



Division of Energy, Mineral and Land Resources

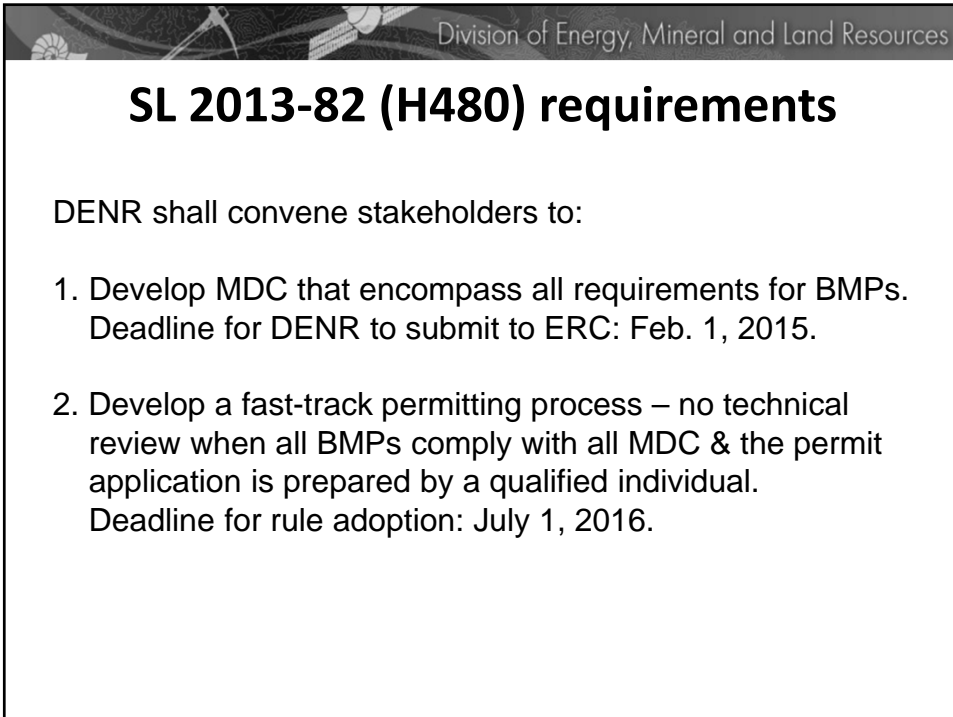
## Minimum Design Criteria for Stormwater Management

SL 2013-82 requirements

Progress to date

Expected path forward

Annette Lucas, PE  
NC Division of Energy, Mineral and Land Resources  
Stormwater Program



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## SL 2013-82 (H480) requirements

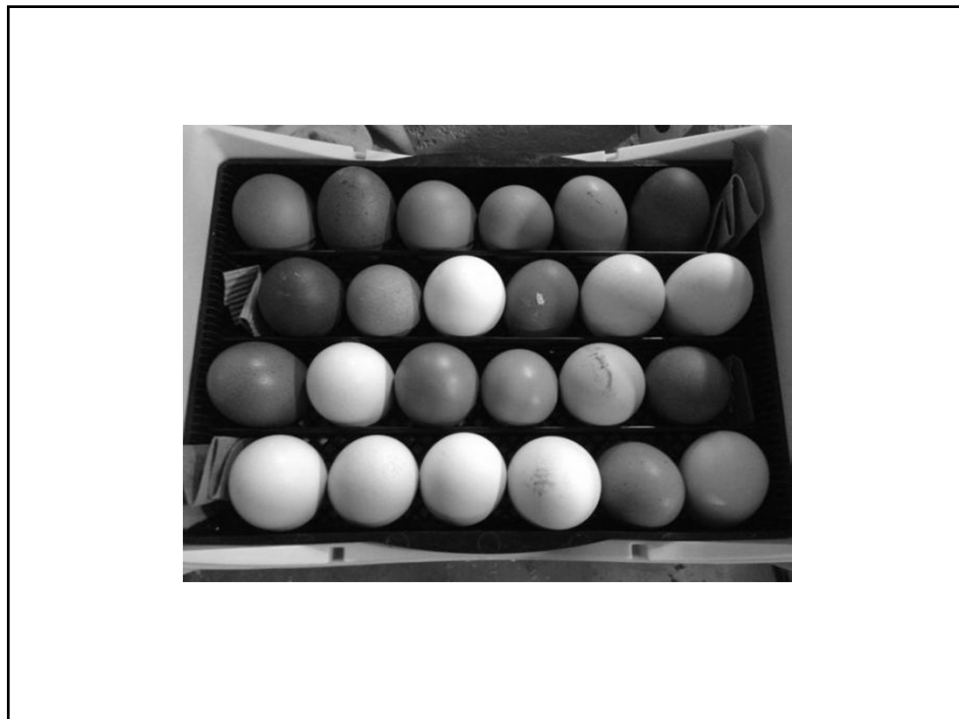
DENR shall convene stakeholders to:

