



# Case Studies & Implications of Low-Order Streams Included in Shoreland Water Quality Protection Act

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# SWQPA and Low-Order Streams

RSA 483-B:4 XVI. (c) Rivers, meaning all year-round flowing waters of **fourth order or higher** and all rivers and river segments **designated as protected** under RSA 483:15. Stream order shall be determined using the New Hampshire hydrography dataset archived by the geographically referenced analysis and information transfer system (GRANIT) at the complex systems research center of the university of New Hampshire in collaboration with the New Hampshire Department of Resources and Economic Development. A listing of the streams of fourth order and higher shall be prepared and periodically updated by the GRANIT at the complex systems research center of the university of New Hampshire and delivered to the commissioner 30 days after the effective date of this subparagraph.

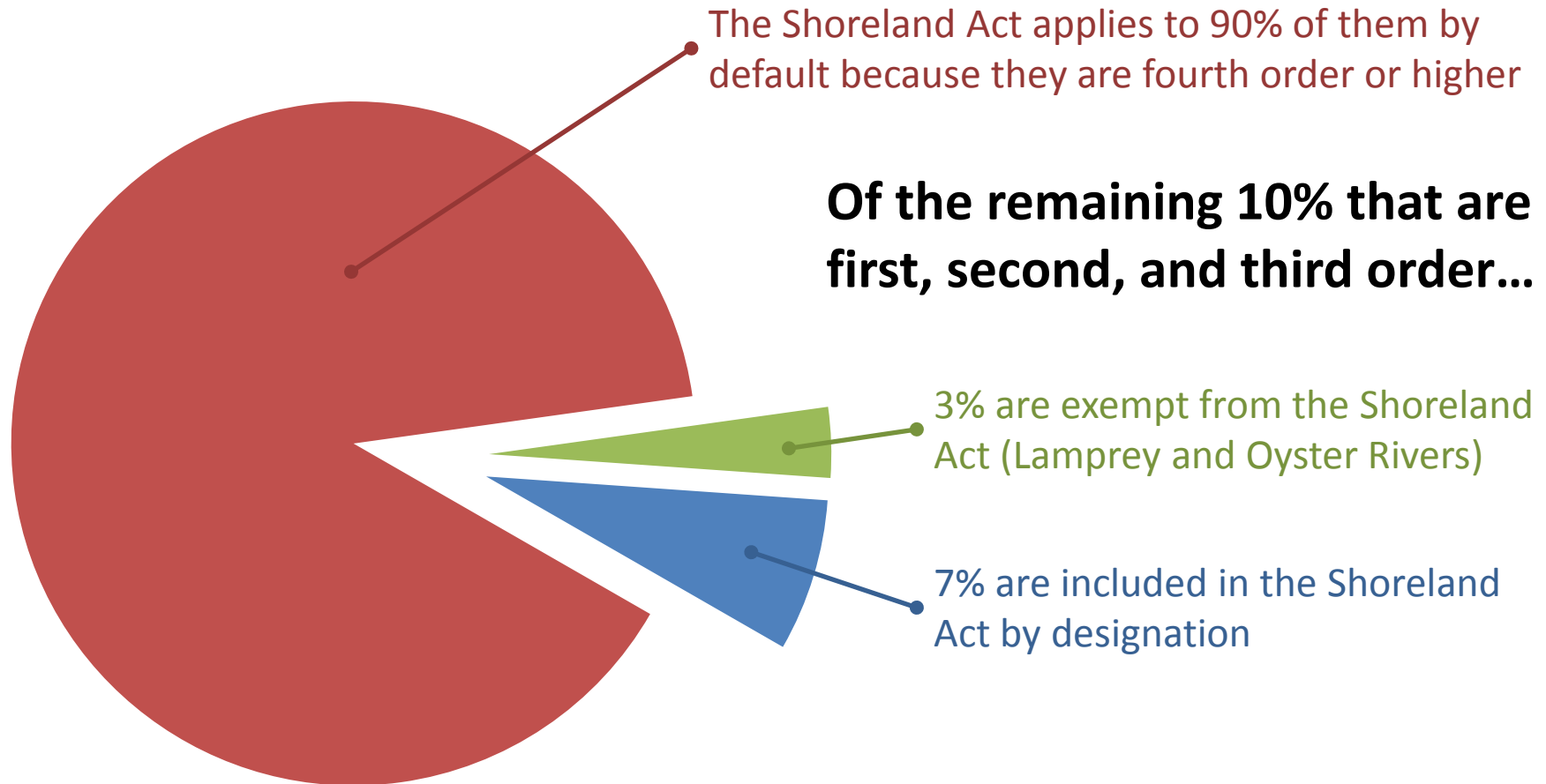
Except for the low-order portions of the Lamprey River and the Oyster River

