Jordan Nutrient Rules: New Development TAG#1

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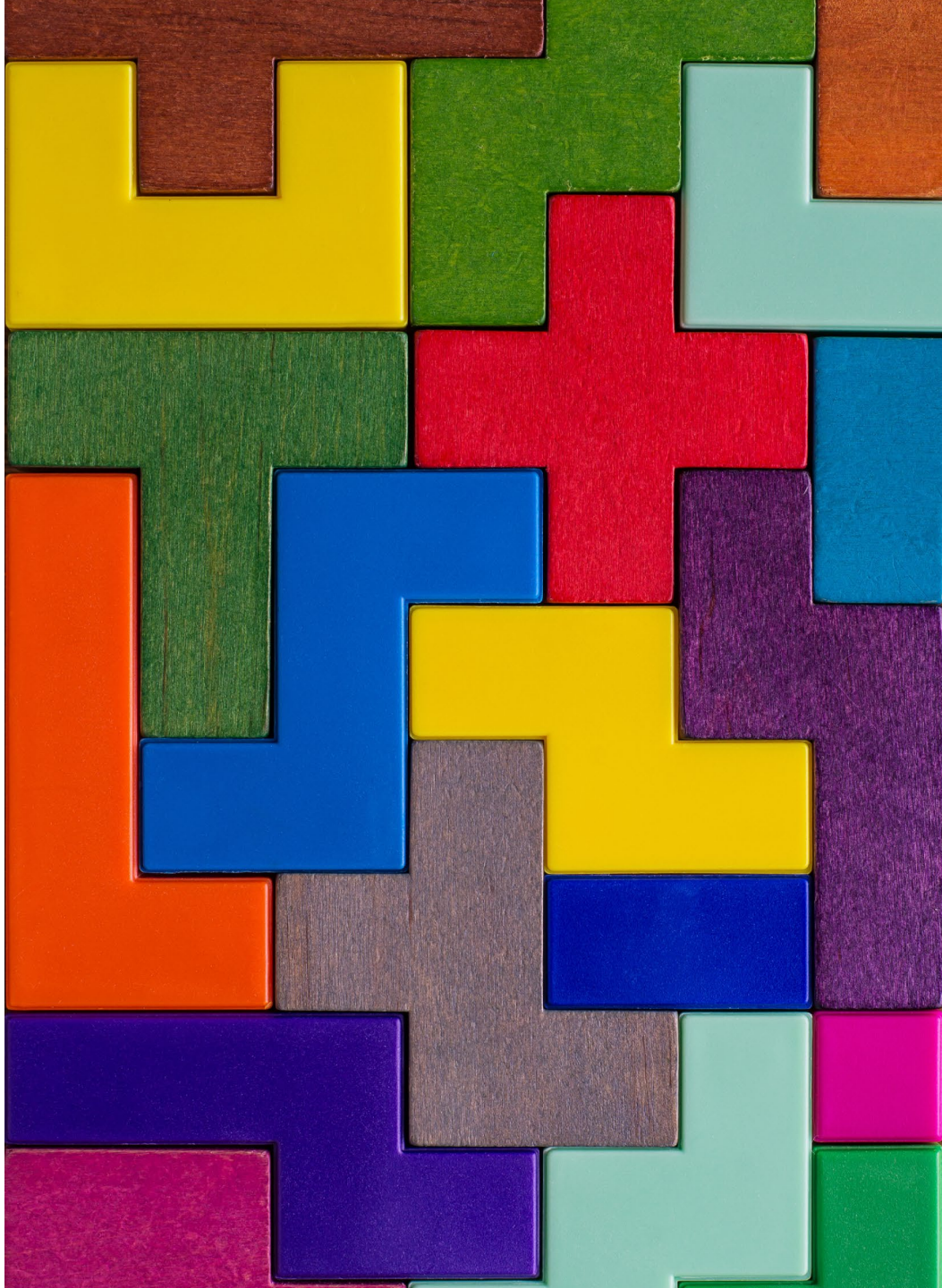
NC DWR, May 2024

Welcome to the first Technical Advisory Group (TAG) for New Development Stormwater Jordan Rule Readoption.

Introductions: please state name, affiliation, relation to Jordan stormwater regulations, and a favorite outdoor activity.



TAG Purpose & Process

- Purpose of TAGs: to get feedback from stakeholders on current implementation and rule revision concepts.