1. Develop MDC that encompass all requirements for BMPs.  
Deadline for DENR to submit to ERC: Feb. 1, 2015.
2. Develop a fast-track permitting process – no technical review when all BMPs comply with all MDC & the permit application is prepared by a qualified individual.  
Deadline for rule adoption: July 1, 2016.




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## Stakeholders represented:

- Engineering/design community (8)
- Home Builder's Association (1)
- Construction (1)
- Local government (4)
- Environmental Group (2)
- Landscape Architect (1)
- Academia (2)
- Soil Scientist (1)
- DOT (1)
- DWR & DEMLR (3)




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	Function in perpetuity
	Remove TSS
	Protect WQ standards

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## Nutrient Design Criteria

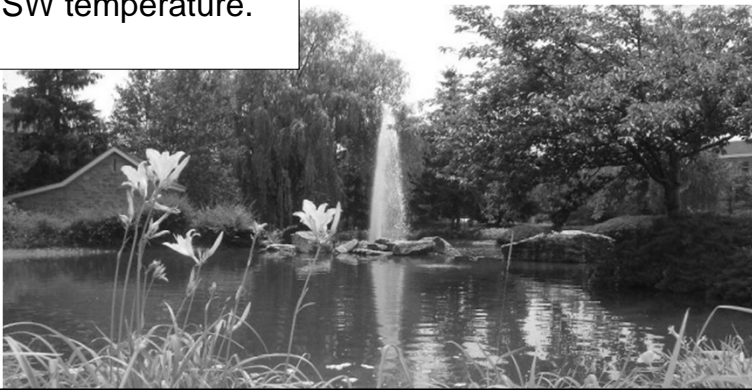
Design criteria that increase the Total Nitrogen (TN) and Total Phosphorus (TP) pollutant removal rates



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## Temperature Design Recommendation

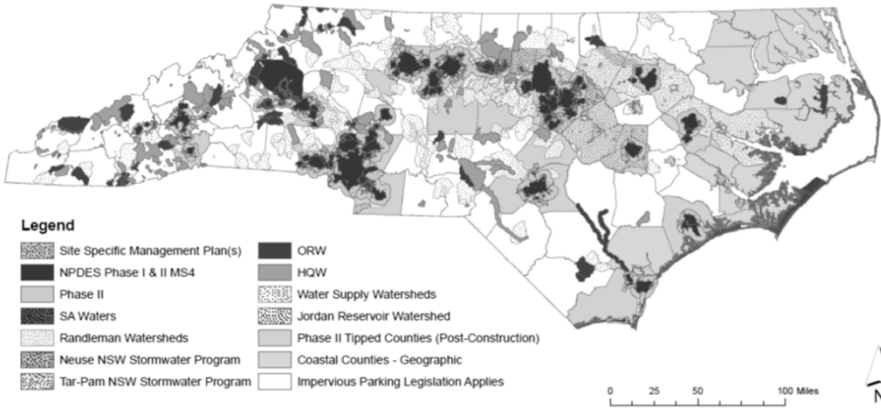
Voluntary design recommendations to optimize the device's effectiveness in reducing SW temperature.



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## MDC apply to all measures regardless of:

Geographical location, stormwater program or fast-track or regular review process.



