

# Improving the EPA Multi-Sector General Permit for Industrial Stormwater Discharges

Allen P. Davis, Chair  
Janet Kieler, Committee member



# Multi-Sector General Permit (MSGP) and Monitoring



- EPA developed in 1995.  
Renewed in 2000, 2008, 2015
- Benchmark monitoring; an indicator of the effectiveness of SCMs
  - Basis in 1992 group applications
- Exceedances are not permit violations
  - Cause for review of SCMs

# MSGP Impact

- EPA permitting authority
  - Four states (Idaho, Massachusetts, New Hampshire, New Mexico) and DC
  - Some federally operated facilities
  - Most of Indian country
- Remaining states use MSGP as a model

# NASEM Study Context

- Derived from legal settlement agreement
  - Waterkeeper Alliance et al., EPA, and Federal Water Quality Coalition and Federal Storm Water Association.
- Will inform next revision of MSGP



Photo Credit: USGS

# Statement of Task

1. Suggest improvements to the current MSGP benchmarking monitoring requirements.
2. Evaluate the feasibility of numeric retention standards.
3. Identify the highest priority industrial facilities/subsectors for consideration of additional discharge monitoring.
  - “highest priority” = subsectors for which the development of numeric effluent limitations would be most scientifically defensible (based upon sampling data quality, data gaps and the likelihood of filling them).





# Committee

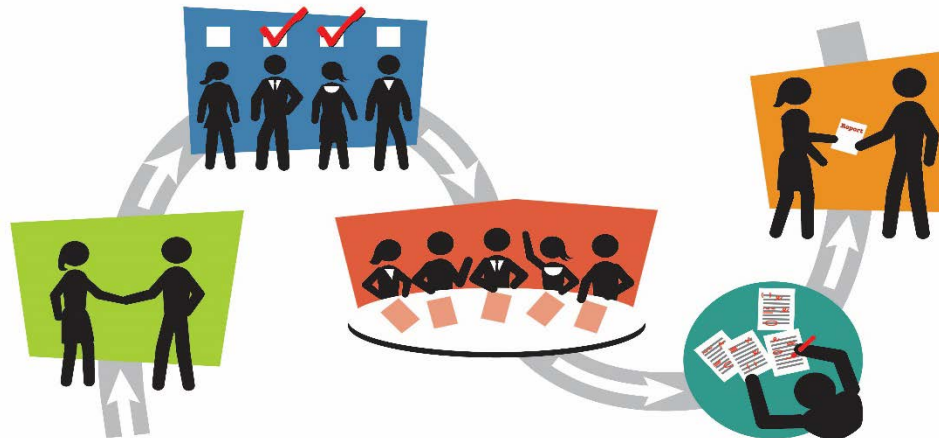
- **Allen P. Davis**, *Chair*, Univ. of Maryland, College Park
- **Roger T. Bannerman**, Wisconsin Dept. of Natural Resources (Retired)
- **Shirley E. Clark**, Penn State, Harrisburg
- **L. Donald Duke**, Florida Gulf Coast Univ.
- **Janet S. Kieler**, Denver International Airport
- **John D. Stark**, Washington State Univ.
- **Michael K. Stenstrom**, UCLA
- **Xavier Swamikannu**, UCLA; CA Water Board, LA Region (Retired)