- TAG Process
  - May 1st – Review foundations of Jordan New Development Stormwater Rule, discuss implementation, review general new concepts and discuss.
  - 2nd TAG (Spring-Sum) – aim to send **draft rule concept prior to meeting**, review in the meeting and discuss implementation questions.
  - 3rd TAG (Sum) – aim to send **draft rule language prior to meeting**, review in meeting and discuss implementation questions.

  - Intent: Complete stakeholder engagement, comments on all rules by November 2024. Draft rules to WQC mid-February for **March 2025 WQC meeting.**

‘Informal’ Stakeholder Engagement

WQC Approval to Proceed (expected multiple reviews)

“Formal” Rulemaking (steps can require > 1 pass)

2024

- DWR stakeholder engagement.
- DWR rule drafts and internal review.
- Stakeholder groups review rule language.

2025

- **March WQC**: Info item – draft rules
- Begin fiscal analysis.
- **May or July WQC**: Action item
  - Request to proceed w/rules
  - Share rough fiscal analysis
- Full fiscal analysis
- **Sept or Nov WQC**: 2nd attempt if needed
- **Fiscal – seek OSBM approval**

(filing dates = 1 mo prior to meetings)

2026-2027

- Fiscal Analysis - OSMB approval
- EMC approval to proceed
- 60-day public comment period
- Hearing Officers deliberate
- Develop Hearing Officers report
- EMC adopts rules
- Rules Review Commission approves

Modeled Reductions to Meet Chl-a Standard

- Overall, new model is calling for significant additional nutrient loading reductions to meet chl-a standard

Current Rule – Lake Reduction Goals*		
	N	P
Upper NH	35%	5%
Lower NH	0%	0%
Haw	8%	5%

* relative to 1997-2001 baseline period

New Lake Model – Further Lake Reduction Needs*		
	N	P
Upper NH	**62%**	0%
Middle NH	**30-50%**	**10-60%**
Haw	**0-30%**	**40-70%**

* relative to 2014-2016 model period

- Internal DWR review of model is underway, additional insights pending.

Current NC Stormwater Reg's in Jordan

- NC DEQ –
  - Federal NPDES Stormwater rules - Phase I, II communities implement MS4 post-construction requirements
  - Water Supply Watershed rules (DEMLR) – local governments implement in WSW areas falling in their jurisdictions
  - Jordan State & Federal Entities rule - DEMLR implements post-construction requirements
  - Jordan New Development Stormwater rule – local implementation barred pending rules readoption

- Local stormwater ordinances, depending on authority, may have further requirements

- Depending on local requirements and project intensity, stormwater may/not be treated before discharge to surface water.

Example Jordan Local Governments

- Several jurisdictions overlap WSW, MS4 and Post construction requirements.

- Greensboro: Stormwater manual. BUA threshold depends on watershed requirements - majority of area uses 24% BUA threshold. 85% TSS removal from first one-inch of precipitation for high density sites. NPDES Phase II and other State requirements to protect and preserve stream channels and floodplains from excessive disturbance and encroachment. 1, 2, 10, 100 yr 24hr storm.

- Chapel Hill: 5.6.4 stormwater ordinance: 85% TSS removal from first one-inch of precipitation. Post peak flow matches pre flow for 1, 2, 25 yr 24hr storm events (soon to add 100yr). Stream channel disturbance minimized.

Content - Jordan New Development Stormwater Rule

- All local governments implement programs approved by EMC:
  - Project approvals
  - Ensure BMP maintenance for life
  - Ensure project compliance for life
  - WSW – ultimate responsibility, variances
- Project requirements –
  - Meet subwatershed N, P loading rate targets (lb/ac/yr)
    - One SCM required, 85% TSS, 1” storm
    - Offset purchase allowed for balance
  - Peak rate match, 1 yr 24 hr storm
  - Comply with buffer rule

Comparison w/other NSW Stormwater Rules

- Neuse: 3.6 lb N/ac/yr loading rate target (or volume match);
- Tar-Pamlico: 4.0 lb N/ac/yr, 0.4 lb P/ac/yr (or volume match);
- Both Neuse and Tar (readopted):
  - 1º SCM > 24% BUA ; offset option for remainder
  - Disturbance thresholds: 1 ac residential; ½ ac commercial/industrial/multi-family
  - Exemption for individual SF lots NPOLCPDOS w/ <5% BUA
- Falls:
  - 2.2 lb N/ac/yr, 0.33 lb P/ac/yr (or volume match)
  - Meet ≥ 30-50% of load reduction need onsite; offset remainder
  - Disturbance thresholds: ½ acre residential; 12,000 ft2 commercial/industrial/multi-family
- **Jordan:**
  - **Nitrogen: UNH 2.2; LNH 4.4; Haw 3.8 lb/ac/yr**
  - **Phosphorus: UNH 0.82; LNH 0.78; Haw 1.43 lb/ac/yr**
  - **All projects above targets ≥ 1 BMP, 85% TSS.**
  - **Post-treatment, offset option remainder < 10 lb N/ac comm./ind. or < 6 lb N/ac SF residential**
  - ***Delivery factors apply, offset based on lake-delivered loads***
  - ***Quantity: peak rate match, 1 yr/ 24 hr storm***