**Legend**

Site Specific Management Plan(s)	ORW
NPDES Phase I & II MS4	HQW
Phase II	Water Supply Watersheds
SA Waters	Jordan Reservoir Watershed
Randleman Watersheds	Phase II Tipped Counties (Post-Construction)
Neuse NSW Stormwater Program	Coastal Counties - Geographic
Tar-Pam NSW Stormwater Program	Impervious Parking Legislation Applies

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**MDC Team process since March 2014:**

1. Team selects our *Practice of the Month*
2. DEMLR staff list all *Potential MDC* based on 2H .1000 rules and the BMP Manual (~25-40)
3. Team debates merit & wording of each potential MDC and creates updated MDC list for the practice (~7-15)

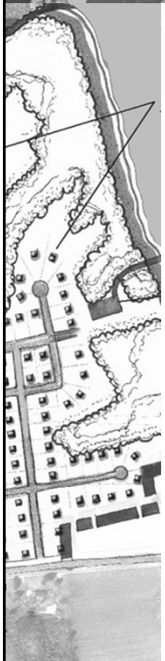
We have now completed all of the SCMs!

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**Preview of the MDC....**



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## General MDC

- Recorded drainage easement.
- Dewatering device.
- No erosion at BMP inlets or outlets.
- Operation & maintenance agreement.
- Vegetated slopes no steeper than 3:1.
- Designer certification.
- Water quality volume calculation.


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## Which one of these is **STILL** a wet pond MDC?

- a. The permanent pool must be within 6" of the SHWT or a liner shall be installed.
- b. The SHWT must be determined for every wet pond.
- c. The vegetated shelf must be 10 feet wide.
- d. The forebay must be approximately 20% of the total volume of the pond.
- e. The SA/DA tables are required.


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~~The permanent pool must be within 6" of the SHWT or a liner shall be installed.~~

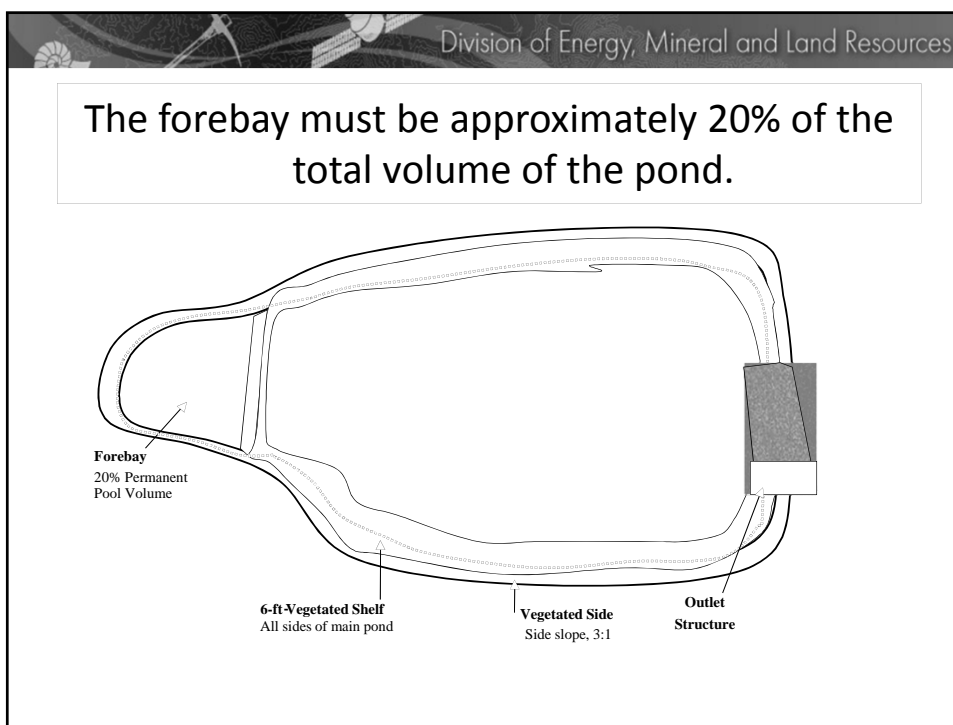
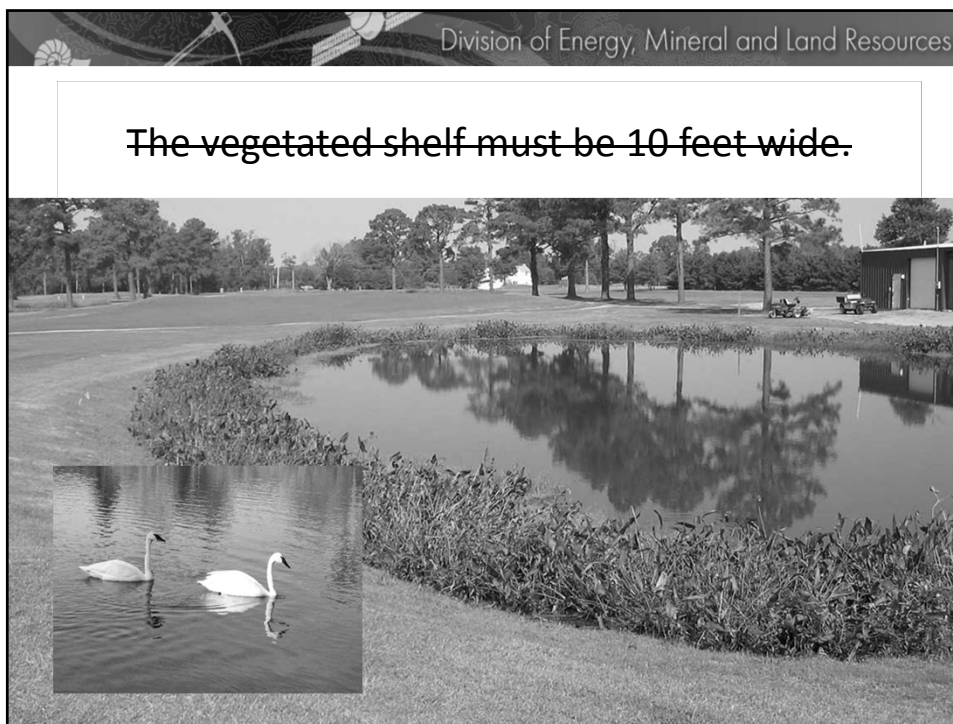