# Designated River Miles by Stream Order

River	Stream Order							Total Orders 1-3	Total Orders 4-7	Total River Miles
	1	2	3	4	5	6	7			
AMMONOOSUC	0.3	0.5	5.4	32.2	17.6			6.2	49.8	56.0
ASHUELOT			2.4	1.1	35.7	26.3		2.4	63.2	65.5
COCHECO	2.7		0.2	24.4	8.0			2.9	32.4	35.3
COLD			6.4	13.7	2.6			6.4	16.3	22.7
CONNECTICUT	0.7		5.9	0.6	40.1	113.2	111.1	6.5	265.0	271.5
CONTOOCOOK		0.2	2.5	8.1	18.8	27.7	35.7	2.7	90.3	93.0
EXETER-SQUAMSCOTT	1.4		3.4	33.9	8.6			4.8	42.5	47.3
ISINGLASS			5.2	11.7				5.2	11.7	16.9
LAMPREY WATERSHED	0.5	5.4	20.8	39.8	19.3	14.6		26.7	73.8	100.5
MASCOMA				3.6	21.7			0.0	25.3	25.3
MERRIMACK (LOWER)							16.2	0.0	16.2	16.2
MERRIMACK (UPPER)						15.5	13.8	0.0	29.3	29.3
OYSTER	0.9	1.4	4.7	7.0				7.0	7.0	14.0
PEMIGEWASSET	1.7	0.6	3.2		16.6	31.5		5.5	48.1	53.5
PISCATAQUOG	1.1	6.1	9.4	33.3	13.5			16.5	46.8	63.4
SACO		4.1	2.4	5.0	24.0	7.8		6.4	36.9	43.3
SOUHEGAN				12.9	21.2			0.0	34.1	34.1
SWIFT	0.4	1.1	5.9	18.8				7.4	18.8	26.2
Total Miles per Order	9.6	19.3	77.7	246.1	247.6	236.7	176.8	106.6	907.2	1013.8

# SWQPA and Low-Order Streams

Of all the Designated Rivers measured in miles of river...



■ Not Exempt Orders 1 - 3

■ Not Exempt Orders 4 - 7

■ Exempt Orders 1 - 3

# Implications of Including Low-Order Streams in SWQPA



**Rivers Protection**

Permitting Workload



**Structures & Setbacks**

# Low-Order Streams are Important

Managers are becoming increasingly aware of the importance of small streams for a wide range of resource benefits.