SCMs

- Stormwater Control Measures (SCMs) are devices used to control and clean stormwater runoff that flows off a property when it rains.
- Primary.
- Secondary.
- NC DEMLR manual.

Table 2: List of Primary and Secondary SCMs

List & Uses	Primary SCMs	Secondary SCMs
List	- Bioretention Cell - Infiltration System - Permeable Pavement - Wet Pond[1] - Stormwater Wetland[1] - Sand Filter - Rainwater Harvesting	- Green Roof - Disconnected Impervious Surface - Level Spreader-Filter Strip - Pollutant removal Swale - Dry Pond
Uses	- As a stand-alone SCM to treat a new development site (when 100% sized). - As a retrofit.	- In series with a primary SCM to reduce the volume of runoff and thus reduce the size of the primary SCM. - In series with a primary SCM to provide pretreatment. - In series with a primary SCM as a hydraulic device to slowly "feed" the stormwater runoff to the primary SCM, to reduce the size of the primary SCM. - In series with another secondary SCM to treat the design storm in a manner that meets or exceeds performance standard. - As a retrofit.

SNAP

- Currently used in Falls and Neuse, Tar-Pamlico
- Spreadsheet calculation, annual nitrogen and phosphorus runoff export from a development site with or w/o treatment (lb/ac/yr)
  - Annual runoff volume * landcover-specific nutrient concentrations
  - Annual runoff volume calculated with Simple Method
  - Models nutrient reductions by Stormwater Control Measures (SCMs)
- SCM nutrient treatment (NOT simple % efficiencies):
  - Inflow = catchment land covers area-weighted aggregate concentration
  - Inflow partitioned through SCM to hydrologic fates
  - Effluent - fixed event mean concentrations, SCM-specific
- Site aggregated into annual runoff load N and P across discharge points (lb/ac/yr)

How Does SNAP Work? Nutrient Export in Runoff

- Average annual runoff volume calculated with Simple Method
- Landcover-specific nutrient concentrations applied to volume

L = 2.72 * (P / 12) * Pj * Rv * C * A

L = Annual load (lb/yr)

P = Annual rainfall (inches)

Pj = Fraction of annual rainfall events that produce runoff (usually 0.9)

Rv = Runoff coefficient (varies by landcover type, permeable vs impermeable)

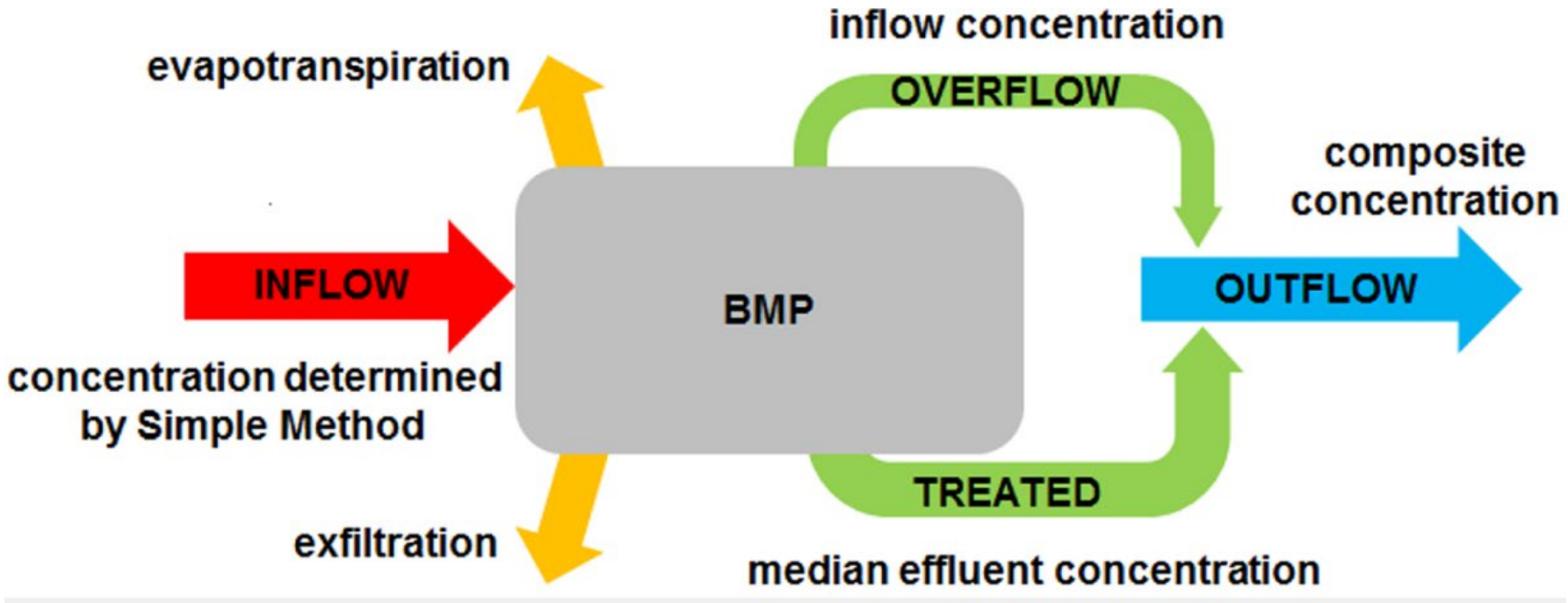
C = Pollutant concentration (mg/L, varies by landcover type)