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~~The SHWT must be determined for every wet pond.~~



Only if the wet pond is within 50 feet of a wetland





~~The SA/DA tables must be used for sizing.~~

Option: Hydraulic Retention Time (HRT) method

**Permanent Pool Volume,  $V_{pp}$ :**

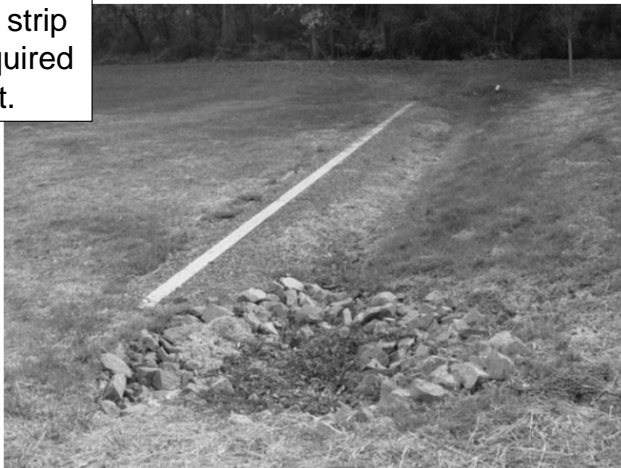
$$V_{pp} = \frac{HRT}{HRT - T_{dd}} * WQV$$

Where:

$V_{pp}$	=	Permanent pool volume (cu ft)
$T_{dd}$	=	Drawdown time (days)
HRT	=	14 days (hydraulic residence time)
WQV	=	Water quality volume (cu ft)

## One other highlight: wet pond MDCs

A level spreader-vegetated filter strip is no longer required at the outlet.



**Which one of these is STILL an infiltration MDC?**

- a. Only the design storm may be conveyed to an infiltration system.
- b. Pre-treatment must be provided to prevent clogging.
- c. The maximum drainage area for an inlet to an infiltration system is 2 acre-inches.
- d. A 4-inch layer of washed sand shall be provided at the bottom of the infiltration system.

~~Only the design storm may be conveyed to an infiltration system.~~



Pre-treatment must be provided to prevent clogging.




