kerr	Narragansett Bay Estuary Program
Sue	Kiernan	RI DEM, Office of Water Resources
Lesley	Lambert	Narragansett Bay Estuary Program
Veronica	Masson	University of Rhode Island
Scott	Millar	RI DEM, Sustainable Watersheds
Carol	Murphy	RI DEM, Freshwater Wetlands
Jules	Oppen-Himmel	The Nature Conservancy
Ernie	Pancieria	RI DEM, Office of Water Resources
Denise	Poyer	Wood Pawcatuck Watershed Association
Margherita	Pryor	US EPA, Region 1
Johnathan	Reiner	North Kingston Planning
Richard	Ribb	Narragansett Bay Estuary Program
Alisa	Richardson	RI DEM, Office of Water Resources
Jane	Sawyers	RI DEM, Office of Water Resources
Elizabeth	Scott	RI DEM, Office of Water Resources
Judith	Swift	University of Rhode Island, Coastal Institute
Elise	Torello	Wood Pawcatuck Watershed Association
Bob	Vanderslice	Department of Health
YQ	Wang	University of Rhode Island, Natural Resources Science
Donna	Williams	Massachusetts Audubon Society