A = Area (acres)

2.72 = converts mg/L to lb/ac

How Does SNAP Work? Nutrient Reduction by SCM

- Inflow partitioned through SCM to 3 hydrologic fates:
  - EvapoTranspiration / Infiltration = % reduction
  - SCM-specific Overflow carries inflow conc through
  - Effluent = SCM-specific median concentrations



SNAP - Runoff Nutrient Concentrations

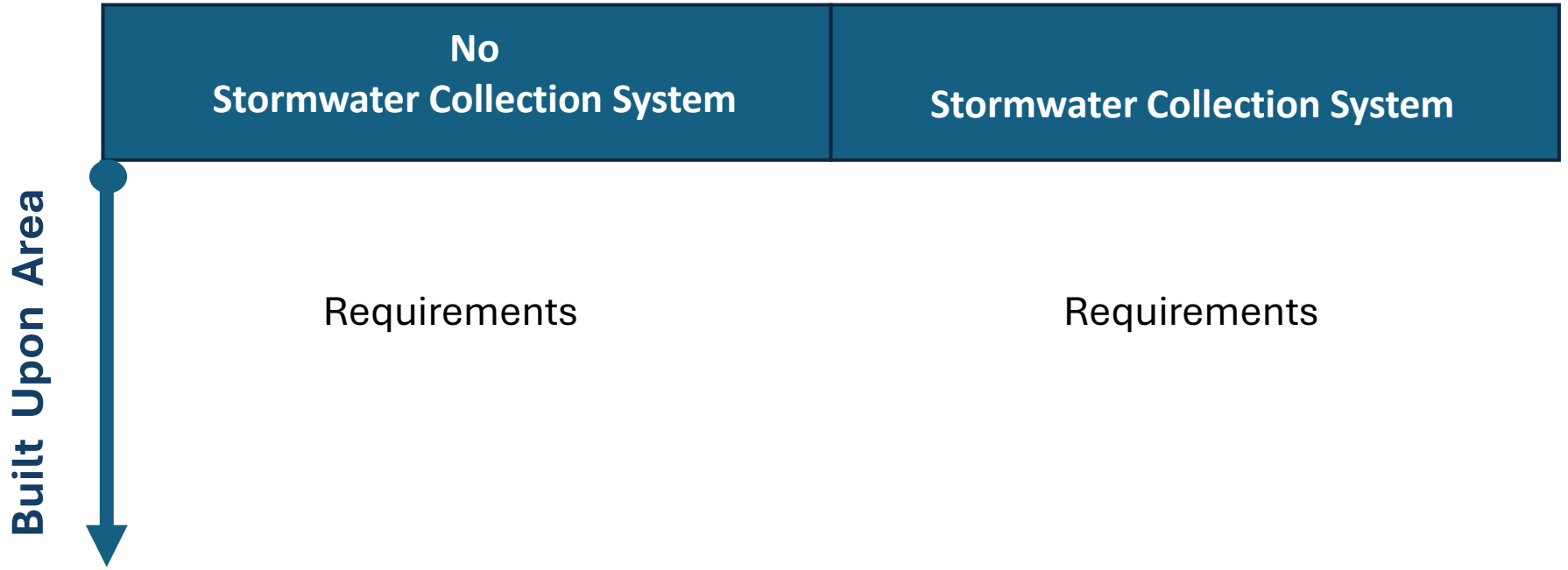
PROJECT AREA LAND COVERS	TN EMC (mg/L)	TP EMC (mg/L)	Pre-Project Area (ft^2)	Post-Project Area (ft^2)
Roof	1.18	0.11		
Roadway	1.64	0.34		
Parking/Driveway/Sidewalk	1.42	0.18		
Protected Forest	0.97	0.03		
Other Pervious/Landscaping	2.48	1.07		
CUSTOM LAND COVER 1				
CUSTOM LAND COVER 2				
CUSTOM LAND COVER 3				
LAND TAKEN UP BY SCM	1.18	0.11		