NASEM staff: Stephanie E. Johnson and Carly Brody



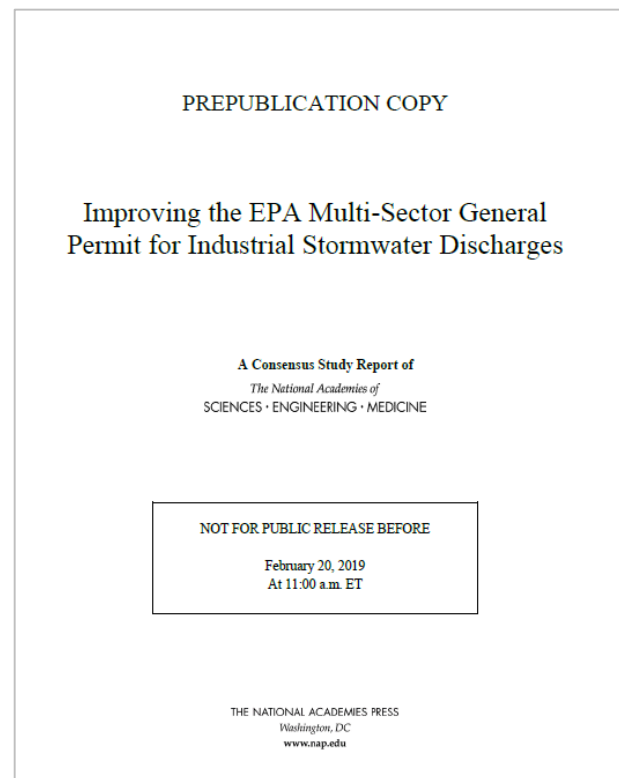
# Study Process

- 5 in-person committee meetings (Nov. '17 to Sept. '18)
  - 3 in-person meetings included information gathering
  - 3 public web conferences
  - Presentations or public comment from nearly 40 people (federal/state/local agencies, NGOs, industry, consultants)
- Product: Peer-reviewed consensus report



# Report Chapters

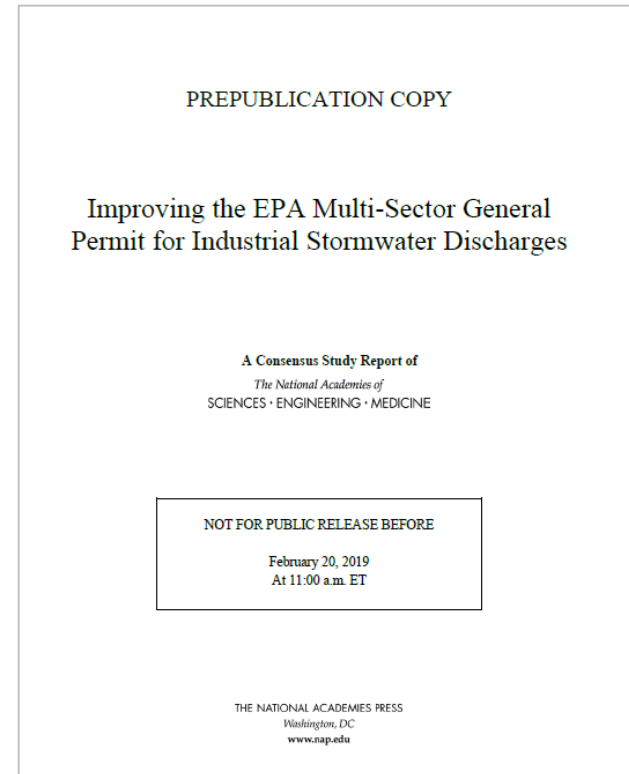
2. Pollutant monitoring requirements and benchmark thresholds
3. Stormwater sampling and data collection
4. Retention standards in the MSGP





# Report Chapters

2. Pollutant monitoring requirements and benchmark thresholds
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# Benchmark Monitoring



Photo Credit: EPA

- 55% of MSGP permittees conduct benchmark monitoring
- Quarterly grab samples
- Annual average determines exceedance

# Assessment of MSGP Benchmark Monitoring

- Shortfalls:
  - Industry fact sheets not updated since 2006
  - Inconsistencies, inadequacies in benchmark monitoring requirements
  - New information, technology, not used to update monitoring requirements

# Benchmark Monitoring

- EPA should periodically review and update sector-specific requirements
  - Industry fact sheets
  - New information, advances in monitoring
  - Where data gaps remain, initiate sector-specific data gathering efforts (e.g., PAH)
- EPA should extend requirements to non-industrial facilities with similar activities

# Benchmark Monitoring

- EPA should require industry-wide monitoring for pH, TSS, and COD
  - Broad indicators of SCM effectiveness
  - Baseline understanding across all sectors
  - Relatively low cost when added to visual monitoring
  - Ultimately replace COD with TOC



Photo Credit: EPA

# Benchmark Thresholds

- Benchmarks should have a basis tied to short term or intermittent exposures
  - Stormwater is episodic and dilution/attenuation is expected
  - To date benchmarks have generally been acute criteria.
  - Iron, arsenic, selenium currently based on chronic criteria