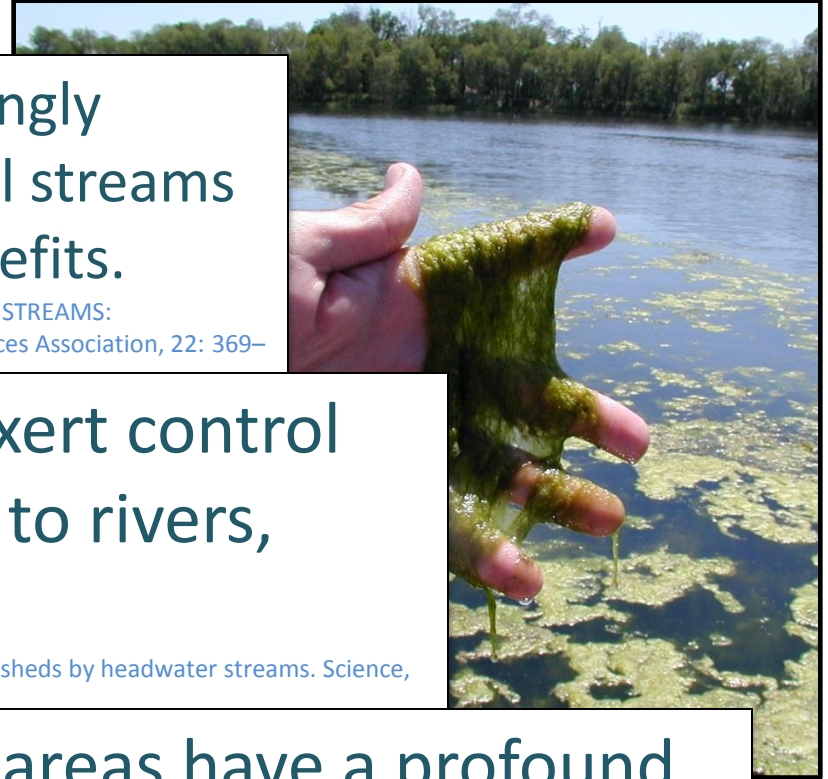
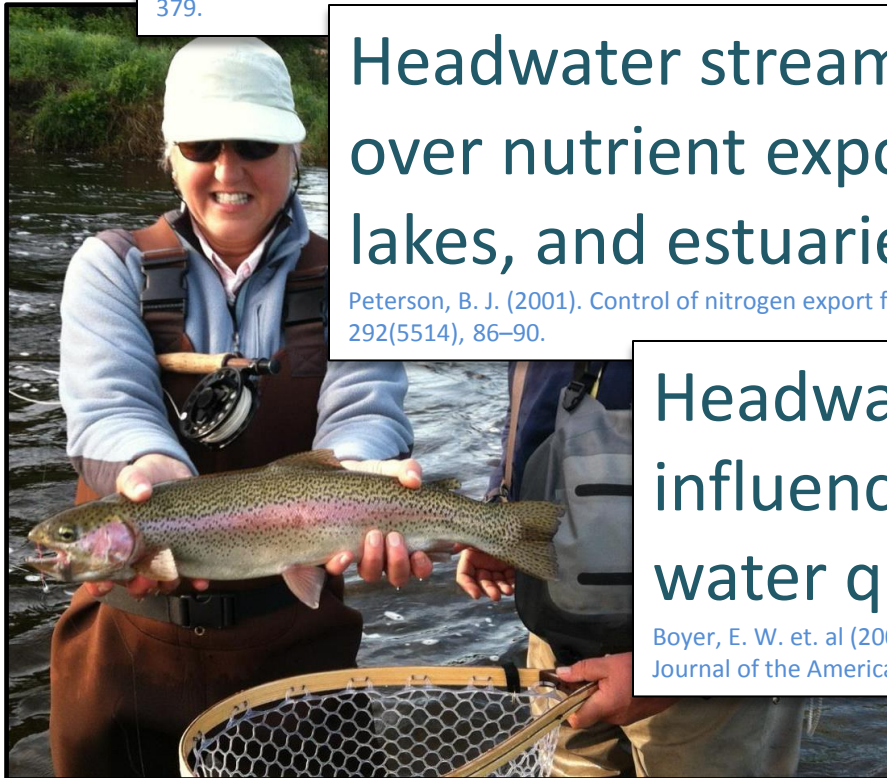
Beschta, R. L. and Platts, W. S. (1986), MORPHOLOGICAL FEATURES OF SMALL STREAMS: SIGNIFICANCE AND FUNCTION. *JAWRA Journal of the American Water Resources Association*, 22: 369–379.

Headwater streams exert control over nutrient exports to rivers, lakes, and estuaries.

Peterson, B. J. (2001). Control of nitrogen export from watersheds by headwater streams. *Science*, 292(5514), 86–90.