Questions and Comments

Input on current implementation?

New ND Proposal

Program that requires different practices (SCMs) depending on the planned level of disturbance (BUA) and type of stormwater collection system in place.



Jordan New Development Revision Concepts

Concern:

- Development changes to runoff hydrograph are not sufficiently offset by treat and release runoff from 1” to protect stream integrity.
- Receiving streams become destabilized despite stormwater reg’s, become sources of P and N.

Objectives of rule revision –

- No nutrient increases vs pre-d (softer than current reduction approach), and
- Protect receiving stream’s integrity.

Premises –

- Adequately addressing the second objective can provide presumptive compliance with the first (although we still want to calculate & track loads).
- Stream protection will require control starting at lower densities than typical 24%.

DWR Discussions on Jordan ND

First Flush:

- What first flush treatment metrics to use – storm size, retention, and/or release criteria?
  - Climate change impacting storm size – 90th vs 95th storm requirement impact on loading and development.

Treatment Threshold:

- What treatment threshold should we use – disturbance area only, development density, other?
  - Considering tiered BUA. Substantial research demonstrating impact of impervious land cover greater than 10%.

DWR Discussions on Jordan ND

Soil Rehab or Site Planning:

- Should we require any site planning, disturbance minimization, BMP restrictions or soil improvement?

Stormwater Collection Systems:

- Should we apply different treatment requirements on developments that drain to stormwater collection systems?

DWR Discussions on Jordan ND

Quantity Requirements - stream protection:

- Are their stream protection requirements or flood protection requirements that effectively manage flow from large storms?
  - Treat and release of runoff from the 1” is not protecting streams
  - Flashier flows – from both development and more bigger storms - causes expensive damage to infrastructure and carries pollutants.

Research Status

- Data Collection on select US State, Regional, and Local Government stormwater regulations - 2024.
  - Surveying across US with focus on States draining to Chesapeake Bay, Great Lakes, Long Island Sound.

- SWMM modeling consultation 2025-2027.

- Engineer analysis late 2024-2027.

- Fiscal analysis 2025-2026.

State Examples

Virginia:

- TP in site runoff may not exceed 0.41 lb/ac/yr; starting July 2024 may not exceed 0.26 lb P/ac. 20% P load reduction if redevelopment w/no BUA increase.
- Implemented through MS4's and state statute.
- "VRRM" required for site design – "MEP": LID-type site planning and BMP deployment; conventional BMPs last. Remaining LR need – offset.
- Stream protection: natural streams - 1 yr/24hr peak rate held to fraction of pre-d; man-made conveyances held to easier standard.

South Carolina:

- In process of making TMDL for lower Catawba basin and Reedy River basin. Once TDML is done, they will be making nutrient specific requirements for stormwater regulations. We are sending them our data collection.

Discussion Questions

- Is there interest this general new concept?
- Comments about requiring treatment below 24%?
- Comments about first flush metrics – 90th % storm and 1 inch?
- Is there support for stream protection criteria?
- Is there support for soil rehab requirements?

Next steps:

DWR: Complete state data pulls, interviews with developers and LGs, write up supporting research and new concepts.

TAG: Read write up and email/prepare comments before next TAG meeting.

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Thank you for your time and input.

We appreciate your time sending us your comments and any data/reports that can support ND stormwater decisions.

History - Jordan New Development Stormwater Rule 15A NCAC 02B .0265

- SL 2009-484: EMC-adopted rule enacted w/minor modification
- SL 2012-200: Implementation delayed 2 yrs
- 2012-2015 - 11 of 33 communities implemented voluntarily.
- SL 2013-395: Implementation (all rules) delayed 3 yrs more
- SL 2016-94: **Local implementation barred pending rules readoption**