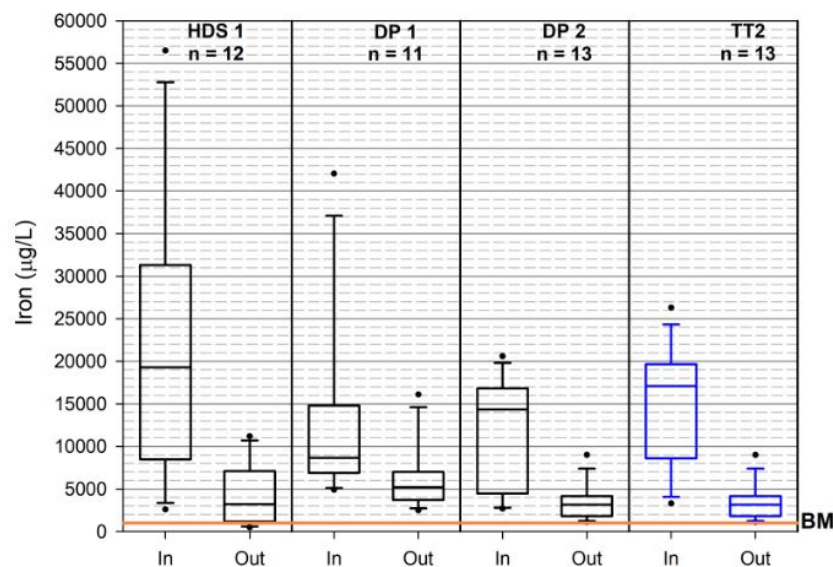


# Benchmark Threshold Recommendations

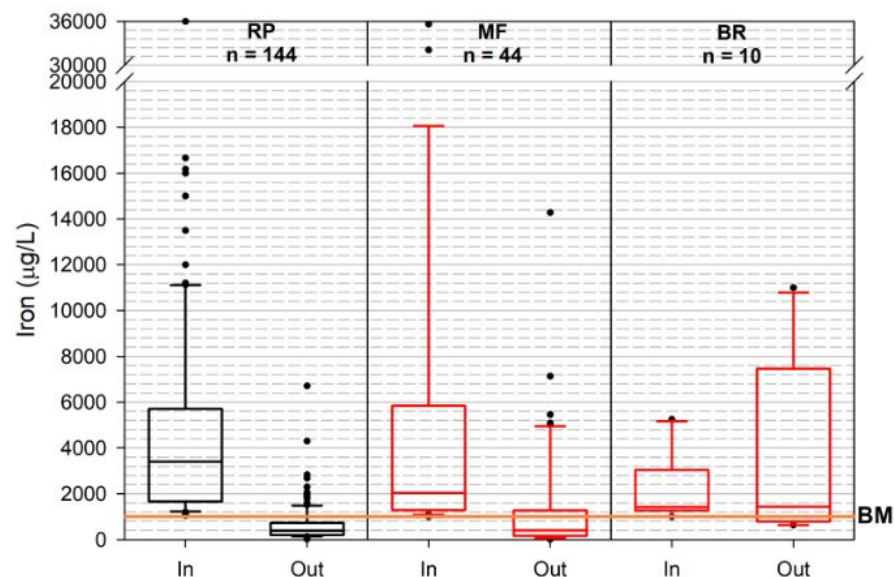
- Develop acute aquatic life criteria (e.g., iron)
- Suspend benchmarks for iron and magnesium
- Develop chronic translators for intermittent exposures
- Allow permittees with repeated exceedances to use more complex measures (BLM for copper; translator for selenium)
- Update units of expression ( $\mu\text{g/L}$ )

# Benchmark Attainability

- Potential difficulties in achieving benchmark for iron, aluminum, copper, lead (soft water), and zinc (soft water)



Individual industrial sites



Multiple sites, all land uses

MSGP 2015  
data:

Percent  
results above  
benchmark

Sector	Al	NH <sub>3</sub>	As	BOD <sub>5</sub>	Cd	CO	Cu	Cr	Fe	P	Mg	Hg	NO <sub>2</sub> + NO <sub>3</sub>	pH	TP	Se	Ag	TSS	Turbidity	Zn					
A1: Sawmills																									
A2: Wood																									
A3: Pulp mills																									
A4: Hardwoods																									
B1: Paperboard																									
B2: Pulp mills																									
C1: Agricultural																									
C2: Industrial inorganics																									
C3: Cleaning, cosmetics																									
C4: Plastics																									
C5: Medicinals																									
D1: Asphalt																									
E2: Concrete																									
E3: Glass																									
F1: Steel works																									
F2: Iron/steel foundries																									
F3: Nonferrous metals																									
F4: Nonferrous foundries																									
G1: Copper ore																									
G2: Other ores																									
H: Coal mines																									
J1: Construction sand																									
J2: Stone																									
J3: Clay mineral mining																									
K: Hazardous waste																									
L1: Landfills																									
L2: Landfills, not MSW																									
M: Automobile salvage																									
N1: Scrap recycling																									
O1: Steam electric																									
P: Transportation, postal																									
Q: Water transportation																									
R: Ship and boat building																									
S: Air transportation																									
T: Sewage treatment																									
U1: Grain mill products																									
U3: Meat, dairy, tobacco																									
Y1: Rubber																									
Y2: Misc. plastics																									
AA1: Fabricated metals																									
AA2: Fabr. metal coating																									
AB: Machinery																									
AC: Electronics																									
No data	Insufficient data (<8 results)					<10% above benchmark (BM)					10-25% above BM					26-50% above BM					>50% above BM				

MSGP 2015  
data:

Percent results  
above 8x  
benchmark

Sector	Al	NH <sub>3</sub>	As	BOD <sub>5</sub>	Cd	COD	Cu	CN	Fe	Pb	Mg	Hg	NO <sub>2</sub> +NO <sub>3</sub>	TP	Se	Ag	TSS	Turb	Zn
A1: Sawmills																			
A2: Wood							81%										13%		
A3: Log storage																			
A4: Hardwoods																			
B1: Paperboard																			
B2: Pulp mills																			
C1: Agricultural									13%										25%
C2: Industrial inorganics																			
C3: Cleaning, cosmetics																			
C4: Plastics																			16%
C5: Medicinals											50%								
D1: Asphalt																			
E2: Concrete									17%										
E3: Glass																			
F1: Steel works																			
F2: Iron/steel foundries																			
F3: Nonferrous metals							14%												12%
F4: Nonferrous foundries							50%												30%
G1: Copper ore																			
G2: Other ores																			
H: Coal mines	95%								95%								55%		
J1: Construction sand																			
J2: Stone													11%						
J3: Clay mineral mining																			
K: Hazardous waste											83%								
L1: Landfills																			
L2: Landfills, not MSWLF									17%										
M: Automobile salvage																			
N1: Scrap recycling	13%						26%		18%										13%
O1: Steam electric																			
P: Transportation, postal																			
Q: Water transportation	12%						61%		12%										
R: Ship and boat building							81%												
S: Air transportation									16%										
T: Sewage treatment																		10%	
U1: Grain mill products																			
U3: Meat, dairy, tobacco												13%							
Y1: Rubber																			23%
Y2: Misc. plastics																			
AA1: Fabricated metals							46%												
AA2: Fabr. metal coating																			
AB: Machinery																			
AC: Electronics																			

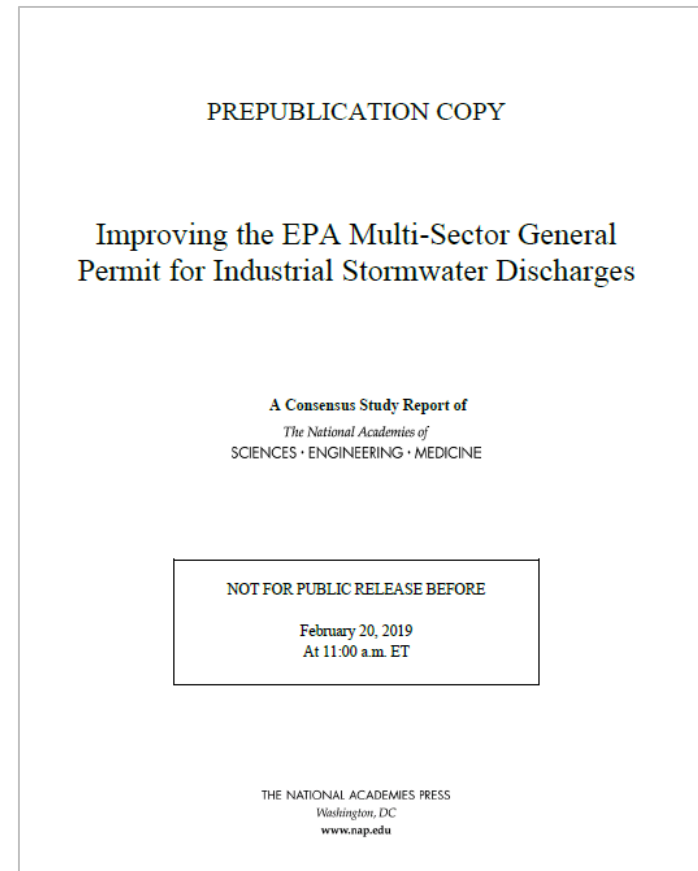
No data	Insufficient data (<8 results)	0% above 8x BM	1-9% above 8x BM	10-25% above 8x BM	>25% above 8x BM