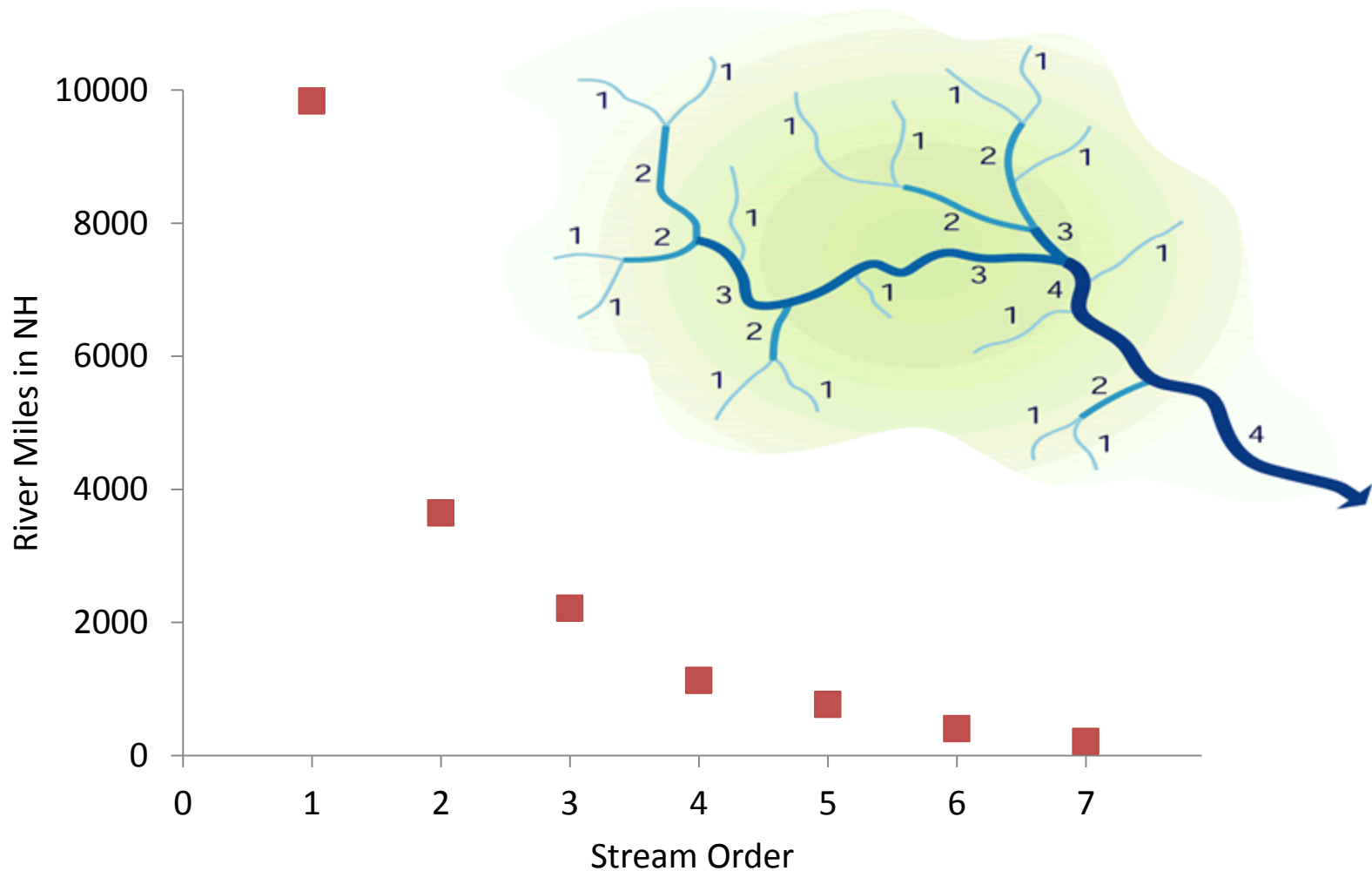
Headwater areas have a profound influence on shaping downstream water quantity and water quality.

Boyer, E. W. et. al (2007), The Role of Headwater Streams in Downstream Water Quality. *JAWRA Journal of the American Water Resources Association*, 43: 41–59.