~~The maximum drainage area for an inlet to an infiltration system is 2 acre-inches.~~



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~~A 4-inch layer of washed sand shall be provided at the bottom of the infiltration system.~~




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**New design basis: infiltration system MDCs**


Infiltration systems shall dewater to the bottom of the infiltration device within 72 hours.

A site-specific soil investigation shall establish the hydraulic properties & characteristics of the infiltration site.



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**Highlight:  
Peak Flow  
Attenuation**




All devices are now allowed to store peak attenuation volume.

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**MDC Highlights: Bioretention Cells**

- Media: 75-85% medium to coarse washed sand & no mechanical compaction
- Maintain drawdown rate of 1 in/hr
- Plant to achieve 50% coverage at 5 years. Sod shall be non-clumping & deep-rooted.
- Must provide internal water storage unless in-situ soil infiltration rate > 2 in/hr



## MDC Highlights: Stormwater Wetlands

- Ponding depth increased from 12 to 15 inches above the permanent pool.
- The pH, compaction and other attributes of the first 12" depth of the soil shall be adjusted if necessary to promote plant growth.



## MDC Highlights: Level Spreader-Filter Strips

- Size based on the 0.75 inch/hour storm, with a flow bypass system for larger storm events.
- Blind swale is sufficient to provide pre-treatment.



## **MDC Highlights: Sand Filters**

- The volume of water that can be stored in the sediment chamber and the sand chamber above the sand surface combined shall be 0.75 times the treatment volume..
- Sand media shall meet ASTM C33.
- Media shall be maintained in a manner that results in a drawdown of at least two inches per hour at the sand surface

**Now it's time to start discussing  
the fast-track process!**



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## Session Law on fast-track permitting

The EMC shall adopt a fast-track permitting rule no later than July 1, 2016. The rule shall provide processes for:

- Permit application, review, and determination.
- Ensuring compliance with the MDC.
- Specifying the types of professionals that are qualified to prepare a fast-track permit application.
- Establishing the liability of a professional who prepares a fast-track permit application that fails to comply with the MDCs.

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graph TD
    A[Qualified professional prepares fast track application package] --> B{determination meeting w/DEMLR: Is project eligible & complete?}
    B -- incomplete --> C[Missing information provided by qualified professional]
    B -- ineligible --> D[Submittal sent to regular or express review process]
    B -- Yes --> E[Fast track permit issued within 10 business days. DEMLR reviews a randomly selected projects for compliance with the MDC.]
    E --> F[Project or project phase constructed.]
    F --> G[Permittee submits marked-up as-built drawings.]
    G --> H[As-built drawings are reviewed for compliance. Randomly selected projects receive a field audit in conjunction with the as-built review.]
    H --> I{Do the as-built drawings and field audit (if applicable) comply with the MDC?}
    I -- No --> J[DEMLR informs permittee of the deficiencies in writing.]
    J --> K{Does the permittee bring the project up to MDC?}
    K -- Yes --> L[DEMLR issues a letter to close-out the construction phase of the permit. This allows the permittee to transfer permit to owner.]
    K -- No --> M[Enforcement action against qualified professional and permittee.]
    L --> N[Ongoing maintenance and compliance for SCMs.]
    
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Suggested approach:

Let's agree on the overall process, then we'll fill in the details meeting-by-meeting.



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## Possible Rule-Making Schedule

The fast-track rule must be adopted no later than May 2016.

Jul 8, 2015	WQC approves rule text
Jul - Oct 2015	DEMLR develops fiscal note
Nov 1, 2015	OSBM certifies fiscal note
Nov 12, 2015	WQC / EMC approves rule & fiscal note
Nov 20, 2015	DEMLR's files rule & fiscal note in Register
Dec 15, 2015	Comment period begins (hearing after 12/29)
Feb 16, 2016	Comment period ends
May 2016	WQC / EMC adopts rule

The screenshot shows a web browser window with the URL <http://portal.ncdenr.org/web/ir/state-stormwater/mdc-team>. The page header includes the NCDENR logo and the text "Division of Energy, Mineral and Land Resources". A navigation menu on the left lists "Home" and "CONTACTS". The main content area is titled "Minimum Design Criteria Team" and contains the following text:

The purpose of the Minimum Design Criteria (MDC) Team is to meet the regulatory requirements associated with [Session Law 2013-82](#) (House Bill 480), which requires DENR to convene a stakeholder team that includes industry experts, engineers, environmental consultants, university faculty and other stakeholders.