# Benchmark Attainability

- Industries should collect additional SCM performance data
  - Inform new national effluent limits (NELs)
  - EPA should help make publicly available
- No NELs recommended for any specific sector based on existing data, data gaps, and the likelihood of filling them

# Report Chapters

2. Pollutant monitoring requirements and benchmark thresholds
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# Sampling and Data Collection

- Stormwater monitoring data contains potential sources of variability and error:
  - Sampling design
  - Sampling procedure
  - Lab analysis
  - Data input and management



Washington Stormwater Sampling Manual

# Sampling and Data Collection

- Strengthen monitoring and analysis protocols
  - Consider a training program for MSGP monitoring
  - National laboratory accreditation
  - Interlaboratory calibration
- Allow and promote composite sampling



Photo Credit: USGS

# Sample Frequency and Number

- Quarterly grab sampling over 1 yr inadequate
  - Recommend annual sampling at minimum
  - Large error with only 4 grab samples
  - EPA should determine minimum sample number for acceptable level of error



Photo Credit: RaleighNC.gov

# Tiered Monitoring

- Expand the tiered approach based on facility risk, complexity, and past performance.
  1. Inspection-only
  2. Industry-wide monitoring only
  3. Benchmark monitoring
  4. Enhanced monitoring

# Tiered Monitoring

## 1. Inspection Only

- For low-risk facilities
- Inspection in lieu of chemical monitoring
  - Certified inspector
  - Review SWPPP
  - Walk site
  - Identify problems
  - Report (public)



Photo Credit: KingCounty.gov

# Tiered Monitoring

## 2. Industry-wide monitoring (pH, TSS, COD):

- Those without benchmark monitoring, and
- Do not qualify (or opt) for inspection only

## 3. Benchmark monitoring:

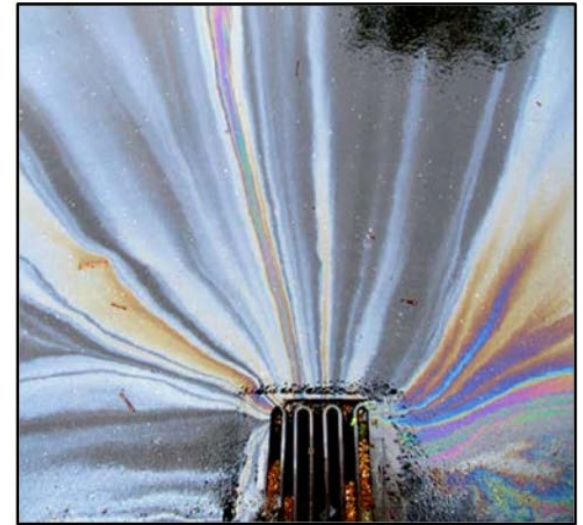
- Similar to existing MSGP, except:
  - Includes pH, TSS, COD
  - Periodic updates