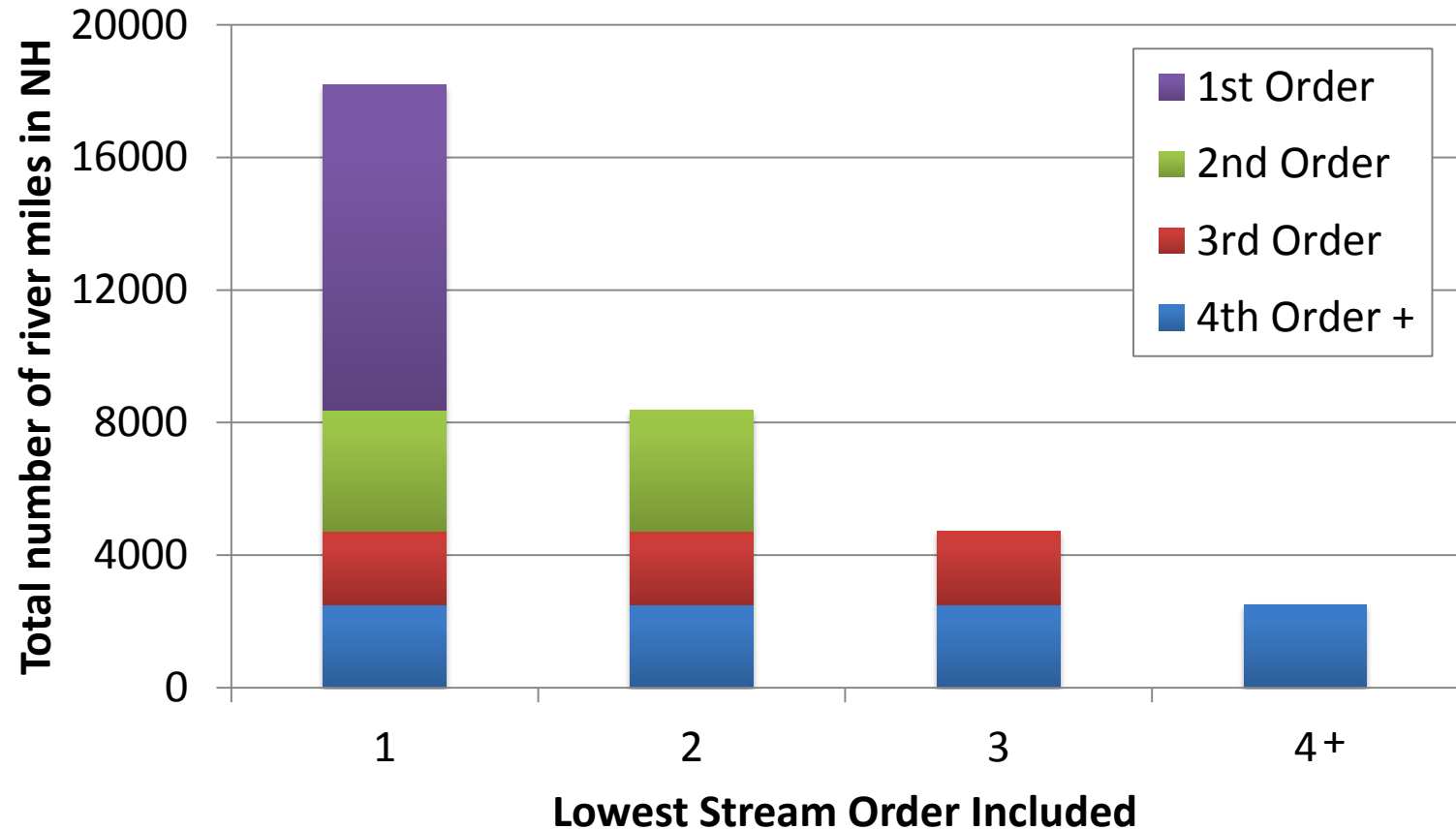


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# 85% of NH Streams are “Low-Order”



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# It's worth considering low-orders

- Including low orders could increase both protected river miles and structures within 50 foot setback exponentially
  - About **2x** with 3<sup>rd</sup>
  - About **3x** with 2<sup>nd</sup> and 3<sup>rd</sup>
  - About **5-7x** with 1<sup>st</sup>, 2<sup>nd</sup>, and 3<sup>rd</sup>
- Increase in number of structures within setback is less than increase in river miles
- Number of structures within setback is roughly equivalent to the size of the setback

Food for thought...





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**THANK YOU!**

**ANY QUESTIONS?**