The law tasks the MDC Team with the following:

1. To consult with DENR in developing MDCs that encompass all requirements for siting, design, construction and maintenance of stormwater BMPs. The MDC shall be developed with the goal of generating state stormwater permits that comply with water quality standards. DENR shall submit its recommendations to the Environmental Review Commission by February 1, 2015.
2. To consult with the N.C. Environmental Management Commission (EMC) in developing a fast-track permitting process for issuing state stormwater permits without a technical review when all BMPs comply with all MDCs and the permit application is prepared by a qualified individual. The EMC shall adopt a fast-track permitting rule by July 1, 2016.

The MDC Team has met once a month since March 2014. The table below includes the materials MDC Team members need to prepare for meetings as well as meeting minutes.

**MDC Team work products include:**

- [MDC to Date 1-27-15](#)
- [Final MDC Team Charter](#)
- [MDC Development Process](#)

A sidebar on the left lists various topics under "CONTACTS", including Energy, Land Quality, Stormwater, and many others.

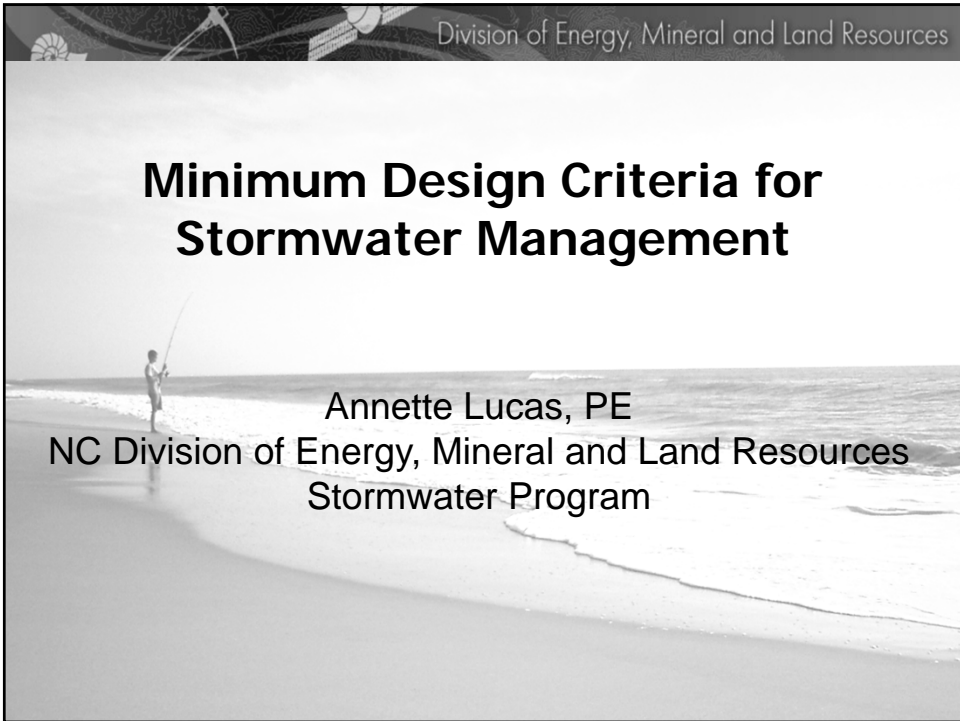
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## Thank you to the MDC Team!

Marc Houle, PE Cameron Moore Ronald Horvath, PE Tim Clinkscales, PE Hunter Freeman, PE Mike Gallant, PE Tom Murray, PE JD Solomon, PE Rob Weintraub Jonathan Bivens, PE Derek Pielech, PE Virginia Spillman, PE	Robert Patterson, PE Mike MacIntyre, PE Todd Miller Peter Raab Larry Ragland, RLA, ASLA Bill Hunt, PhD, PE Eban Bean, PhD, PE Brian Lipscomb, PE Joe Hinton, LSS Boyd Devane Bradley Bennett Linda Lewis
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## Minimum Design Criteria for Stormwater Management



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