# Tiered Monitoring

## 4. Enhanced Monitoring

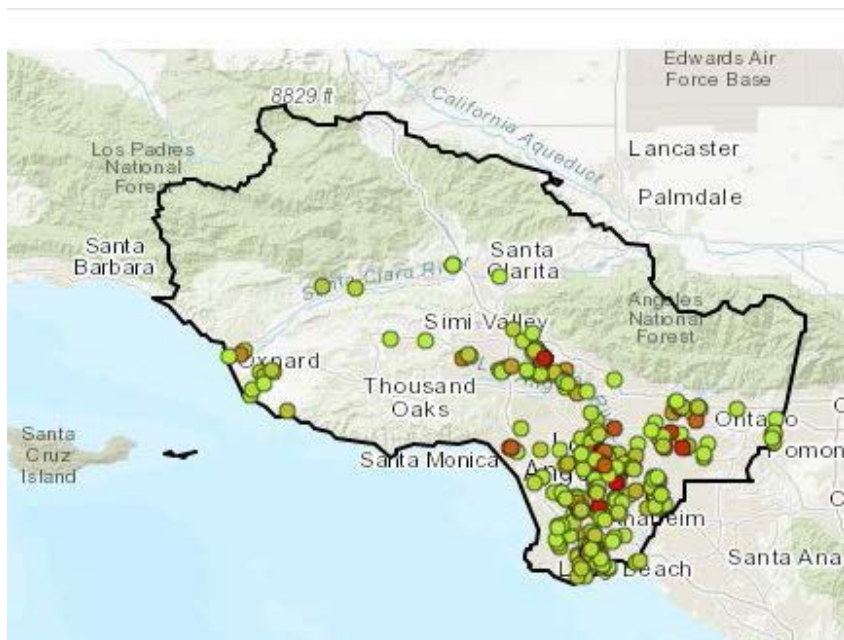
- For repeated exceedances or complex sites
- Could include more rigorous monitoring and modeling:
  - Composite sampling
  - Dissolved metals
  - Wet-weather mixing
  - Biotic ligand model



Washington Stormwater Sampling Manual

# Data Management and Visualization

- Enhance electronic data reporting, analysis and visualization tools



Sites since 2013 with results  
< lead benchmark



Sites since 2013 with results  
> lead benchmark

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Improving the EPA Multi-Sector General  
Permit for Industrial Stormwater Discharges

A Consensus Study Report of  
*The National Academies of*  
SCIENCES • ENGINEERING • MEDICINE

NOT FOR PUBLIC RELEASE BEFORE

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# Retention Standards in the MSGP

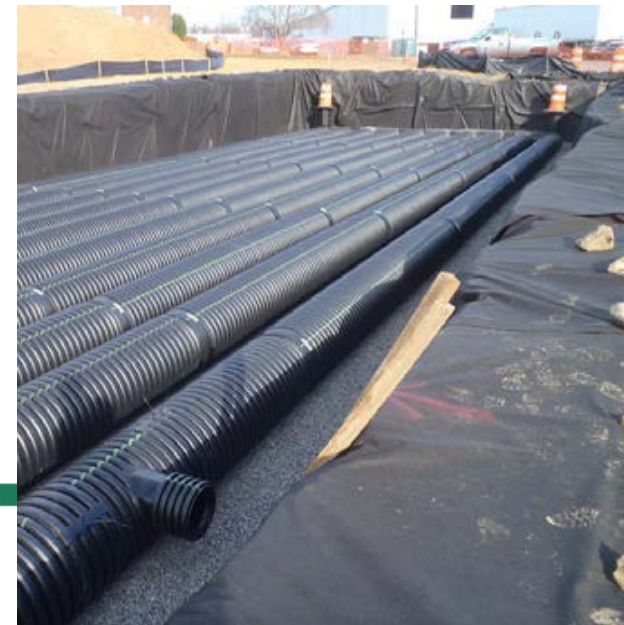


Photo Credit: City of Columbia, MO

- Many benefits; already allowed in MSGP
- Rigorous requirements needed to ensure groundwater protection
  - Detailed site data, or
  - Infiltrated water should meet selected primary & secondary drinking water standards

# Retention Standards in the MSGP

- National retention standards infeasible in MSGP due to site-specific factors
- Consider incentives to encourage industrial stormwater infiltration (or capture and use) where appropriate.
  - Develop guidance
  - Address bypass exceedance



# Summary

- Tiered monitoring framework could improve quality of data while reducing burden to lowest-risk facilities
- MSGP should incorporate the best available science with each permit revision
  - a structured review process that addresses scientific advances and data gaps
  - continuously incorporate more sophisticated monitoring, training, and data analysis tools



# Questions?

Full report at <https://www.nap.edu/catalog/25355>

Also available on this page under “Resources” tab:

- Press release
  - 4-page report-in-brief
  - Will post slides and link to webinar
- 